Process CPU

MITSUBISHI

User's Manual

(Hardware Design, Maintenance and Inspection)

Mitsubishi Programmable Logic Controller

MELSEC-Q

Q12PHCPU
Q25PHCPU

● 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.
Note that the AnS series module will turn off the output in either of cases (a) and (b).

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

(b) The PLC CPUs self-diagnosis functions, such as the watch dog 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 latch 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.

- Securely load the memory card into the memory card loading connector. After loading, check for lifting. Lifting can cause a malfunction due to a contact fault.

- 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.
  Note that online module change can be made when the QnPHCPU is used.
  Note that there are restrictions on the modules that can be changed online and each module has a predetermined changing procedure.
  For details, refer to the section of online module change in this manual.

- 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.

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[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.
  Note that online module change can be made when the QnPHCPU is used.
  Note that there are restrictions on the modules that can be changed online and each module has a predetermined changing procedure.
  For details, refer to the section of online module change in this manual.

- Do not drop or give an impact to the battery installed 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.

[DISPOSAL PRECAUTIONS]

⚠ CAUTION

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

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REVISIONS

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

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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)
Process CPU User's Manual (Function Explanation, Program Fundamentals) This manual explains the functions, programming methods, devices and so on necessary to create programs with the Process CPU. (Sold separately)	SH-080315E (13JR56)
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)
QCPU (Q Mode)/QnACPU Programming Manual (SFC) This manual explains the system configuration, performance specifications, functions, programming, debugging, error codes and others of MELSAP3. (Sold separately)	SH-080041 (13JF60)
QCPU (Q Mode) Programming Manual (MELSAP-L) This manual describes the programming methods, specifications, functions, and so on that are necessary to create the MELSAP-L type SFC programs. (Sold separately)	SH-080076 (13JF61)
QnPHCPU Programming Manual (Process Control Instructions) This manual describes the programming procedures, device names, and other items necessary to implement PID control using process control instructions. (Sold separately)	SH-080316E (13JF67)

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How to Use This Manual

This manual is prepared for users to understand the hardware specifications of those modules such as the CPU modules, power supply modules, and base units, 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, and base units, and the performance specifications of these modules.

3) Chapters 8 to 10 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.
• Process CPU User's Manual (Function Explanation, Program Fundamentals)

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About the Generic Terms and Abbreviations

This manual uses the following general names and abbreviations in the descriptions of the Process CPU unless otherwise specified.

Generic Term/Abbreviation	Description
Process CPU	General name for Q12PHCPU, and Q25PHCPU modules.
Q Series	Abbreviation for Mitsubishi MELSEC-Q Series Programmable Logic Controller.
AnS Series	Abbreviation for small types of Mitsubishi MELSEC-A Series Programmable Logic Controller.
GX Developer	General name for GX Developer Version 7.10L or later.
Main base unit Q3□B	General name for Q33B, Q35B, Q38B, Q312B type main base unit with Process CPU, Q Series power supply module, I/O module and intelligent function module attachable.
Extension base unit	General name for Q5□B and Q6□B.
Q5□B	General name for Q52B and Q55B type extension base unit with Q Series I/O 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, I/O module and intelligent function module attachable.
Base unit	General name for Main base unit and extension base unit.
SRAM card	Abbreviation for Q2MEM-1MBS, Q2MEM-2MBS types SRAM card.
Flash card	General name for Q2MEM-2MBF and Q2MEM-4MBF types Flash card.
ATA card	General name for Q2MEM-8MBA, Q2MEM-16MBA and Q2MEM-32MBA types ATA card.
Memory card	General name for SRAM card, Flash card and ATA card.
Power supply module	General name for Q61P-A1, Q61P-A2, Q62P, Q63P and Q64P types power supply module.
Battery	General name for battery for Q6BAT type CPU module and Q2MEM-BAT type SRAM card.
Extension cable	General name for QC05B, QC06B, QC12B, QC30B, QC50B, QC100B type extension cable.

A - 19

1 OVERVIEW

This User's Manual describes the hardware specifications and handling methods of the Process CPU.
The Manual also describes those items related to the specifications of the power supply module, main base unit, extension base unit, extension cable, memory card and battery.

The Process CPU is a process control-compatible CPU module.
Based on the High Performance model QCPU, the Process CPU has the following additional instructions and functions.

- Process control instructions: 52 instructions
- Auto tuning function
- Online module change
- MELSECNET/H multiplex remote I/O system compatibility

POINT
(1) For details of the added instructions and auto tuning function, refer to the QnPHCPU Programming Manual (Process Control Instructions).
(2) For details of online module change, refer to Section 4.6 of this manual.

1 - 1

1.1 Features

Process CPU has the following new features:

(1) 52 instructions added as process control instructions
52 additional instructions are capable of high-level process control.

(2) 2-degree-of-freedom PID control system
The 2-degree-of-freedom PID control system adopted enables optimum response to both set value variation and disturbance variation.

(3) Addition of auto tuning function (PID constant initial value setting)
The auto tuning function automates control parameter adjustment, shortens adjustment, saves the labor of operators and control engineers, and resolves differences in adjustment results between individuals.

(4) Module can be changed online (online module change)
When a module fails, you can change it without stopping the system.
Online module change applies to the Q series I/O modules and to the A/D converter, D/A converter, thermocouple input and temperature control modules of function version C and later.

(5) Multiplex remote I/O system of MELSECNET/H can be configured
By mounting the remote master station of the MELSECNET/H, you can configure the multiplex remote I/O system of the MELSECNET/H.

(6) Compatibility with process-control-dedicated software package
Use of PX Developer allows PID control programs to be created easily with function blocks.
Combination with the process control software package (PX Developer) provides excellent engineering environment.

POINT

(1) For details of the added instructions and auto tuning function, refer to the QnPHCPU Programming Manual (Process Control Instructions).
(2) For details of online module change, refer to Section 4.6 of this manual.
(3) When using the Process CPU, use GX Developer Version 7.10L or later.
(4) Use PX Developer in combination with GX Developer Version 7.10L or later. Refer to the PX Developer manual for details.

(7) Controllable multiple I/O points

Process CPUs support 4096 points (X/Y0 to FFF) as the number of actual I/O points capable of getting access to the I/O module installed on the base unit. They also support 8192 points max. (X/YO to 1FFF) as the number of I/O devices which can be used in the remote I/O stations such as MELSECNET/H remote I/O NET and CC-Link data link.

(8) Lineup according to program capacity

The optimum CPU module for the program capacity to be used can be selected.
Q12PHCPU : 124k step
Q25PHCPU : 252k step

(9) Realised high speed processing

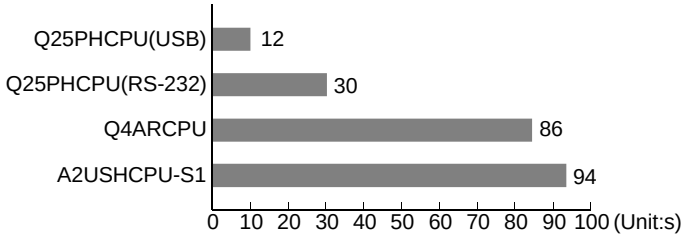
Depending on the type of the sequencer, high speed processing has been realized.(Example: when LD instruction is used)
Q12PHCPU, Q25PHCPU : 0.034μs

In addition, an access to the intelligent function module or an increase in speed of the link refresh of the network have been realized by the connection system (System bus connection) of the newly developed base unit.
Access to the intelligent function module : 20μs /word (approx. 7 times)*1
MELSECNET/H link refresh processing : 4.6ms/8k word (approx. 4.3 times)*1
*1: Where Q25PHCPU is compared with Q4ARCPU.

(10) Increase in debugging efficiency through high speed communication with GX Developer

In the Process CPU, a time required for writing/reading of a program or monitoring has been reduced through the high speed communication at a speed of 115.2kbps max. by the RS-232, and a communication time efficiency at the time of debugging has been increased.
In the Process CPU, a high speed communication at a speed of 12Mbps is allowed through the USB.

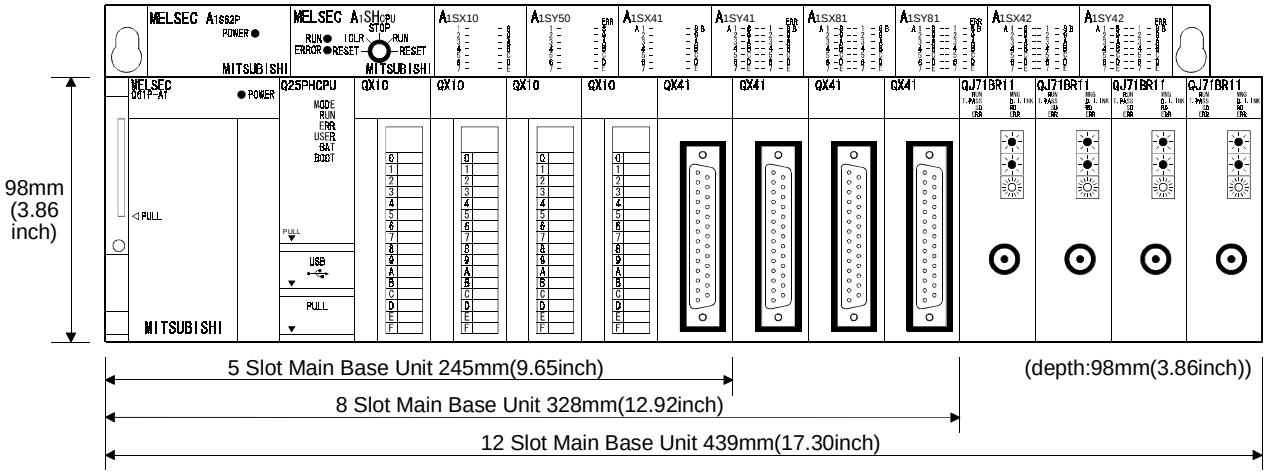
26k step program transfer time



(11) Saved space by a reduction in size

The installation space for Q series has been reduced by approx. 60 % of the space for AnS series.

Comparison of installation space



(12) Connection of up to seven extension base units.

(a) The Process CPU can connect to seven extension base units (eight base units including the main) and accept up to 64 modules.

(b) The overall distance of the extension cables is up to 13.2m to ensure high degree of extension base unit arrangement.

(13) Memory extension by memory card

The Process CPU is provided with a memory card installation connector to which a memory card of 32 Mbyte max. can be connected (32 Mbyte is available when a ATA card is used).
When a memory card of large capacity is installed, a large capacity of file can be controlled, comments to all data devices can be set up, and the programs in the past can be stored in the memory as they are in the form of the corrected histories.
If a memory card is not installed, a program can be stored onto the standard ROM built in the CPU module, and 128k points of the file registers can be handled by the standard RAM.

(14) Data can be written automatically to standard ROM

You need not use GX Developer to write parameters/programs on a memory card to the standard ROM of the Process CPU.
When the standard ROM is used to perform ROM operation, you can load a memory card into the Process CPU and write parameters/programs on the memory card to the standard ROM. Hence, you need not carry GX Developer (personal computer) to rewrite the parameters/programs.

(15) External I/O can be turned ON/OFF forcibly

If the Process CPU is in the RUN mode, you can operate GX Developer to turn external inputs/outputs ON/OFF forcibly, independently of the program execution status.
You need not put the Process CPU in the STOP mode to perform wiring/operation tests by forced ON/OFF of outputs.

(16) Remote password can be set

When access to an Ethernet module or serial communication module is made externally, whether access to the Process CPU can be made or not can be selected with a remote password.
/H to configure an MELSECNET/H remote I/O system.

REMARK

In addition to the remote password, there are the following protection facilities for the Process CPU.
(a) Protection of the whole CPU module by making system protection settings of the Process CPU
(b) Protection of the memory card by setting the write protect switch of the memory card
(c) File-by-file protection using password

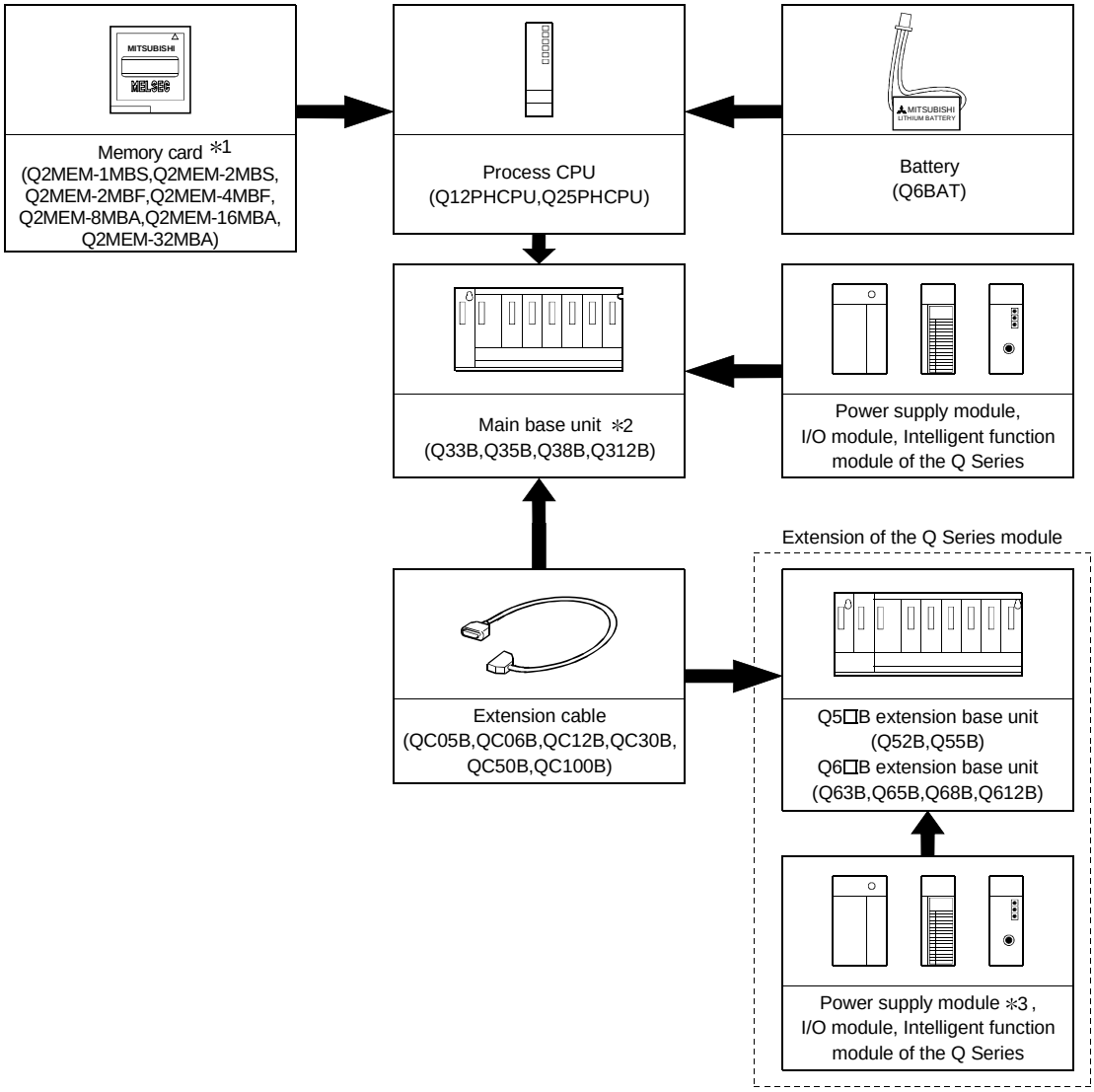
2 SYSTEM CONFIGURATION FOR SINGLE CPU SYSTEM

This section describes the system configuration of the Process CPU, cautions on use of the system, and configured equipment.

2.1 System Configuration

The outline of the equipment configuration, configuration with peripheral devices, and system configuration in the Process CPU system is described below.

(1) Equipment configuration



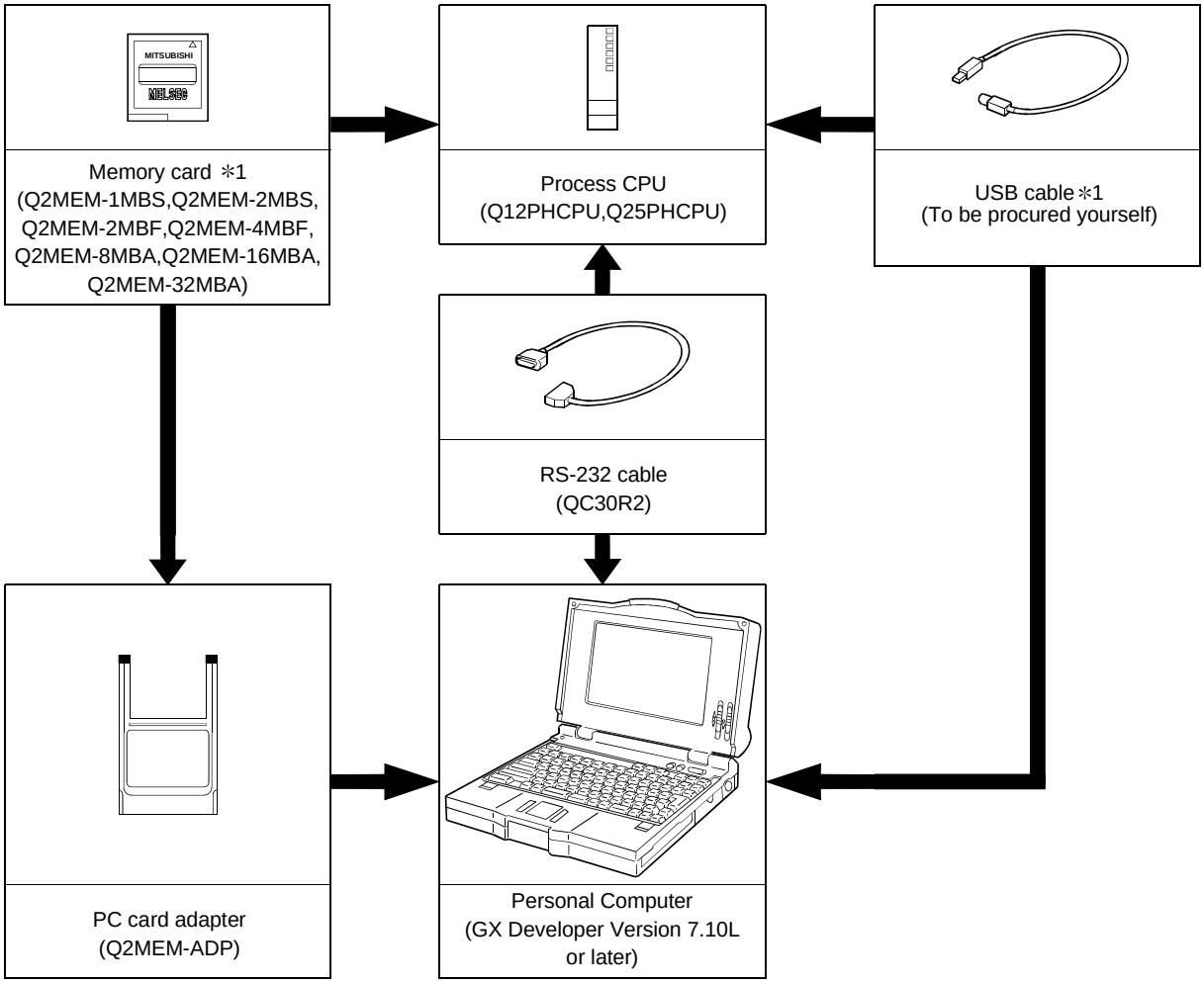
POINTS

*1: The number of memory cards to be installed is one sheet.
The memory card must be selected from SRAM card, Flash card, and ATA card according to the application and capacity.
With commercial memory cards, the Operation is not assured.

*2: The Process CPU cannot use the slim type main base unit (Q32SB, Q33SB, Q35SB).

*3: The Q series power supply module is not required for the Q5□B type extension base unit.

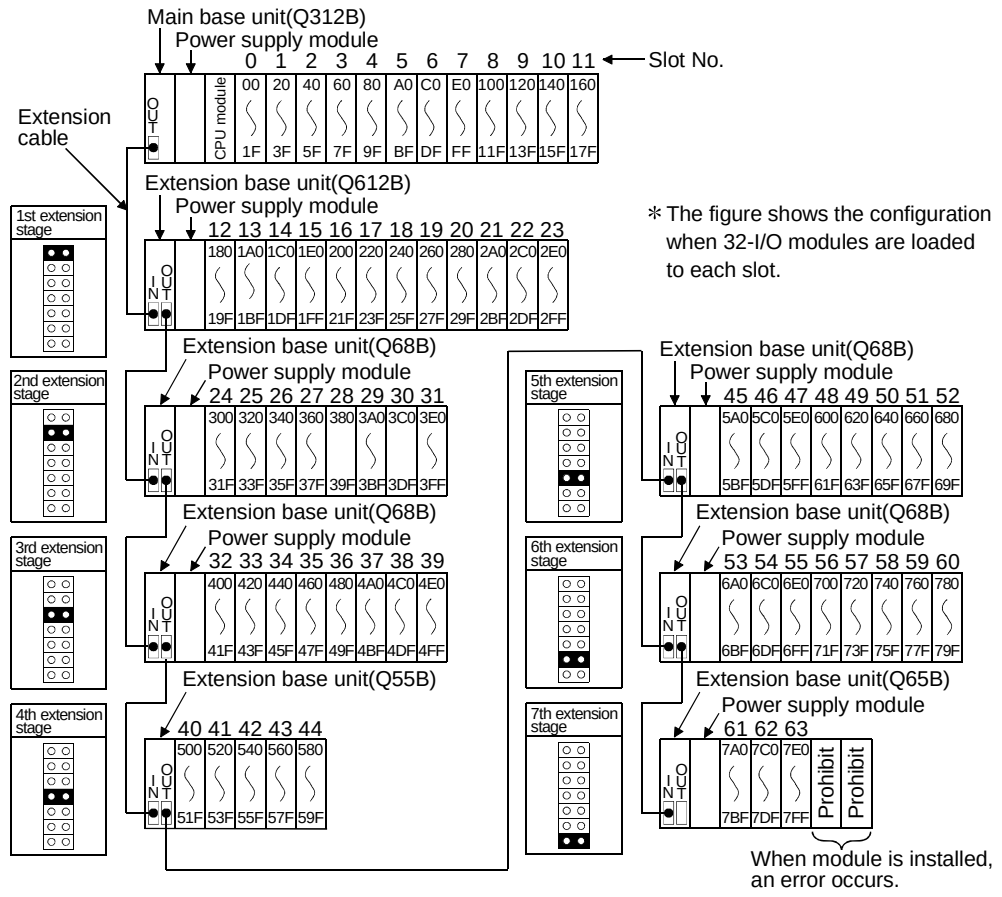
(2) Configuration of peripheral devices



∗1: For how to write to the memory card and the details of the USB cable, refer to the operating manual of the GX Developer.

2 - 2

(3) Outline of system configuration

System configuration	
Maximum number of Extension Stages	Seven Extension Stages
Maximum number of I/O modules to be installed	64 modules
Maximum number of occupied I/O points	4096
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	(1) Extension bases unit of up to seven stages can be used. (2) Do not use extension cable longer than an overall extension length of 13.2m(43.31ft.). (3) 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. (4) 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. (5) Although there are no particular restrictions in the order of the installation of the Q5□B and Q6□B, refer to Section 6.6 for usability. (6) 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. (7) If 65 or more modules are installed, an error will occur. (8) The Process CPU cannot use the slim type main base unit (Q32SB, Q33SB, Q35SB).

2.2 Precaution on System Configuration

This section describes hardware and software packages compatible with Process CPU.

(1) Hardware

(a) The Process CPU can be used with the MELSEC-Q series I/O and intelligent function modules.
It cannot be used with the MELSEC-AnS/Q2AS series I/O and special function modules.

(b) 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/10H network module	• QJ71LP21 • QJ71BR11 • QJ71LP21-25 • QJ71LP21G • QJ71LP21GE	Up to 4 inter-PLC network and remote I/O network modules in total
Q series Ethernet interface module	• QJ71E71 • QJ71E71-B2 • QJ71E71-100	Up to 4 units
Q series CC-Link system master local module	• QJ61BT11	No limit*
Interrupt module	• QI60	One unit only

*: A maximum of 4 modules if the network parameters for CC-Link are set and controlled by the GX Developer. There is no restriction in the number of modules when the parameters are set by the special-purpose instructions for the CC-Link. For details on the CC-Link System Master Local Unit that can set parameters with the special-purpose instructions, refer to the user's manual for the CC-Link Master Local module.

(c) A graphic operation terminal can be used only for the GOT900 series (Basic OS matching Q mode and communication driver must be installed).
The GOT800 series, A77GOT, and A64GOT cannot be used.

(2) Software package

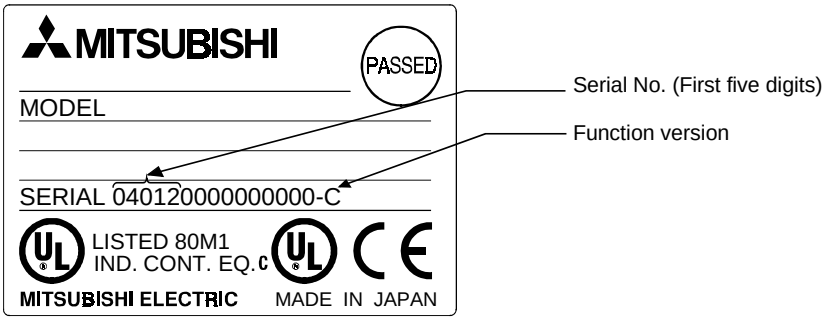
You can use GX Developer Version 7.10L or later to create the programs of the Process CPU.
Do not use GX Developer Version 7.09K or earlier.

2.3 Confirming the Serial Number and Function Version

The CPU module serial No. can be confirmed on the rated plate and GX Developer's system monitor.

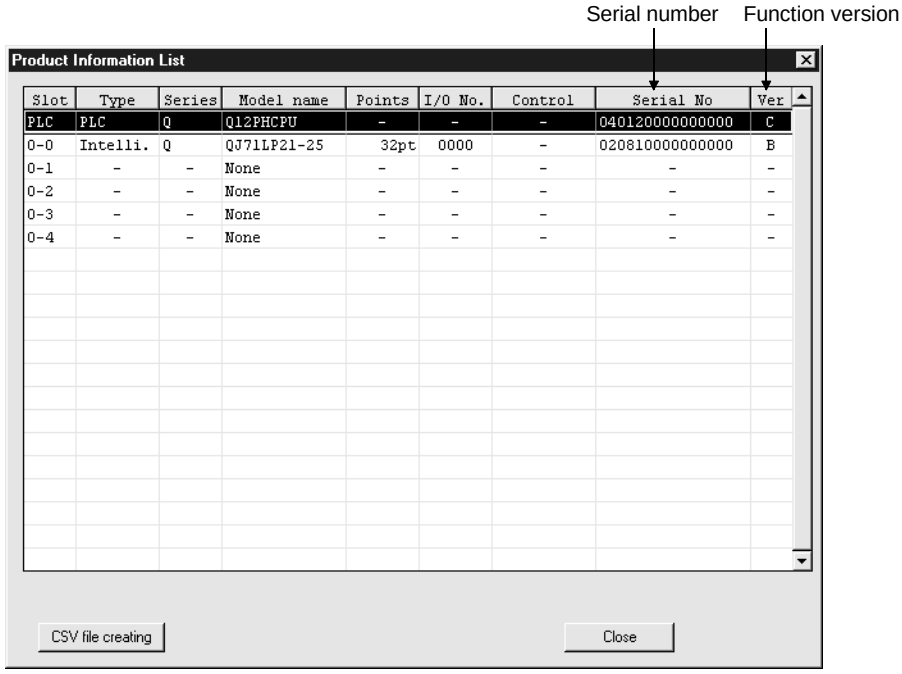
(1) Confirming the serial No. on the rated plate

The serial No. and function version can be confirmed on the rating plate.



(2) Confirming the serial No. on the system monitor (list of product information)

The CPU module serial No. and function version can be confirmed with the list of product information on the GX Developer system monitor.
Serial Nos. and function versions of the intelligent function module and CPU module can also be confirmed.



3 GENERAL SPECIFICATIONS

Performance specification of PLC is as follows:

<table>
<tr><th>Item</th><th colspan="6">Specifications</th></tr>
<tr><td>Operating ambient temperature</td><td colspan="6">0 to 55°C</td></tr>
<tr><td>Storage ambient temperature</td><td colspan="6">-25 to 75°C</td></tr>
<tr><td>Operating ambient humidity</td><td colspan="6">5 to 95%RH, non-condensing</td></tr>
<tr><td>Storage ambient humidity</td><td colspan="6">5 to 95%RH, non-condensing</td></tr>
<tr><td rowspan="5">Vibration resistance</td><td rowspan="5">Conforming to JIS B 3502, IEC 61131-2</td><td></td><td>Frequency</td><td>Acceleration</td><td>Amplitude</td><td>Sweep count</td></tr>
<tr><td rowspan="2">Under intermittent vibration</td><td>10 to 57Hz</td><td>———</td><td>0.075mm (0.003inch)</td><td rowspan="3">10 times each in X, Y, Z directions (for 80 min.)</td></tr>
<tr><td>57 to 150Hz</td><td>9.8m/s^2</td><td>———</td></tr>
<tr><td rowspan="2">Under continuous vibration</td><td>10 to 57Hz</td><td>———</td><td>0.035mm (0.001inch)</td></tr>
<tr><td>57 to 150Hz</td><td>4.9m/s^2</td><td>———</td></tr>
<tr><td>Shock resistance</td><td colspan="6">Conforming to JIS B 3502, IEC 61131-2 (147 m/s^2, 3 times in each of 3 directions X, Y, Z)</td></tr>
<tr><td>Operating ambience</td><td colspan="6">No corrosive gases</td></tr>
<tr><td>Operating altitude</td><td colspan="6">2000m (6562ft.) max.</td></tr>
<tr><td>Installation location</td><td colspan="6">Inside control panel</td></tr>
<tr><td>Overvoltage category ＊1</td><td colspan="6">II max.</td></tr>
<tr><td>Pollution level ＊2</td><td colspan="6">2 max.</td></tr>
</table>

＊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

3 - 2

4 HARDWARE SPECIFICATION OF THE CPU MODULE

4.1 Performance Specification

The table below shows the performance specifications of the CPU module.

Performance Specifications

Item			Model		Remark
			Q12PHCPU	Q25PHCPU	
Control method			Repetitive operation of stored program		——
I/O control mode			Refresh mode		Direct I/O is possible by direct I/O specification (DX□, DY□)
Programming language	Sequence control dedicated language		Relay symbol language, logic symbolic language, MELSAP3 (SFC), MELSAP-L, Function block		——
	Process control language		Process control FBD		Programming using PX Developer.
Processing speed (Sequence instruction)		LD X0	0.034 μs		——
		MOV D0 D1	0.102 μs		——
Total number of instructions			415 (excluding intelligent function module dedicated instructions)		——
Constant scan (Function for setting the scan timer to fixed settings)			0.5 to 2000 ms (configurable in increments of 0.5 ms)		Set parameter values to specify
Program ✻2 capacity	Program memory (Drive 0)		124k step	252k step	——
Memory capacity	Memory card (RAM) (Drive 1)		Capacity of loading memory cards(2Mbyte max.)		For memory capacity, see Section 7.1.
	Memory card (ROM) (Drive 2)		Installed memory card capacity (Flash card: 4 Mbyte max., ATA card: 32 Mbyte max.)		For memory capacity, see Section 7.1.
	Standard RAM (Drive 3)		256kbyte		——
	Standard ROM (Drive 4)		496 kbyte	1008 kbyte	——
	CPU shared memory ✻3		8 kbyte		——
Maximum number of stored files	Program memory		124	252 ✻1	——
	Memory card (RAM)		256		——
	Memory card (ROM)	Flash card	288		——
		ATA card	512		——
	Standard RAM		2		Only one file register and one local device
	Standard ROM		124	252	——
Standard ROM number of writings			Max. 100000 times		——

✻1: 124 is the maximum number of programs that can be executed on Process CPU.
125 or more programs are not available.

✻2: The maximum number of sequence steps (for one program) for which the parameters are stored in another drive and executed with the Process CPU can be calculated with the following expression.
(Program size) - (File header size (default: 34 steps))
Refer to the Process CPU User's Manual (Function Explanation, Program Fundamentals) for details on the program size and file.

✻3: The CPU shared memory is not latched. The CPU shared memory is cleared when the power is turned on to the PLC or when the CPU module is reset.

Performance Specifications (continued)

Item			Model		Remark
			Q12PHCPU	Q25PHCPU	
Number of I/O devices points			8192 points (X/Y0 to 1FFF)		Number of devices usable on program
Number of occupied I/O points			4096 points (X/Y0 to FFF)		Number of points accesible to actual I/O modules
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 8192 points (L0 to 8191)		
	Link relay [B]		Default 8192 points (B0 to 1FFF)		
	Timer [T]		Default 2048 points (T0 to 2047) (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(for low / high speed retentive timer) Switchover between the low / high speed retentive timer is set by instructions. The measurement unit of the low / 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 1024 points (C0 to 1023) • Interrupt counter maximum 256 points (default 0 point, set with parameters)		
	Data register [D]		Default 12288 points (D0 to 12287)		
	Link register [W]		Default 8192 points (W0 to 1FFF)		
	Annunciator [F]		Default 2048 points (F0 to 2047)		
	Edge relay [V]		Default 2048 points (V0 to 2047)		
	File register	[R]	• When standard RAM is used: 32768 points (R0 to 32767) • When SRAM card (2M byte) is used: Up to 1041408 points are available by changing block assignment in increments of 32768 points (R0 to 32767). • When Flash card (2M byte) is used: Up to 1041408 points are available by changing block assignment in increments of 32768 points (R0 to 32767). • When Flash card (4M byte) is used: Up to 1042432 points are available by changing block assignment in increments of 32768 points (R0 to 32767).		When a Flash card is used, read only is possible. The ATA card cannot be used.
		[ZR]	• When standard RAM is used: 32768 points (ZR0 to 32767) • When SRAM card (2M byte) is used: 1041408 points (ZR0 to 1041407), no need to change block assignment. • When Flash card (2M byte) is used: 1041408 points (ZR0 to 1041407), no need to change block assignment. • When Flash card (4M byte) is used: 1042432 points (ZR0 to 1042431), no need to change block assignment.		

4 - 2

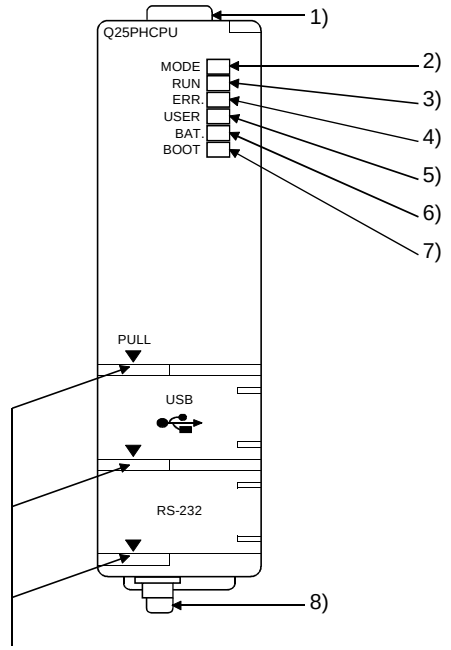
Performance Specifications (continued)

Item		Model		Remark
		Q12PHCPU	Q25PHCPU	
Number of device points	Special link relay [SB]	2048 points (SB0 to 7FF)		The number of device points is fixed.
	Special link register [SW]	2048 points (SW0 to 7FF)		
	Step relay [S]	8192 points (S0 to 8191)		
	Index register [Z]	16 points (Z0 to 15)		
	Pointer [P]	4096 points (P0 to 4095), set parameter values to select usable range of in-file pointer / shared pointers.		
	Interrupt pointer [I]	256 points (I0 to 255) 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]	2048 points (SM0 to 2047)		
	Special register [SD]	2048 points (SD0 to 2047)		
	Function input [FX]	16 points (FX0 to F)		
	Function output [FY]	16 points (FY0 to F)		
	Function register[FD]	5 points (FD0 to 4)		
Link direct device		Device having a direct access to link device. MELSECNET/10(H) use only. Specified form : J□□\X□□, J□□\Y□□, J□□\W□□, J□□\B□□, J□□\SW□□, J□□\SB□□		——
Intelligent function module device		Device having a direct access to the buffer memory of the intelligent function module. Specified form : U□□\G□□		——
Latch (power failure compensation) range		L0 to 8191 (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 1FFF, respectively.		
Clock function		Year, month, day, hour, minute, second, day of the week (leap year automatic distinction) Accuracy -3.18 to +5.25s (TYP. +2.12s) /d at 0°C Accuracy -3.93 to +5.25s(TYP. +1.90s)/d at 25°C Accuracy -14.69 to +3.53s(TYP. -3.67s)/d at 55°C		——
Allowable momentary power failure period		Varies according to the type of power supply module.		——
5VDC internal current consumption		0.64A		——
External dimensions	H	98mm (3.86inch)		——
	W	27.4mm (1.08inch)		——
	D	89.3mm (3.52inch)		——
Weight		0.20kg		——

4.2 Part Names and Settings

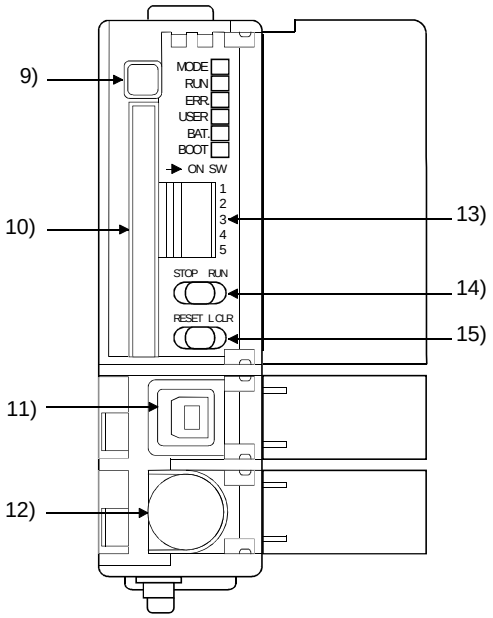
This section explains the part names and settings of the module.

Front face

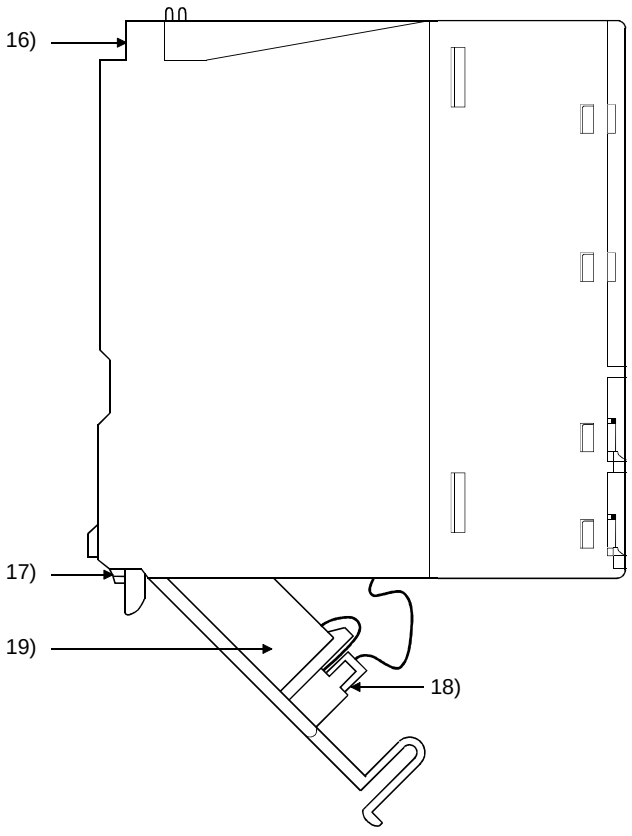


When opening the front cover, put your finger here.

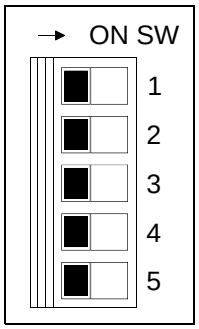
With front cover open



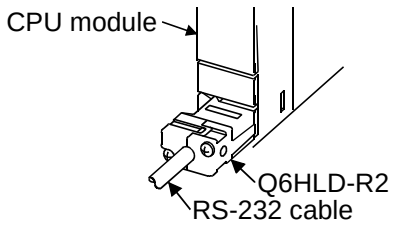
Side face



No.	Name	Application
1)	Module fixing hook	Hook used to fix the module to the base unit. (Single-motion installation)
2)	"Mode" LED	Indicates the mode of the CPU module. ON (green) : Q mode Flicker (green) : Enforced ON/OFF for external I/O registered
3)	"RUN" LED	Indicates the operating status of the CPU module. ON : During operation in "RUN" status. OFF : During a stop in "STOP" status or detection of error whose occurrence stops operation. Flicker : When parameter/program is written at STOP and RUN/STOP switch is changed from "STOP" to "RUN". To turn ON the RUN LED after writing the program, carry out the following steps. • Set the RUN/STOP switch from "RUN" → "STOP" → "RUN". • Reset with the RESET/L.CLR switch. • Restart the PLC power. To turn ON the RUN LED after writing the parameters, carry out the following steps. • Reset with the RESET/L.CLR switch. • Restart the PLC power. (If the RUN/STOP switch is set from "RUN" → "STOP" → "RUN" after changing the parameters, the parameters related to the intelligent function module, such as the network parameters, will not be reflected.)
4)	"ERR." LED	ON : Detection of self-diagnostic error which will not stop operation, except battery error. (When operation continued at error detection is set in the parameter) OFF : Normal Flicker : Detection of error whose occurrence stops operation. When automatic write to standard ROM is completed normally. ("BOOT" LED also flickers.)
5)	"USER" LED	ON : Error detected by CHK instruction or annunciator ON OFF : Normal Flicker : Execution of latch clear
6)	"BAT." LED	ON : Occurrence of battery error due to reduction in battery voltages of CPU module or memory card. OFF : Normal
7)	"BOOT" LED	ON : Start of boot operation OFF : Non-execution of boot operation Flicker : When automatic write to standard ROM is completed normally. ("ERR." LED also flickers.)
8)	Module loading lever	Used to load the module to the base unit.

<table>
<tr><th>No.</th><th>Name</th><th>Application</th></tr>
<tr><td>9)</td><td>Memory card EJECT button</td><td>Used to eject the memory card from the CPU module.</td></tr>
<tr><td>10)</td><td>Memory card loading connector</td><td>Connector used to load the memory card to the CPU module.</td></tr>
<tr><td>11)</td><td>USB connector ∗1</td><td>Connector for connection with USB-compatible peripheral device. (Connector type B)
Can be connected by USB-dedicated cable.</td></tr>
<tr><td>12)</td><td>RS-232 connector ∗1</td><td>Connector for RS-232 connection
Can be connected by RS-232 connection cable (QC30R2).</td></tr>
<tr><td rowspan="4">13)</td><td rowspan="4">DIP switches
 
</td><td>Used to set the items for operation of the CPU module.
For system protection and parameter-valid drive functions, refer to the Process CPU User's Manual (Function Explanation, Program Fundamentals).</td></tr>
<tr><td>SW1 : Used to set system protection. Batch-inhibits write and control directives to the CPU module. (Shipped in OFF position)
OFF : No protection
ON : Protection</td></tr>
<tr><td>SW2, SW3: Used to specify parameter-valid drive.
(Both SW2 and SW3 are shipped in OFF position)
<table>
<tr><th>SW2</th><th>SW3</th><th>Parameter Drive</th></tr>
<tr><td>OFF</td><td>OFF</td><td>Program memory (Drive 0)</td></tr>
<tr><td>ON</td><td>OFF</td><td>SRAM card (Drive 1)</td></tr>
<tr><td>OFF</td><td>ON</td><td>Flash card/ATA card (Drive 2)</td></tr>
<tr><td>ON</td><td>ON</td><td>Standard ROM (Drive 4)</td></tr>
</table>
Note: Parameters cannot be stored in standard RAM (Drive 3).</td></tr>
<tr><td>SW4 : Must not be used. Normally OFF. (Shipped in OFF position)</td></tr>
<tr><td>SW5 : Must not be used. Normally OFF. (Shipped in OFF position)</td></tr>
<tr><td>14)</td><td>RUN/STOP switch</td><td>RUN : Executes sequence program operation.
STOP : Stops sequence program operation.</td></tr>
<tr><td>15)</td><td>RESET/L.CLR switch</td><td>RESET : Used to perform hardware reset, operation fault rest, operation initialization, etc.
If this switch is left in the RESET position, the whole system will be reset and the system will not operate properly.
After performing reset, always return this switch to the neutral position.
L.CLR : Used to turn "OFF" or "zero" all data in the parameter-set latch area.
Used to clear the sampling trace and status latch registration.</td></tr>
<tr><td>16)</td><td>Module fixing screw hole</td><td>Hole for the screw used to fix to the base unit. (M3 × 12 screw)</td></tr>
<tr><td>17)</td><td>Module fixing latch</td><td>Hook used to fix to the base unit.</td></tr>
<tr><td>18)</td><td>Battery connector pin</td><td>For connection of battery lead wires.
(When shipped from the factory, the lead wires are disconnected from the connector to prevent the battery from consuming.)</td></tr>
<tr><td>19)</td><td>Battery</td><td>Backup battery for use of program memory, standard RAM and power failure compensation function.</td></tr>
</table>

∗1 : When normally connecting a cable to the USB connector or RS-232 connector, clamp the cable to prevent it from coming off due to the dangling, moving or carelessly pulling of the cable.
Q6HLD-R2 type RS-232 Connector Disconnection Prevention Holder is available as a clamp for RS-232 connector.



4.3 Switch Operation After Writing in Program

When writing a program into the CPU module, do not turn off the system protect set switch SW1 in advance (When the switch is turned off, the system will not be protected).

(1) When a program is written while CPU module is stopped:

When a program is written while the CPU module is stopped, operate the switch in the order shown below.

1) RUN / STOP switch : STOP
"RUN" LED: Turns off CPU module in stop status → Write a program.

2) RESET / L.CLR switch : Tilt this switch to RESET once, and return it to the original center position.

3) RUN / STOP switch : STOP → RUN
"RUN" LED: Turns on CPU module in running status

(2) When a program is written while CPU module is running.

When a program is written while the CPU module is running, the switch need not be operated.

POINTS

(1) Even if the RUN/STOP switch is set to RUN immediately after a program is written when the CPU module is in the stop status, CPU module will not come into RUN status.
When the CPU module is reset with the RESET / L.CLR switch and the RUN/STOP switch is set to RUN after a program has been written, the CPU module can be brought into RUN status.

(2) If the CPU module is desired to be brought into RUN status without resetting it, operate the RUN/STOP switch from STOP to RUN, RUN to STOP, and STOP to RUN in that order.
After the seconds STOP to RUN switch operation, the CPU module is brought into RUN status.

(3) When a program is written while the CPU module is running in boot operation, the program written during the running is written into the program memory.
After a program has been written while the CPU module is running, write the program also into the boot original memory. Failure to write a program into the boot original memory will run an old program at the time of the next boot operation.
(For details of the boot operation, see Process CPU User's Manual (Function Explanation, Program Fundamentals)).

4.4 Latch Clear Operation

To perform latch clear, operate the RESET/L.CLR switch in the following procedure.

1) RUN/STOP switch : STOP

2) RESET/L.CLR switch : Move the switch to L.CLR several times until the USER LED flickers.
"USER" LED: Flicker Ready for latch clear.

3) RESET/L.CLR switch : Move the switch to L.CLR once more.
"USER" LED: OFF Latch clear complete.

POINTS

(1) The ineffective range for latch clear can be set for each device by the device setting parameter.

(2) In addition to the way of using the RESET/L.CLR switch for latch clear, remote latch clear may be performed from GX Developer.
For details of the remote latch clear operation using GX Developer, refer to the Process CPU User's Manual (Function Explanation, Program Fundamentals).

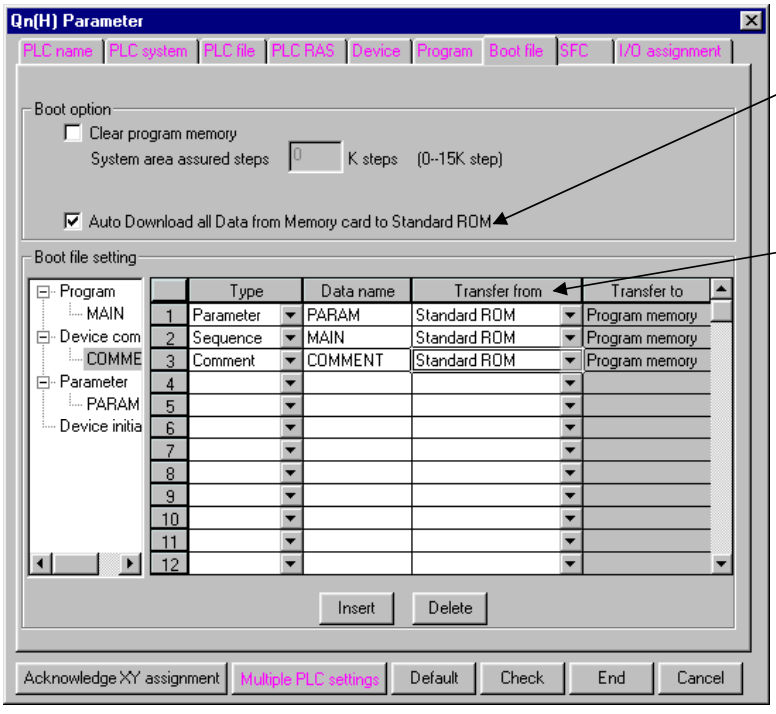
4.5 Executing Automatic Write to Standard ROM

(1) Order of execution for automatic write to standard ROM

Automatic write to the standard ROM is carried out with the following procedures.

(a) Operation with GX Developer (setting automatic write to standard ROM)

1) Check the "Auto Download all Data from Memory card to Standard ROM" item in the PLC parameter boot file setting.
Set the parameter and program to be booted at the "Boot file setting" section.
(Set the "Transfer from" to the "Standard ROM".)



Check "Auto Download all Data from Memory card to Standard ROM ".

Set the "Transfer from" to "Standard ROM".

2) Store the set parameters and programs to be booted in the memory card.

(b) Operations with CPU module (automatic write to standard ROM)

1) Switch OFF the power supply to the PLC.

2) Mount the memory card that contains the parameters and programs to be booted onto the CPU module.

3) Set the parameter's valid drive in the mounted memory card with the CPU module's dip switches.
   • When a SRAM card is mounted ･･･ SW2 : ON, SW3 : OFF
   • When a Flash card /ATA card is mounted ･･･ SW2 : OFF, SW3 : ON

4) Switch ON the power supply to the PLC.

5) "BOOT" LED will flicker when automatic write to standard ROM has been completed, and the CPU module will assume a suspension error status.

6) Switch OFF the power supply to the PLC.

7) Remove the memory card, and then set the parameter's valid drive in the standard ROM with the CPU module's dip switches.
   • Standard ROM ･･･ SW2 : ON, SW3 : ON

(c) The parameters and programs will be booted from the standard ROM to the program memory when the PLC is switched on to enable actual operations.

4.6 Online Module Change

Online module change is a function to change the Q Series module mounted on the main or extension base unit during control of the PLC system.
If a module fails during control, it can be changed to the same type module by using this function.

POINT

(1) An online module change does not add a module or change it for a module of another type.
(2) To perform an online module change using a Process CPU in a multiple CPU system, "Enable online module change for other CPU" must be selected in the multiple CPU setting dialog box on the PLC parameter screen.
There are restrictions on the versions of the CPU modules that configure a multiple CPU system. For details, refer to the Process CPU User's Manual (Function Explanation, Program Fundamentals).
(3) Perform an online module change after making sure that the system outside the PLC will not malfunction.
(4) It is necessary to turn OFF the external power for the module changed online to prevent an electric shock or like.

(1) Conditions for performing online module change

An online module change is available under the following conditions.

(a) Online changeable modules

The following table indicates online changeable modules.

Module Type		Restriction
Input module		No restrictions
Output module		
I/O mixed module		
Intelligent function module	Analog-digital converter module	Supported by function version "C"
	Digital-analog converter module	
	Temperature input module	
	Temperature control module	

The other modules cannot be changed online.
For whether the above intelligent function modules can be changed online or not and their changing procedures, refer to the manuals of the intelligent function modules used.

(b) GX Developer that enables online module change

GX Developer Version 7.10L or later is necessary for online module change.
An online module change is available from GX Developer via a network.

(c) Base unit that enables online module change

1) For an online module change, use the main base and Q6□B extension base.
The module installed on the main base or Q6□B extension base is not available for online change.

2) The module installed on the Q5□B extension base is not available for online change.
When the Q5□B is in use, the module installed on the main base is not available for online change.

(d) Control status of CPU module

1) An online module change is available when there is no stop error.
The following table indicates whether an online module change is available depending on the control status of the CPU module.

Control Status	RUN Status ∗1	STOP Status	PAUSE Status	At Stop Error
Online module change	Enabled	Enabled	Enabled	Disabled

∗1: This includes a RUN status at the occurrence of a continuation error.

2) An online module change can be continued if the control status of the CPU module is changed to STOP/PAUSE during the online module change.
In either of the following cases, however, the online module change cannot be continued.
• The CPU module was reset.
• A stop error occurred.

(e) Number of modules that can be changed online

The number of modules that can be changed online at one time is one per CPU module.
You cannot change two or more modules at the same time.

(2) Restrictions during online module change

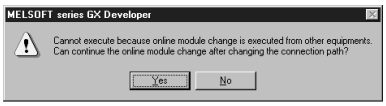
The following operations fail an online module change.

(a) One CPU module gets the online module change orders from multipe GX Developer at the same time. (Requests from multiple GX Developers are made of one CPU module for an online module change.)

(b) Parameters are written to the CPU module during an online module change.

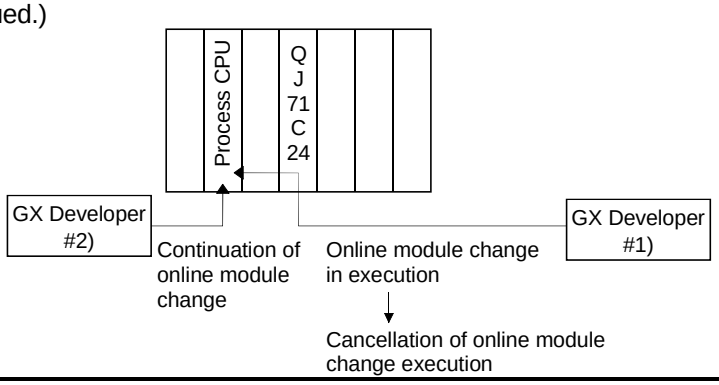
POINT

The following message will appear in case one CPU module gets the online module change orders from multipe GX Developer at the same time. .
After confirming the message, choose "Yes" or "No".



• When you selected "Yes"
Operation for an online module change is switched to that of GX Developer #2) that request later. (Operation is continued from the pre-switching status.)

• When you selected "No"
Operation for an online module change (GX Developer #2)) requested later is suspended. (The online module change (GX Developer #1)) already in execution is continued.)



4 - 12

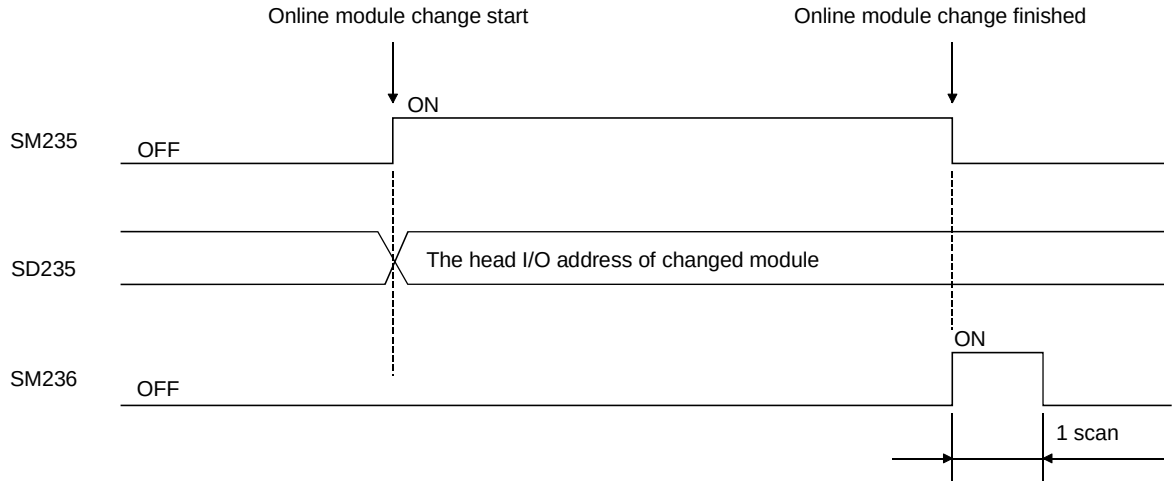
(3) Special relays and special registers related to online module change

Indication for online module change is stored into the special relays (SM235, SM236) and special register (SD235).

By monitoring SM235, SM236 and SD235, shows the status for online module change.

- SM235: Online module change flag (Holds ON during online module change.)
- SM236: Flag that turns ON only one scan after online module change (Turns ON only one scan after the online module change finished.)
- SD235: Module being changed online (The head I/O address of module being changed online / 10H is stored.)

Refer to Section 11.6 for details of SM235 and SM236, and Section 11.7 for details of SD235.



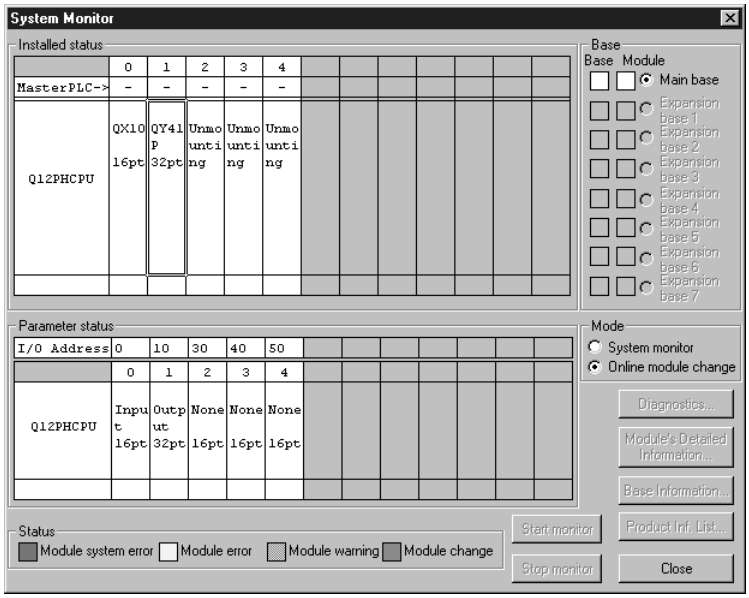
(4) Online module change procedure

The online module change procedure for an I/O module is explained here.
Please refer to the intelligent function module's manual about its online module change procedure.

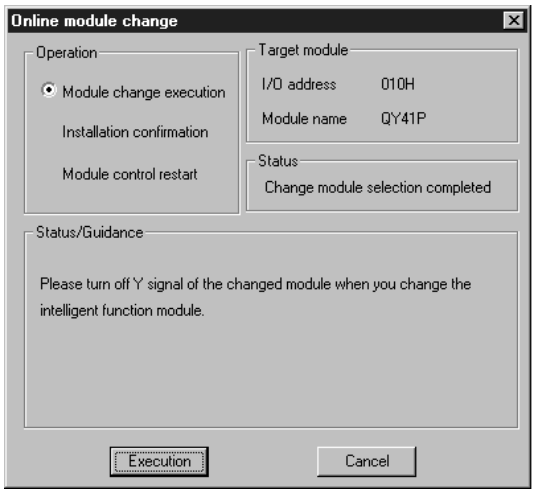
POINT

It is recommended to turn OFF the output (Y) from the output or I/O mixed module before its on line change.

(a) Click [Diagnosis] - [Online module change] on GX Developer to select the "Online module change" mode.

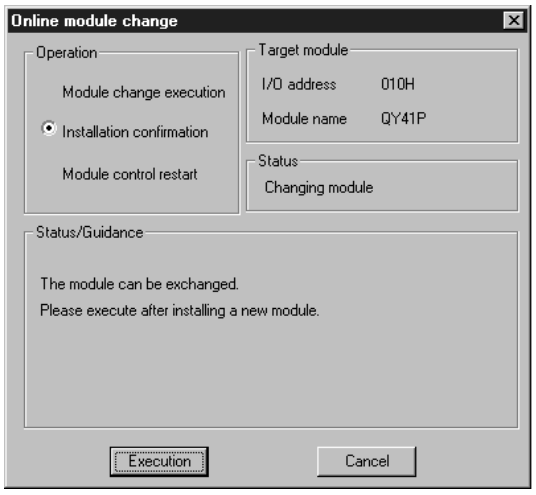


(b) Double-click the module to be changed online to display the Online module change screen.
(The following table indicates the status of communication with the module changed online when the following screen is being displayed.)



Target Module, Item	Executed/ Not Executed
Input module refresh	Executed
Output module refresh	Executed
I/O mixed module	
Input refresh	Executed
Output refresh	Executed
Intelligent function module	
Input refresh	Executed
Output refresh	Executed
FROM/TO instruction	Executed
Instruction using intelligent function module device	Executed
instruction dedicated for Intelligent function module	Executed
automatic refresh of intelligent function module	Executed
Buffer memory batch monitor	Executed

(c) Click the [Execution] button to enable a module change.
(The following table indicates the status of communication with the module changed online when the following screen is being displayed.)

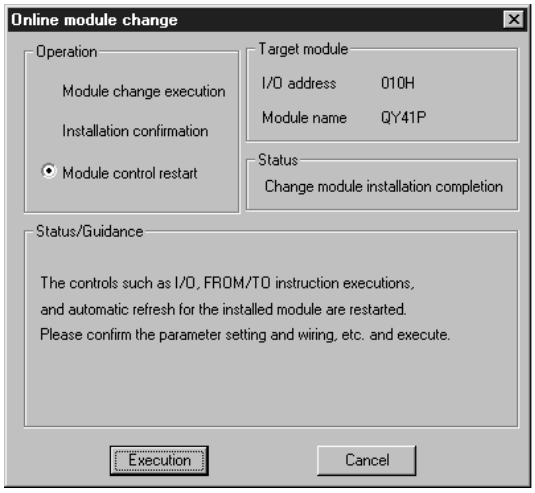


Target Module, Item	Executed/ Not Executed
Input module refresh	Not executed (Data is held)
Output module refresh	Not executed
I/O mixed module	
Input refresh	Not executed (Data is held)
Output refresh	Not executed
Intelligent function module	
Input refresh	Not executed
Output refresh	Not executed
FROM/TO instruction	No processing
Instruction using intelligent function module device	No processing
instruction dedicated for Intelligent function module	No processing
automatic refresh of intelligent function module	No processing
Buffer memory batch monitor	Communication error

(d) Disconnect the external wiring and dismount the module.
Refer to Section 9.3.3 for module dismounting.

(e) Mount a new module to the same slot and connect the external wiring.
Refer to Section 9.3.3 for module mounting.

(f) After mounting the module, click the "Execution" button.
(The following table indicates the status of communication with the module changed online when the following screen is being displayed.)



Target Module, Item	Executed/ Not Executed
Input module refresh	Not executed (Data is held)
Output module refresh	Not executed
I/O mixed module	
Input refresh	Not executed (Data is held)
Output refresh	Not executed
Intelligent function module	
Input refresh	Executed
Output refresh	Executed
FROM/TO instruction	No processing
Instruction using intelligent function module device	No processing
instruction dedicated for Intelligent function module	No processing
automatic refresh of intelligent function module	No processing
Buffer memory batch monitor	Communication error

*: If the initial settings of the intelligent function module have been made using GX Configurator, the preset data are written to the intelligent function module.

(g) Click the "Execution" button to start control.

(h) The "Online module change completed" screen appears.
(The following table indicates the status of communication with the module changed onlinely, when the following screen is displayed.)

Target Module, Item	Executed/ Not Executed
Input module refresh	Executed
Output module refresh	Executed
I/O mixed module	
Input refresh	Executed
Output refresh	Executed
Intelligent function module	
Input refresh	Executed
Output refresh	Executed
FROM/TO instruction	Executed
Instruction using intelligent function module device	Executed
instruction dedicated for Intelligent function module	Executed
automatic refresh of intelligent function module	Executed
Buffer memory batch monitor	Executed

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% (85 to 132VAC)	200 to 240VAC +10% -15% (170 to 264VAC)	100 to 240VAC +10% -15% (85 to 264VAC)	24VDC +30% -35% (15.6 to 31.2VDC)
Input frequency		50/60Hz ±5%			——
Input voltage distortion factor		Within 5% (See, section 5.1.3)			——
Max. input apparent power		105VA			——
Max. input power		——			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 10MΩ or more by insulation resistance tester			10MΩ or more by insulation resistance tester
Noise immunity		• By noise simulator of 1500Vp-p noise voltage, 1 μs noise width and 25 to 60Hz noise frequency • Noise voltage IEC61000-4-4, 2kV			By noise simulator of 500Vp-p noise voltage, 1 μs 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^2			
Applicable crimping terminal		RAV1.25 to 3.5, RAV2 to 3.5			
Applicable tightening torque		66 to 89N•cm			
External dimensions	H	98mm (3.86inch)			
	W	55.2mm (2.33inch)			
	D	90mm (3.55inch)			
Weight		0.31kg		0.39kg	0.33kg

Power Supply Module Specifications (Continued)

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 +10% -15% (85V to 132VAC/170 to 264VAC)
Input frequency		50/60Hz ±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 or more
	24VDC	——
Overvoltage protection*2	5VDC	5.5 to 6.5V
	24VDC	——
Efficiency		70% or more
Allowable momentary power failure period*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 10MΩ or more by insulation resistance tester
Noise durability		• By noise simulator of 1500Vp-p noise voltage, 1 μs noise width and 25 to 60Hz noise frequency • Noise voltage IEC61000-4-4, 2kV
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^2
Applicable solderless terminal		RAV1.25 to 3.5, RAV2 to 3.5
Applicable tightening torque		66 to 89N•cm
External dimensions	H	98mm (3.86inch)
	W	55.2mm (2.33inch)
	D	115mm (4.53inch)
Weight		0.40kg

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 unlit or 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 lasting less than 20ms will cause AC down to be detected, but operation will continue.
- An instantaneous power failure lasting more than 20ms may cause the operation to continue or initial start to take place depending on the power supply load.
  Furthermore, by using the same AC power supply for the AC input module and the power supply module, it is possible to prevent the sensor, to which the AC input module is connected, from turning OFF when it is ON when the power is turned OFF.
  However, if only the AC input module is connected to the AC line, which is connected to the power suppludetection of the AC down for the power supply module may be delayed by the capacitor in the AC input module. Thus, connect a load of approx. 30mA per QX10 unit to the AC line.

(2) For DC input power supply

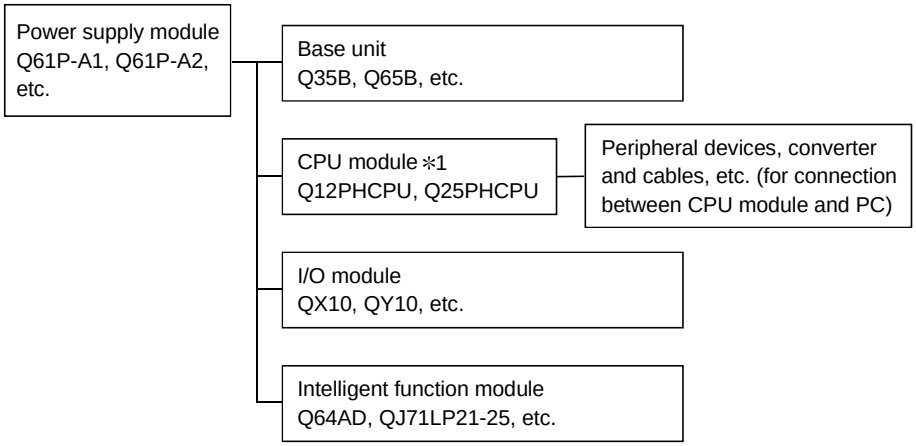
- An instantaneous power failure lasting less than 10ms (*4) will cause 24VDC down to be detected, but operation will continue.
- An instantaneous power failure lasting more than 10ms (*4) may cause the operation to continue or initial start to take place depending on the power supply load.

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

5.1.2 Selecting the power supply module

The power supply module is selected according to the total of current consumption of the base units, I/O modules and intelligent function module, supplied by its 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 I/O modules, intelligent function module, special function module, and peripheral devices, see the User's Manuals of their respective modules.
For devices obtained by a user, see the manual for the respective device.

(1) When the base unit is of Q3□B or Q6□B:



*1: The CPU module is loaded on the Q3□B main base unit.

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

Using the Q52B or Q55B supplies 5VDC power from the power supply module of 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 Guideline for Use of Extension Base Units.

(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.

5.1.3 Precaution when connecting the uninterruptive power supply

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

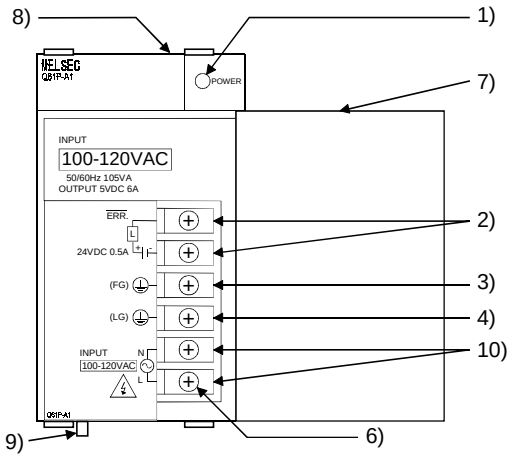
Use a UPS which employs the constant inverter power supply method with 5 % or less voltage fluctuation.

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

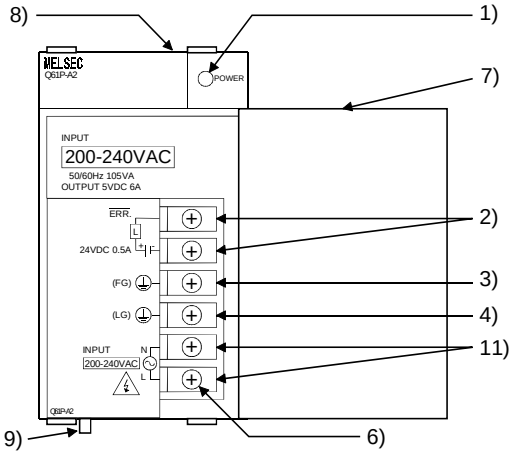
5.2 Names of Parts and Settings

The names of the parts of each power supply module are described below.

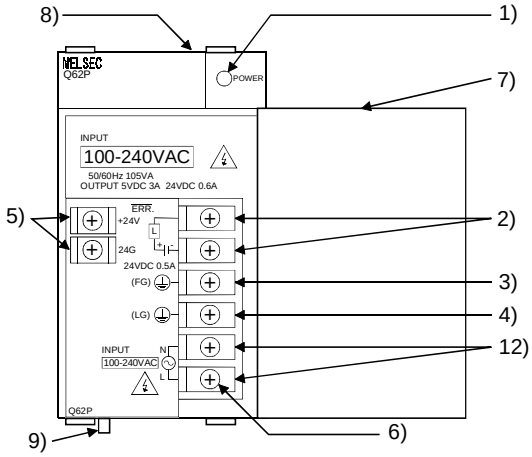
(1) Q61P-A1, Q61P-A2, Q62P, Q63P, Q64P



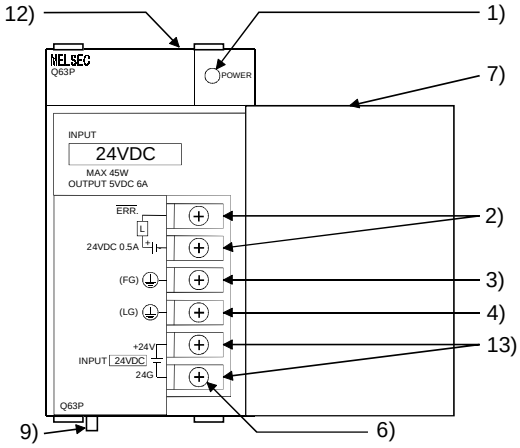
Q61P-A1



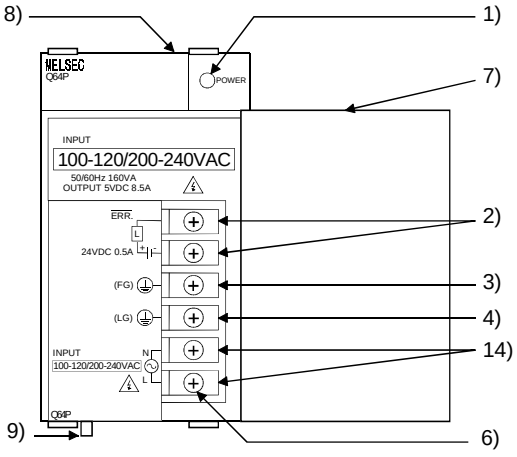
Q61P-A2



Q62P



Q63P



Q64P

No.	Name	Application
1)	POWER LED	5VDC power indicator LED
2)	$\overline{\text{ERR}}$ terminals	1) Turned ON when the whole system operates normally. 2) Turned OFF (opened) when a stop error occurs in the CPU module. 3) In a multiple CPU system configuration, turned OFF when a stop error occurs in any of the CPU modules. 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. The potential of Q61P-A1, Q61P-A2, Q64P and Q62P terminal is 1/2 of the input voltage
5)	+24V, 24G terminals	Used to supply 24VDC power to inside the output module (using external wiring).
6)	Terminal screw	M3.5 × 7 screw
7)	Terminal cover	Protective cover of the terminal block
8)	Module fixing screw hole	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 24VAC 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 supply module causes trouble.
Q61P-A2	Power supply module does not cause trouble. CPU module cannot be operated.	Operates normally.

(2) Q64P automatically switches the input range 100/200VAC.
Therefore, it is not compatible with the intermediate voltage (133 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.

5 - 7

MEMO

5 - 8

6 BASE UNIT AND EXTENSION CABLE

This section describes the specifications of the extension cables for the base units (main base unit 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

Item \ Type		Q33B	Q35B	Q38B	Q312B
Number of I/O modules installed		3	5	8	12
Possibility of extension		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 ϕ4.5 hole (for M4 screw)			
External dimensions	H	98mm (3.86inch)			
	W	189mm (7.44inch)	245mm (9.65inch)	328mm (12.92inch)	439mm (17.30inch)
	D	44.1mm (1.74inch)			
Weight		0.21kg	0.25 kg	0.35 kg	0.45 kg
Attachment		Mounting screw M4×14, 4 pieces (DIN rail mounting adapter to be sold separately)			
DIN rail mounting Adapter type		Q6DIN3	Q6DIN2	Q6DIN1	

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

Item \ Type		Q52B	Q55B
Number of I/O modules installed		2	5
Possibility of extension		Extendable	
Applicable module		Q series modules	
5 VDC internal current consumption		0.080A	0.100A
Mounting hole size		M4 screw hole or ϕ 4.5 hole (for M4 screw)	
External dimensions	H	98mm (3.86inch)	
	W	106mm (4.17inch)	189mm (7.43inch)
	D	44.1mm (1.74inch)	
Weight		0.14kg	0.23kg
Attachment		Mounting screw M4×14, 4 pieces (DIN rail mounting adapter to be sold separately)	
DIN rail mounting Adapter type		Q6DIN3	

(3) Extension base unit specifications

Item \ Type		Q63B	Q65B	Q68B	Q612B
Number of I/O modules installed		3	5	8	12
Possibility of extension		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 ϕ4.5 hole (for M4 screw)			
External dimensions	H	98mm (3.86inch)			
	W	189mm (7.44inch)	245mm (9.65inch)	328mm (12.92inch)	439mm (17.30inch)
	D	44.1mm (1.74inch)			
Weight		0.23kg	0.25 kg	0.35 kg	0.45 kg
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 Process CPU system.

Item \ Type	QC05B	QC06B	QC12B	QC30B	QC50B	QC100B
Cable length	0.45m (1.48ft.)	0.6m (1.97ft.)	1.2m (3.93ft.)	3.0m (9.84ft.)	5.0m (16.38ft.)	10.0m (32.79ft.)
Application	Connection across the main base unit and extension base unit or across the extension base units.					
Weight	0.15 kg	0.16 kg	0.22 kg	0.40 kg	0.60 kg	1.11 kg

POINT

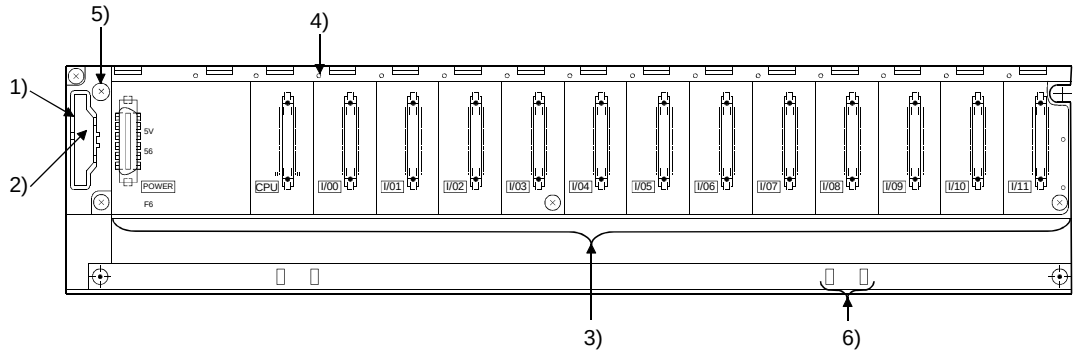
When the extension cables are used in combination, limit the overall distance of the combined cable to 13.2 m(43.28 ft.).

6 - 2

6.3 Parts Names of Base Unit

The names of the parts of the base unit are described below.

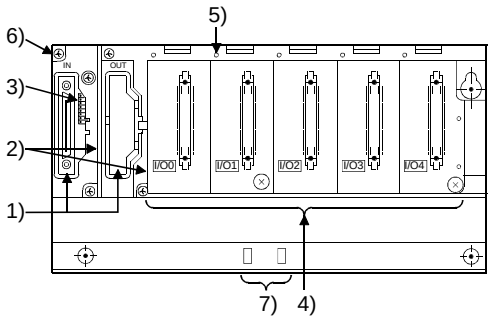
(1) Main base unit(Q33B, Q35B, Q38B, Q312B)



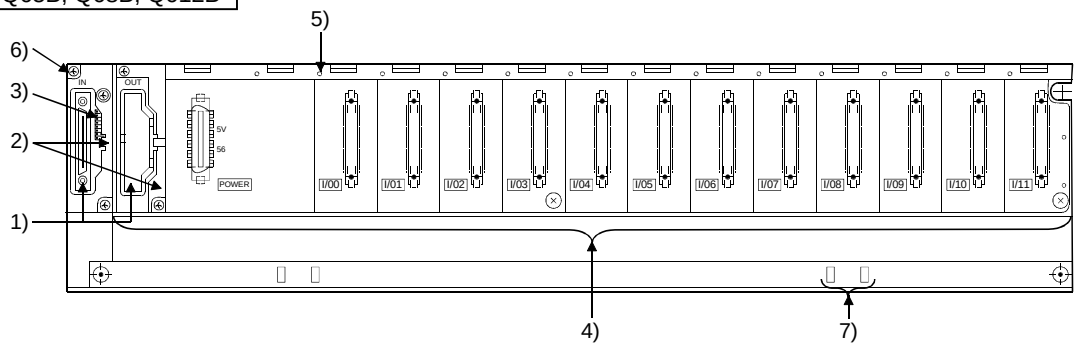
No.	Name	Application
1)	Extension cable connector	Connector for sending and receiving signals from the extension base unit, to which the extension cables are connected.
2)	Base cover	Protective cover of extension cable connector. Before an extension cable is connected, the area of the base cover surrounded by the groove under the word "OUT" on the base cover must be removed with a tool such as nippers.
3)	Module connector	Connector for installing the power supply module, CPU module, I/O 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.
4)	Module fixing screw hole	Screw hole for fixing the module to the base unit. Screw size:M3 × 12
5)	Base mounting hole	Hole for mounting this base unit onto the panel of the control panel (for M4 screw)
6)	DIN rail adapter mounting hole	Hole for mounting DIN rail adapter

(2) Extension base unit (Q5□B, Q6□B)

Q52B, Q55B



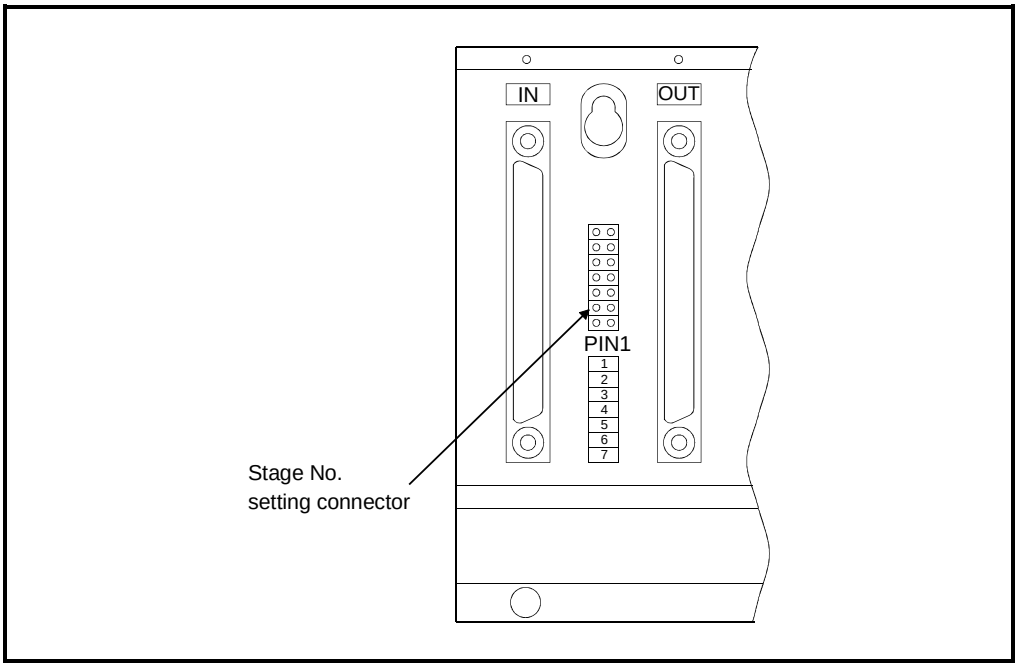
Q63B, Q65B, Q68B, Q612B



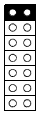
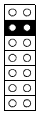
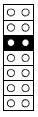
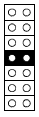
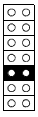
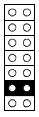
No.	Name	Application
1)	Extension cable connector	Connectors for sending and receiving signals from the main base unit or the other extension base units, to which the extension cables are connected. Do not remove the supplied connector cover.
2)	Base cover	Protective cover of extension cable connector.
3)	Stages No. setting connector	Connector for setting the number of stages of the extension base unit. For setting method, see Section 6.4.
4)	Module connector	Connectors for installing the power supply module, I/O modules, and intelligent function module. To those connectors located in the spare space where these modules are not installed, apply the supplied connector cover or the blank cover module to prevent entry of dirt. Blank cover module applicable to Q52B, Q55B, Q63B, Q65B, Q68B and Q612B :QG60
5)	Module fixing screw hole	Screw hole for fixing the module to the base unit. Q52B, Q55B, Q63B, Q65B,Q68B and Q612B Screw size: M3 × 12
6)	Base mounting hole	Hole for mounting this base unit on the panel of the control panel. Q52B, Q55B, Q63B, Q65B,Q68B and Q612B For M4 screw
7)	DIN rail adapter mounting hole	DIN rail adapter mounting hole.

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

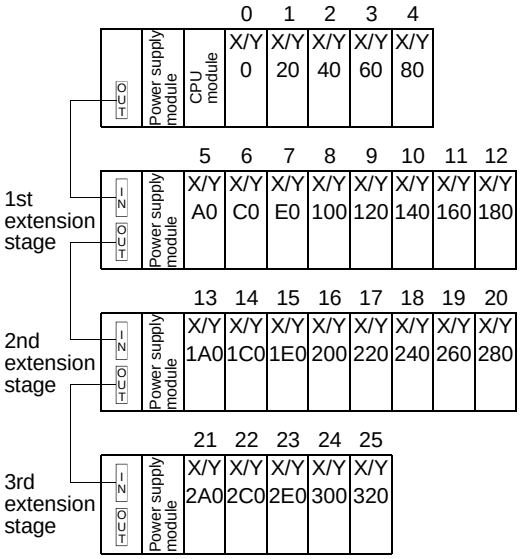
	Number Setting for Extension Stages						
	1st stage	2nd stage	3rd stage	4th stage	5th stage	6th stage	7th stage
Setting of stage No. setting connector							

POINTS

To set the stages No. setting connector, set a number from 1 to 7 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.

6.5 I/O Number Allocation

The I/O numbers are automatically allocated in the system loading status.



* In this system, 32-point modules are loaded on slots 0 to 25.

For the I/O number setting method using GX Developer, refer to the Operating Manual of GX Developer.

For details of I/O number allocation, refer to the following manual.

• Process CPU User's Manual (Function Explanation, Program Fundamentals)

6.6 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 I/O 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.

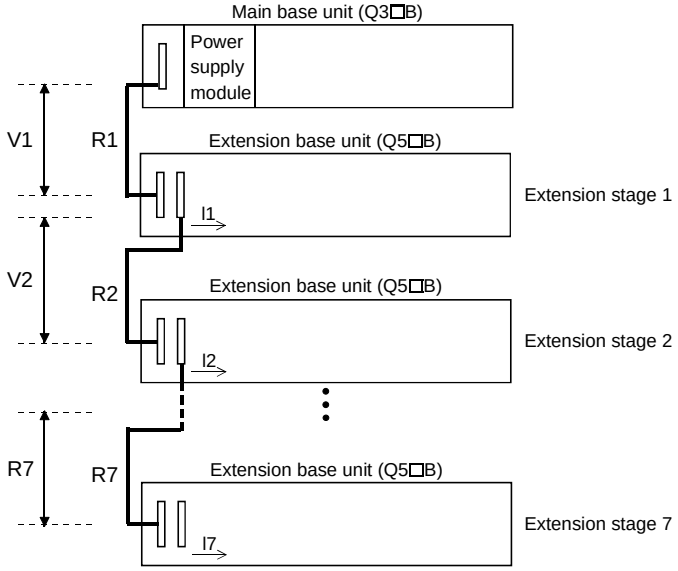
(1) When only the Q5□B is connected to the extension base unit

(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 0.15VDC or lower (4.9VDC - 4.75VDC = 0.15VDC).



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)
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)
I1 to I7	5VDC current consumption among extension stage 1 to 7 ＊1

＊1: Sum total of current consumed by Q5□B and currents consumed by the I/O, intelligent function modules loaded on the Q5□B.
The symbols including "I" (I1 to I7) 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 7

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	V5	V6	V7	
Extension stage 1	R1 • I1	—	—	—	—	—	—	V=V1
Extension stage 2	R1(I1+I2)	R2 • I2	—	—	—	—	—	V=V1+V2
Extension stage 3	R1(I1+I2+I3)	R2(I2+I3)	R3 • I3	—	—	—	—	V=V1+V2+V3
Extension stage 4	R1(I1+I2+I3+I4)	R2(I2+I3+I4)	R3(I3+I4)	R4 • I4	—	—	—	V=V1+V2+V3+V4
Extension stage 5	R1(I1+I2+I3+I4 +I5)	R2(I2+I3+I4+I5)	R3(I3+I4+I5)	R4(I4+I5)	R5 • I5	—	—	V=V1+V2+V3+V4+V5
Extension stage 6	R1(I1+I2+I3+I4 +I5+I6)	R2(I2+I3+I4+I5 +I6)	R3(I3+I4+I5+I6)	R4(I4+I5+I6)	R5(I5+I6)	R6 • I6	—	V=V1+V2+V3+V4+V5+ V6
Extension stage 7	R1(I1+I2+I3+I4 +I5+I6+I7)	R2(I2+I3+I4+I5 +I6+I7)	R3(I3+I4+I5+I6 +I7)	R4(I4+I5+I6+I7)	R5(I5+I6+I7)	R6(I6+I7)	R7 • I7	V=V1+V2+V3+V4+V5+ V6+V7

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

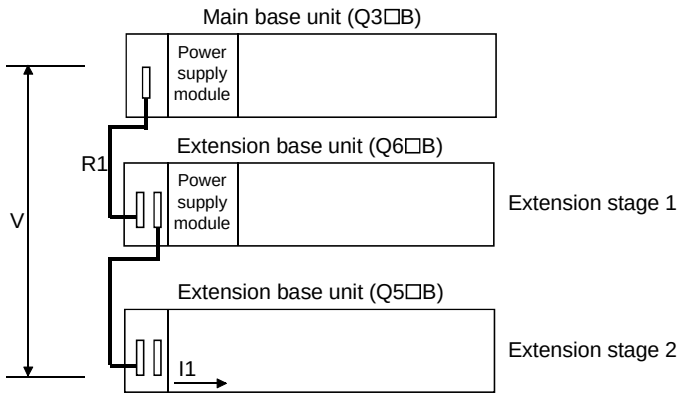
4.75VDC or higher should be supplied to the "IN" connector of the Q5□B in the final extension.

(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 0.15VDC or lower (4.9VDC - 4.75VDC = 0.15VDC).

[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)
In	5VDC current consumption when the Q5□B is used as Extension n+1, n = 1 to 6, n: Extension No. of Q6□B connected (Sum total of current consumed by Q5□B and currents consumed by the I/O, 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)
R_{n+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
Extension stage 1 to 4	Extension stage 5	V=(R1+R2+R3+R4+R5)I1
Extension stage 1 to 5	Extension stage 6	V=(R1+R2+R3+R4+R5+R6)I1
Extension stage 1 to 6	Extension stage 7	V=(R1+R2+R3+R4+R5+R6+R7)I1

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

(3) When the GOT is bus-connected

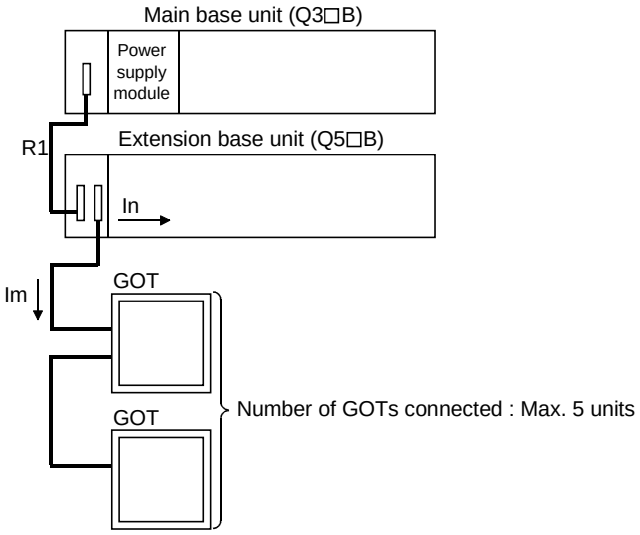
(a) Selection condition

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 0.15VDC or lower (4.9VDC - 4.75VDC = 0.15VDC).



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)
In	5VDC current consumption when the Q5□B is used as Extension n+1, n = 1 to 5, n: Extension No. of the Q6□B connected (Sum total of current consumed by Q5□B and currents consumed by I/O, intelligent function modules loaded on the Q5□B)
Im	5VDC current consumption of the GOT (current consumption per GOT is 254mA) • Im = 254 × 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 extension base unit (Q6□B)
R_{n+1}	Extension cable resistance between the extension base unit (Q6□B) and extension base unit (Q5□B)

POINT

When connecting GOT by extension cable that is 13.2 m (43.31ft) or longer, the bus extension connector box A9GT-QCNB is required.
Since the A9GT-QCNB is supplied with 5VDC from the power supply module loaded on the main base unit, 29mA must be added to "Im" as the current consumption of the A9GT-QCNB.
For details of the GOT-bus connection, refer to the GOT-A900 Series User's Manual (Connection).

7 MEMORY CARD AND BATTERY

This section describes the specifications and handling of the memory card and battery which can be used on the Process CPU.
The memory card is necessary for sampling tracing.
The memory card is also used to handle file registers of more than the number of points that can be stored in the standard RAM. (Refer to Section 4.1)

7.1 Memory Card Specifications

The specifications of the memory card which can be used on the Process CPU adheres to the PCMCIA small PC card.
On the Process CPU, only one memory card can be installed.

(1) SRAM card

Item \ Type		Q2MEM-1MBS	Q2MEM-2MBS
Memory capacity after format		1011.5 kbyte	2034 kbyte
Storable number of files		256	288
Number of insertions and extractions		5000 times	
External dimensions	H	45mm (1.77inch)	
	W	42.8mm (1.69inch)	
	D	3.3mm (0.13inch)	
Weight		15g	

(2) Flash card

Item \ Type		Q2MEM-2MBF	Q2MEM-4MBF
Memory capacity after format		2035 kbyte	4079 kbyte
Storable number of files		288	
Number of insertions and extractions		5000 times	
Number of writings		100000 times	
External dimensions	H	45mm (1.77inch)	
	W	42.8mm (1.69inch)	
	D	3.3mm (0.13inch)	
Weight		15g	

(3) ATA card

Item \ Type		Q2MEM-8MBA	Q2MEM-16MBA	Q2MEM-32MBA
Memory capacity after format		7940 kbyte	15932 kbyte	31854 kbyte
Storable number of files		512		
Number of insertions and extractions		5000 times		
Number of writings		1000000 times		
External dimensions	H	45mm (1.77inch)		
	W	42.8mm (1.69inch)		
	D	3.3mm (0.13inch)		
Weight		15g		

7 - 1

7.2 Battery Specifications (For CPU Module and SRAM Card)

(1) For CPU module

Item \ Type	Q6BAT
Classification	Manganese dioxide lithium primary battery
Initial voltage	3.0V
Nominal current	1800mAh
Storage life	10 years (room temperature)
Total power interrupt time	Refer to Section 10.3.1.
Application	Power failure backup for program memory, standard RAM and latch devices

(2) For SRAM card

Item \ Type	Q2MEM-BAT
Classification	Graphite fluoride primary battery
Initial voltage	3.0V
Nominal current	48mAh
Storage life	5 years (room temperature)
Total power interrupt time	Refer to Section 10.3.1.
Application	Power failure backup for SRAM card

REMARK

Refer to Section 10.3.1 for the service life of the battery.

7 - 2

7.3 Handling the Memory Card

(1) Formatting of memory card

Any SRAM or ATA card used on the Process CPU must have been formatted
Since the SRAM or ATA card purchased is not yet formatted, format it using GX Developer before use.
(The Flash card need not be formatted.)
For the formatting procedure, see the Operating Manual of the GX Developer.

(2) Installation of SRAM card battery

A power interrupt hold-on battery is furnished with the SRAM card you purchased.
Before using the SRAM card, install the battery.

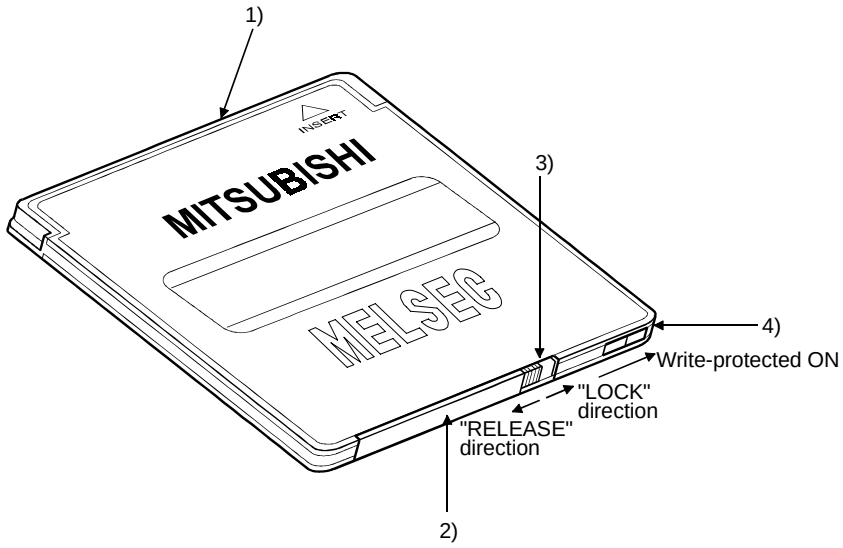
POINTS
Even if the battery is installed on the CPU module, if a battery is not installed on the SRAM card, the memory of the SRAM card will not be backed up. Ensure to install the battery on the SRAM card. Also, if the battery is installed on the SRAM card but the CPU module has no battery, the program memory, standard RAM and latch devices of the CPU module are not backed up. Similarly ensure to install the battery on the CPU module.

(3) Kind of file which can be stored on memory card

Please refer to the Process CPU User's Manual (Function Explanation, Program Fundamentals) of section 6.1 for the kind of the file which can be stored on each memory card.

7.4 The Names of The Parts of The Memory Card

The names of the parts of the memory card are described below.



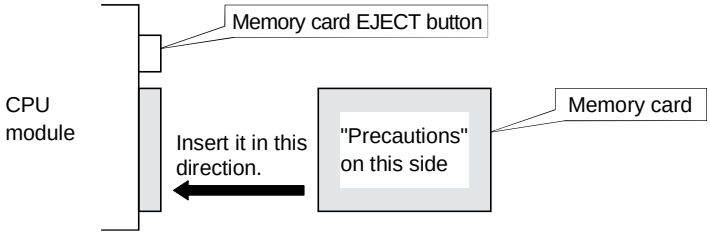
No.	Name	Descriptions
1)	Connector section	Connector section connected to the CPU module
2)	Battery holder	Used to set the lithium battery for data backup of the SRAM memory (SRAM card only)
3)	Battery holder fixing switch *	Switch for fixing the battery holder to the memory card main module Locked at LOCK position (write protect switch side) LOCK: Locked, RELEASE: Unlocked (SRAM card only)
4)	Write protect switch	Used to set write inhibit in the memory. At the time of shipping, it is set at OFF. (SRAM card and Flash card only) ON: Data write inhibited OFF: Data write enabled

*: The battery holder fixing switch is returned automatically from RELEASE to LOCK when the battery holder is disconnected.

7.5 Memory Card Loading/Unloading Procedures

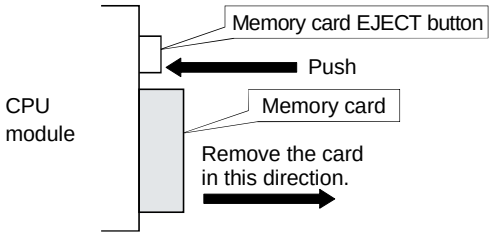
(1) To install the memory card

Install the memory card into the CPU module, while paying attention to the orientation of the memory card. Insert the memory card securely into the connector until the height of the memory card reaches that of the memory card EJECT button.



(2) To remove the memory card

To remove the memory card from the CPU module, press the memory card EJECT button to push out the card.



(3) To extract the memory card while the power is turned on

Before removing the memory card, make sure that the special relays "SM604", "SM605" are OFF.

- When "SM604" is ON, the memory card cannot be removed since the CPU module is using the memory card.
- When "SM605" is ON, turn it OFF.
  When "SM604" and "SM605" are OFF, remove the memory card in the following procedure.

1) Turn ON the special relay "SM609" using the sequence program or by the device test of GX Developer etc.
2) By monitoring GX Developer etc., check that the special relays "SM600" is turned OFF.
3) Extract the memory card.

∗ SM600 (Memory card usable flag) : The system is turned on when memory card is ready for use by user.
SM604 (memory card use flag) : The system is turned on when the CPU module uses a memory card.
SM605 (memory card detach inhibit flag) : This is turned on by the user to disable the memory card from being detached.

(4) To install the memory card while the power is turned ON

1) Install the memory card.
2) By monitoring GX Developer etc., check that the special relays "SM600" is turned ON.

POINTS

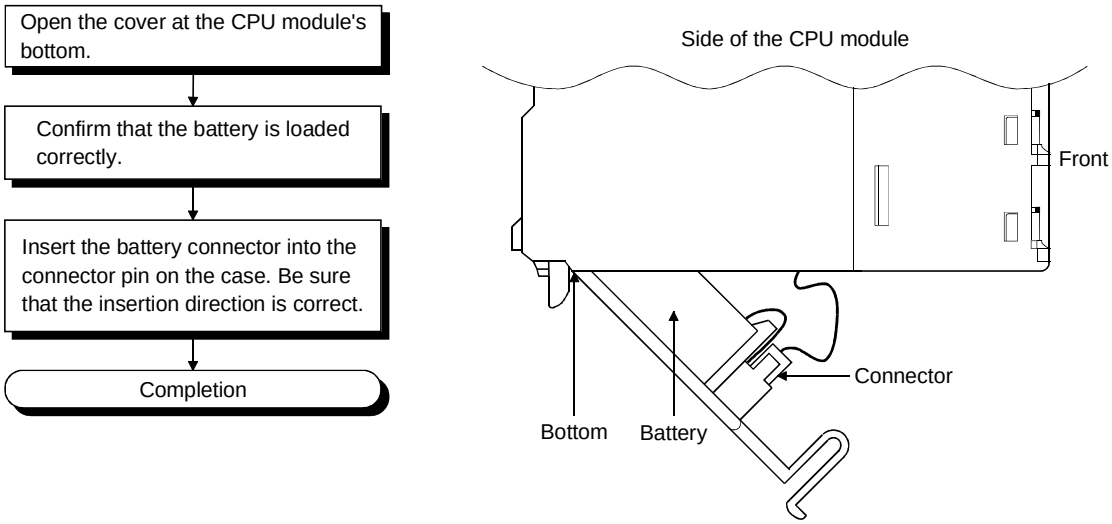
Install and remove the memory card while the power is turned on, paying attention to the following.

(1) If the procedures specified above are not followed, the data stored in the memory card may be destroyed.
When the CPU module operation at the time of occurrence of a parameter error is set to STOP, the CPU module operation is stopped by the occurrence of "ICM.OPE.ERROR."

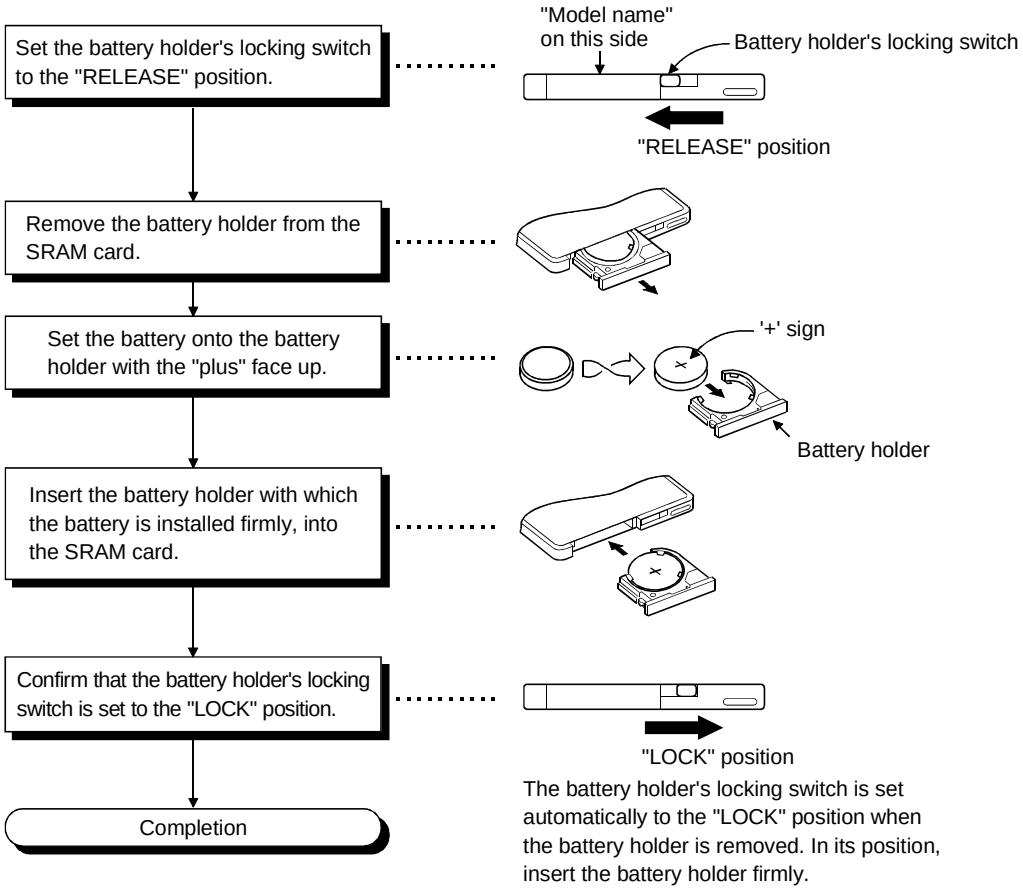
(2) When the memory card is installed, its mount processing is performed again. As a result, the scanning time is increased by several 10 ms max.

7.6 Installation of Battery (For CPU Module and Memory Card)

(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 service life of the battery and how to replace the battery.



(2) The battery for the SRAM card is shipped separately from the battery holder. Before installing the SRAM card into the CPU module, set the battery holder in the following procedure.



8 EMC AND LOW VOLTAGE DIRECTIVE

For the products sold in European countries, the conformance to the EMC Directive, which is one of the European Directive, has been a legal obligation since 1996. Also, conformance to the Low Voltage Directive, another European Directive, has been a legal obligation since 1997.
Manufacturers who recognize their products must conform to the EMC and Low Voltage Directive required to declare that their products conform to these Directives and put a "CE mark" on their products.

8.1 Requirements for Conformance to 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 control 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 of the machinery.

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 μ V/m (30 m in measurement range) ∗1 230 M-1000 MHz QP : 37 dB μ 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 I/O (24 V or higher) : 1 kV (Digital I/O (24 V or less)) > 250 V (Analog I/O, 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 I/O (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 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 inch) diameter or less. If the holes are 10 cm (3.94 inch) 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 (11.81 inch) 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

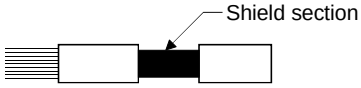
The cables extracted from the control panel contain a high frequency noise component. On the outside of the control panel, therefore, they serve as antennas to emit noise. To prevent noise emission, use shielded cable for the cables which are connected to the I/O modules and intelligent function modules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

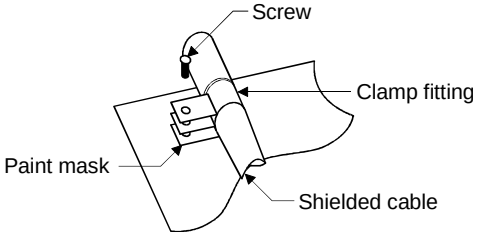
When the shield of a shielded cable is earthed to the cabinet body, please ensure that the shield contact with the body is over a large surface area. If the cabinet body is painted it will be necessary to remove paint from the contact area. All fastenings must be metallic and the shield and earthing 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

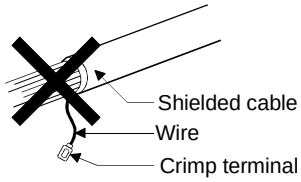
(a) Earth the shield of the shielded cable as near the module as possible taking care so that the earthed cables are not induced electromagnetically by the cable to be earthed.

(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.



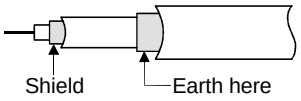


Note) The method of earthing by soldering a wire onto the shield section of the shielded cable as shown below is not recommended. The high frequency impedance will increase and the shield will be ineffective.



(2) MELSECNET/H module

Always use a double-shielded coaxial cable (MITSUBISHI CABLE INDUSTRIES, LTD.: 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.

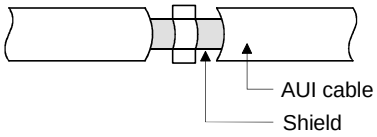


Refer to (1) for the earthing of the shield.

(3) Ethernet module, Web server module

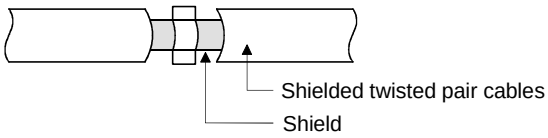
Precautions for using AUI cables, twisted pair cables and coaxial cables are described below.

(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.



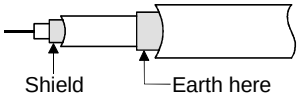
Refer to (1) for the earthing of the shield.

(b) Use shielded twisted pair cables as the twisted pair cables connected to the 10BASE-T/100BASE-TX connector. For the shielded twisted pair cables, 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.

(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) I/O signal lines and other communication cables

For the I/O signal lines and other communication cables lines (RS-232, RS-422, CC-Link, etc.), if extracted to the outside of the control panel, also ensure to earth the shield section of these lines and cables in the same manner as in item (1) above.

8.1.4 Power supply module

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

8.1.5 Others

(1) Ferrite core

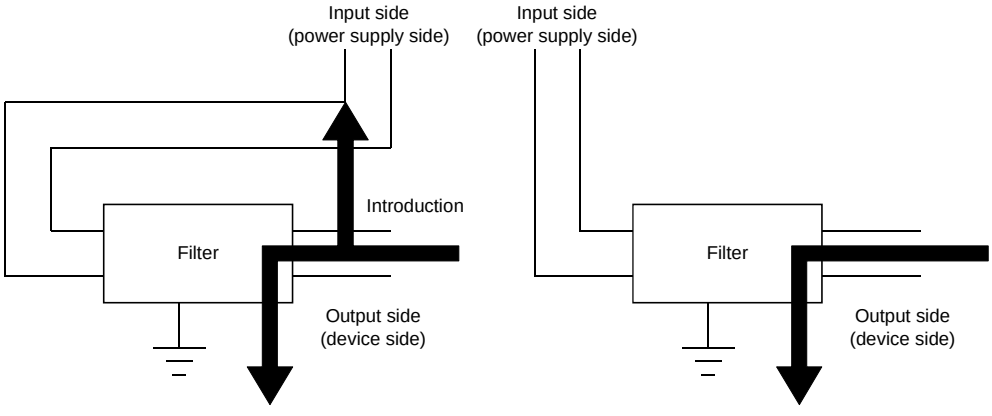
A ferrite core has the effect of reducing radiated noise in the 30MHz to 100MHz band.
It is not required to fit ferrite cores to cables, but it is recommended to fit ferrite cores if shield cables pulled out of the enclosure do not provide sufficient shielding effects.
It should be noted that the ferrite 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 inch)).

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 50 to 1000VAC and 75 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 supply module

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

(2) I/O module

There are dangerous voltages (voltages higher than 42.4V peak) inside the I/O modules of the 100/200VAC rated I/O voltages. Therefore, the CE marked models are enhanced in insulation internally between the primary and secondary.
The I/O modules of 24VDC or less rating are out of the Low Voltage Directive application range.

(3) CPU module, memory card, base unit

Using 5VDC circuits inside, the above modules are out of the Low Voltage Directive application range.

(4) Intelligent function modules (special function modules)

The intelligent function modules (special 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 CE marked display device.

8.2.3 Power supply

The insulation specification of the power supply 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.

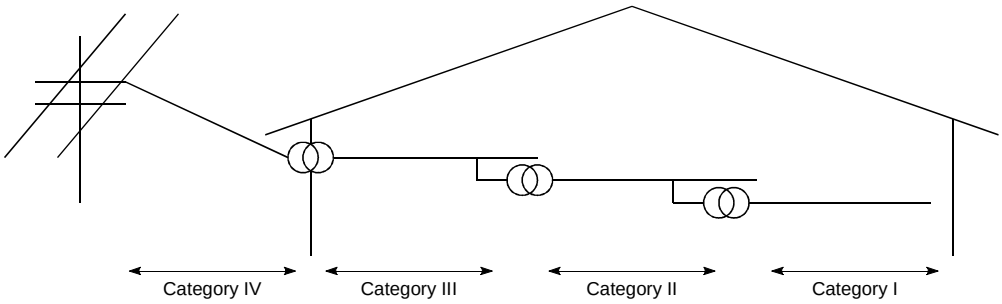


Figure 8.1: Installation Category

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 pollustion 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 exits 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) 24VDC external power supply

For the MELSEC-Q series PLC 24VDC I/O modules and the intelligent function modules (special function modules) which require external supply power, use a model whose 24VDC 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 μs)
150VAC or below	2500 V
300VAC 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 I/O controller.
  (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.operating status of each station. Not doing so could result in erroneous output or erroneous operation.

9 - 1

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.

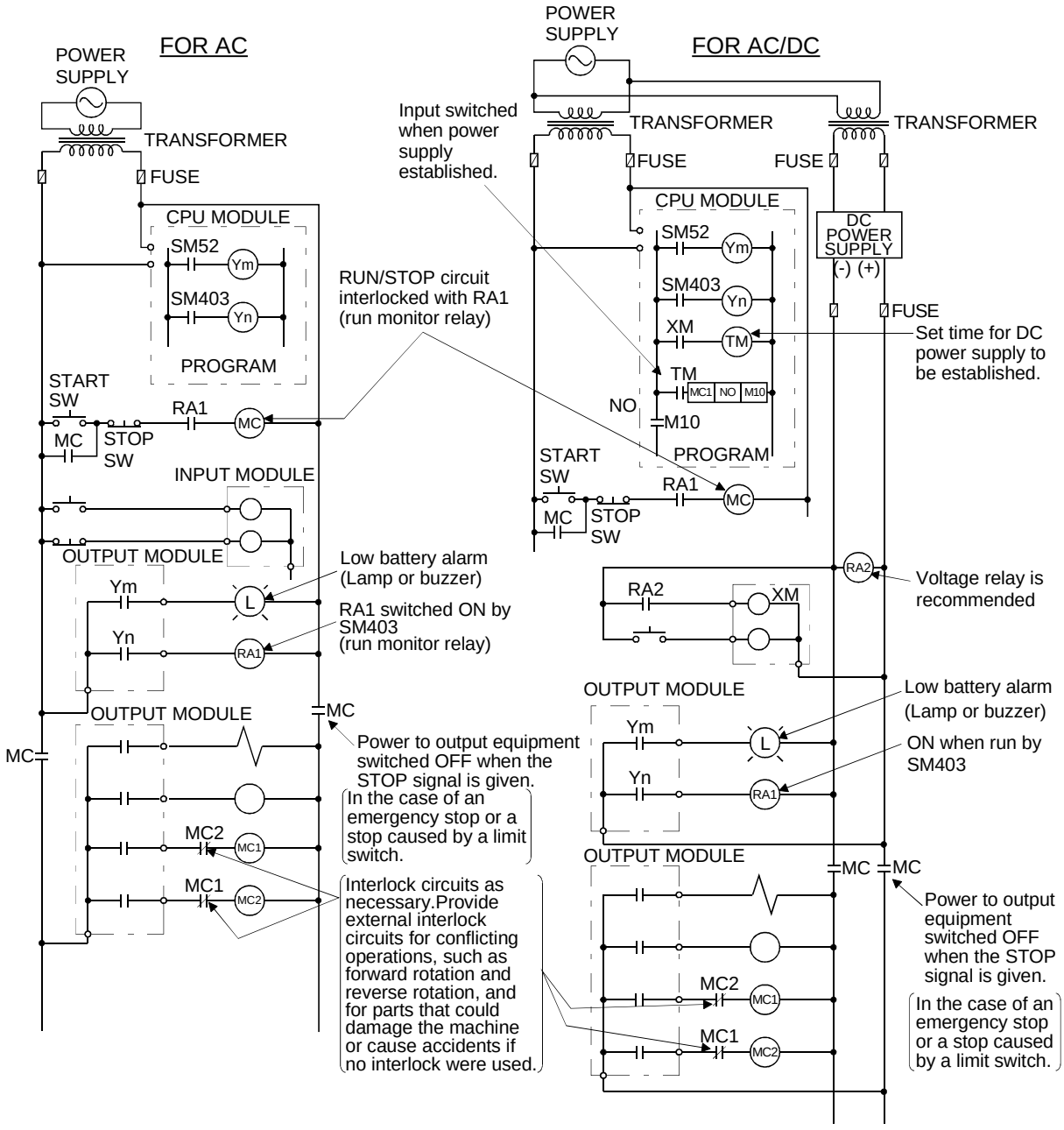
CAUTION

- 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, correct control output may not be performed temporarily due to differences in delay time and starting time between the PLC power supply and the external power supply for the controlled object (especially DC).
For example, if the external power supply for the controlled object is switched on in a DC output module and then the PLC power supply is 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 that 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.

9 - 2

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



The power-ON procedure is as follows:

For AC

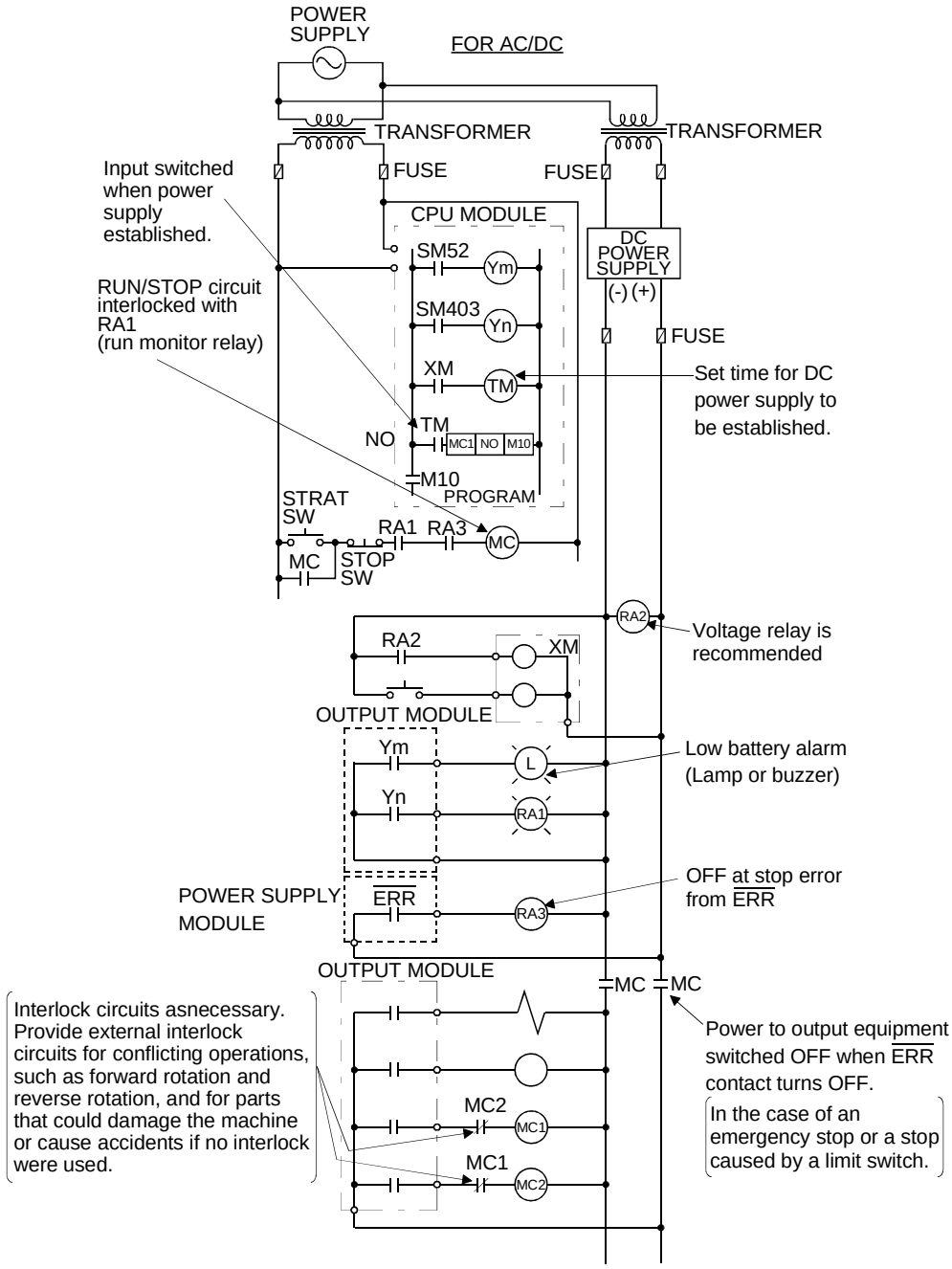
1) Switch power ON.
2) Set CPU to RUN.
3) Turn ON the start switch.
4) When the magnetic contactor (MC) comes on, the output equipment is powered and may be driven by the program.

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.)

9 - 3

(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.)

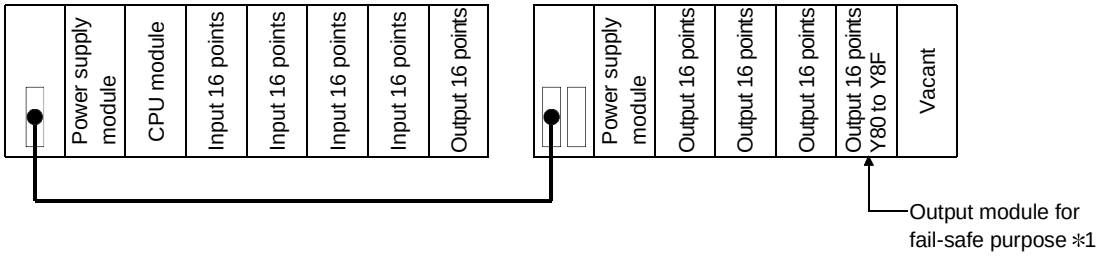
(3) Fail-safe measures against failure of the PLC

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

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

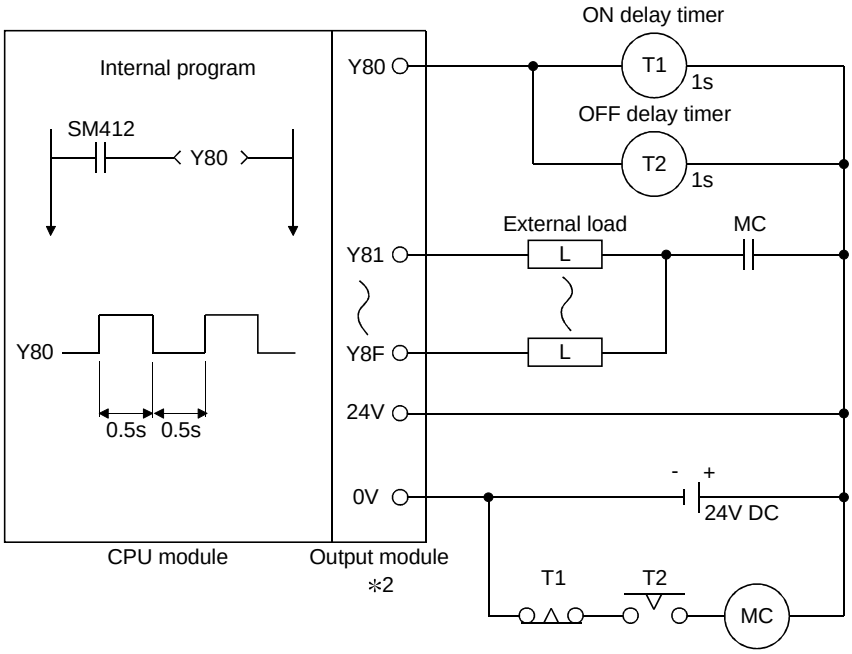
Though Mitsubishi PLCs are manufactured under strict quality control, they may cause failure or abnormal operations due to unspecific reasons. To prevent the abnormal operation of the whole system, machine breakdown, and accidents, fail-safe circuitry against failure of the PLC must be constructed outside 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 - 5

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.

$$Wpw = \frac{3}{7} \times (I_{5V} \times 5)\ (W)$$

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

(2) Power consumption of a total of 5 VDC logic section of each module
The power consumption of the 5 VDC output circuit section of the power supply module is the power consumption of each module (including the current consumption of the base unit).

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

(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.

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

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

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

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

$W_{IN} = I_{IN} \times E \times$ Number of input points $\times$ 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

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

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

$W = W_{PW} + W_{5V} + W_{24V} + W_{OUT} + W_{IN} + W_S$ (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.

$$T = \frac{W}{UA} (°C)$$

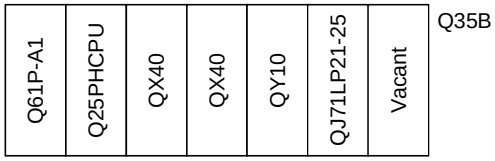
W : Power consumption of overall sequencer system (value obtained above)
A : Surface area inside the board
U : When the ambient temperature inside the board is uniformed by a fan..... 6
When air inside the board is not circulated 4

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, and it may affect the performance of the PLC.

(7) Example of calculation of average power consumption

(a) System configuration



(b) 5 VDC current consumption of each module

Q25PHCPU	: 0.64 (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
$W_{PW} = 3/7 \times (0.64+0.05+0.05+0.43+0.55+0.074) \times 5) = 3.84$ (W)

(d) Power consumption of a total of 5 VDC logic section of each module
$W_{5V} = (0.64+0.05+0.05+0.43+0.55+0.074) \times 5) = 8.97$ (W)

(e) A total of 24 VDC average power consumption of the output module
$W_{24V} = 0$ (W)

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

W_{OUT} = 0 (W)

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

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

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

W_S = 0 (W)

(i) Power consumption of overall system.

W = 3.84 + 8.97 + 0 + 0 + 3.07 + 0 = 15.88 (W)

9.3 Module Installation

9.3.1 Precaution on installation

⚠ 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 latch 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 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.
- Securely load the memory card by pushing it into the memory card loading slot. Check for insecure loading after loading the memory card. Not doing so can cause a malfunction due to a contact fault.
- 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.
  Note that online module change can be made when the QnPHCPU is used.
  Note that there are restrictions on the modules that can be changed online and each module has a predetermined changing procedure. For details, refer to the section of online module change in this manual.
- 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.

This section gives instructions for handling the CPU, I/O, 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 supply module terminal screw (M3.5 screw)	59 to 88 N・cm

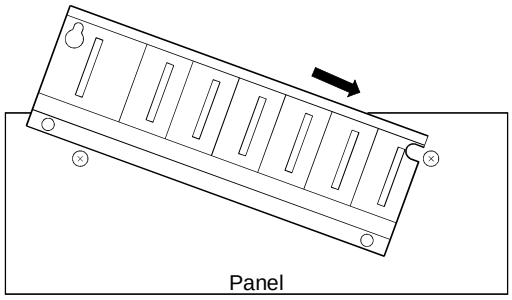
(4) Be sure to install the power supply module in the Q3□B, Q6□B and QA1S6□B. Even if the power supply module is not installed, when the I/O modules and intelligent function module installed on the base units are of light load type, the modules may be operated. In this case, because a voltage becomes 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.

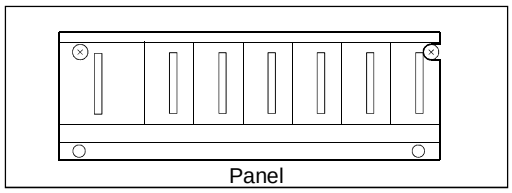
(6) Install the main base unit (by screwing) in the following procedure.

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.



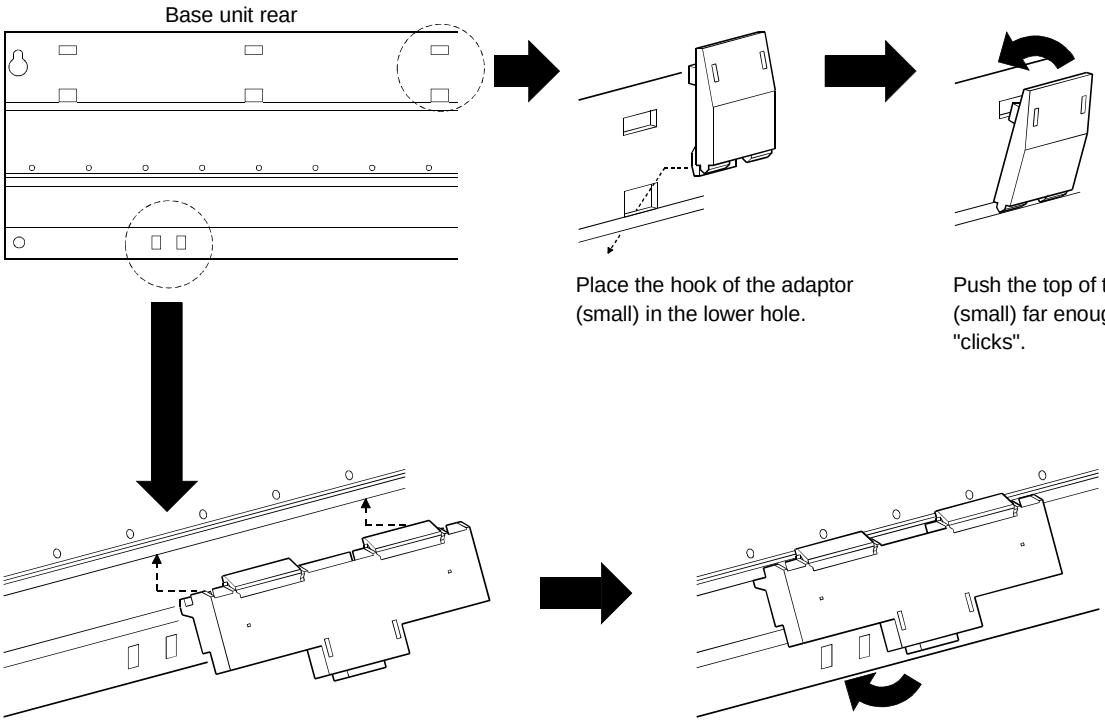
4) Fit the mounting screws into the mounting screw holes in the base unit bottom and retighten the four mounting screws.

Note 1: Install the main base unit 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.

(7) Note the following points when mounting a DIN rail.
Mounting a DIN rail needs special adaptors (optional), which are to be user-prepared.

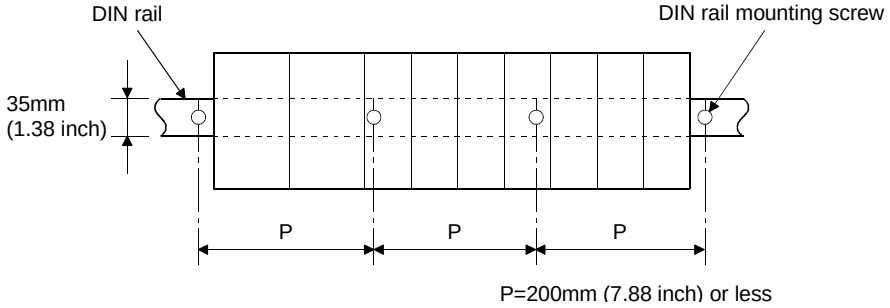
(a) Applicable adaptor types
For Q38B, Q312B, Q68B, Q612B : Q6DIN1
For Q35B, Q65B : Q6DIN2
For Q33B, Q52B, Q55B, Q63B : Q6DIN3

(b) Adaptor installation method
The way to install the adaptors 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.

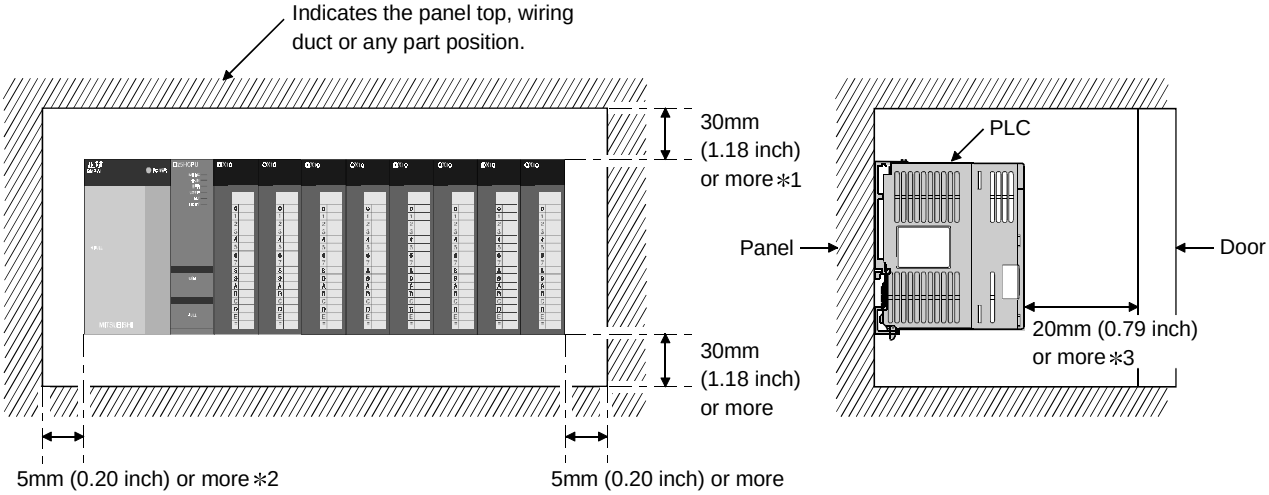


9.3.2 Instructions for mounting the base unit

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.



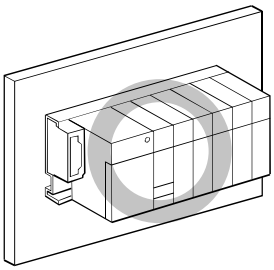
∗1 : For wiring duct (50mm (1.97 inch) or less height).
40mm (1.58 inch) or more for other cases.

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

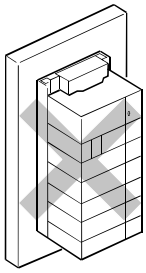
∗3 : 80mm (3.15 inch) or more for the connector type.

(2) Module mounting orientation

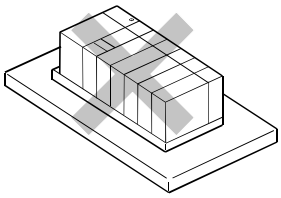
(a) Since the PLC generates heat, it should be mounted on a well ventilated location in the orientation shown below.



(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.

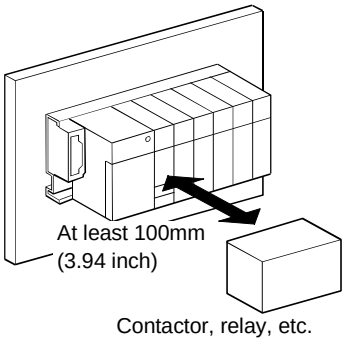
(4) Installation of unit in an area where the other devices are installed

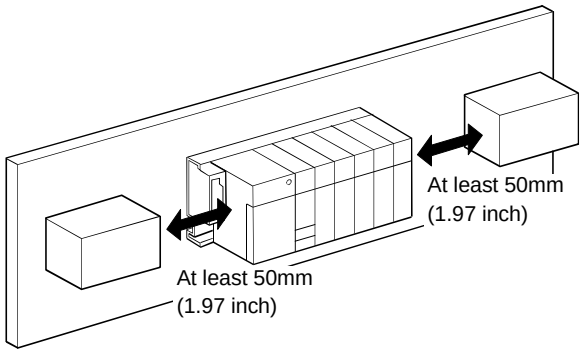
Avoid mounting base unit in proximity to vibration sources such as large magnetic contractors and no-fuse circuit breakers; mount these on a separate panel or at a distance.

(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)





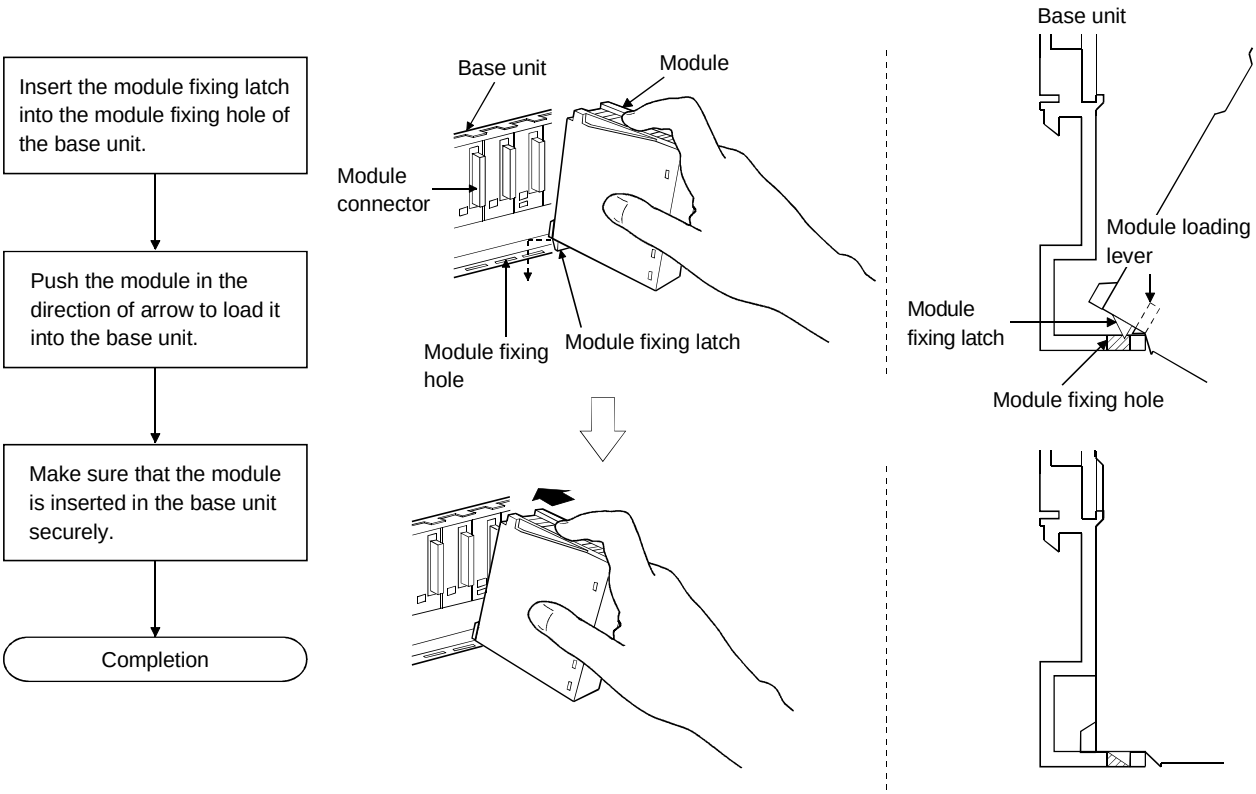
9.3.3 Installation and removal of module

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

(1) Installation and removal of the module from Q3□B, ,Q5□B and Q6□B

The installation and removal of the module from Q3□B/Q6□B base unit are described below.

(a) Installation of module on Q3□B, Q5□B and Q6□B

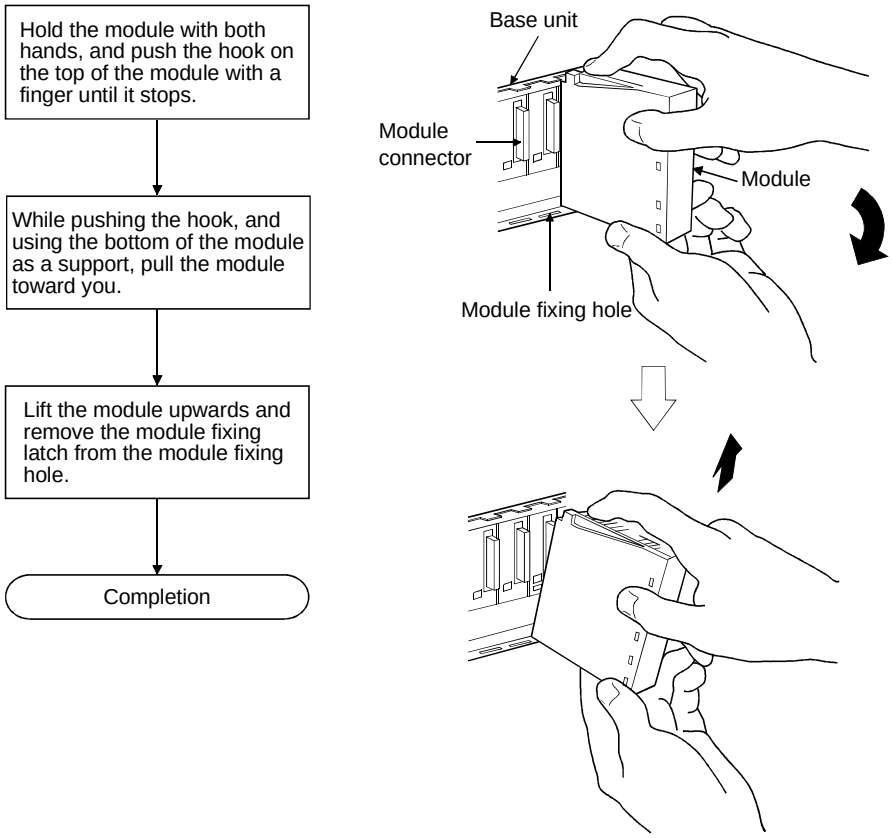


POINTS

(1) Always insert the module fixing latch 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 Q3□B, Q5□B and Q6□B



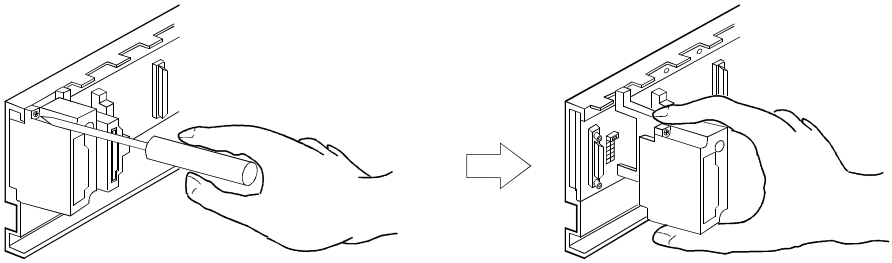
POINT
When the module fixing screw is used, always remove the module by removing the module fixing screw and then taking the module fixing latch off the module fixing hole of the base unit. Do not try to remove the module forcibly since this may damage the module.

9 - 15

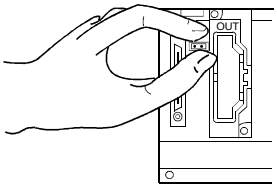
9.4 How to Set Stage Numbers for the Extension Base Unit

When using two or more extension base units, their stage numbers must be set with their stage number setting connectors. Extension 1 need not be set since the extension number is factory-set to 1.
Make this setting in the following procedure.

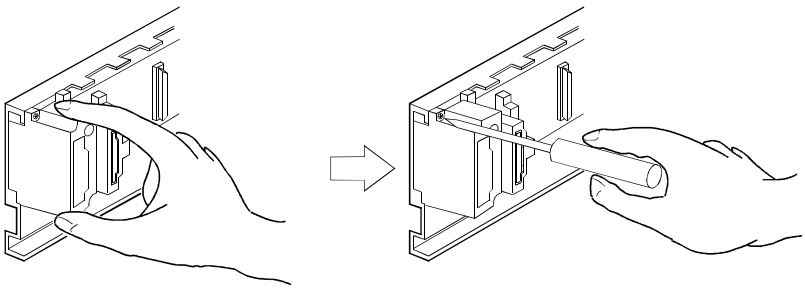
(1) The stage number setting connector of the extension base unit is located under the IN side base cover. (Refer to Section 6.4 for the setting of the extension number setting connector.)
First, loosen the upper and lower screws in the IN side base cover and remove the base cover from the extension base unit.



(2) Insert the connector pin in the required stage 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)

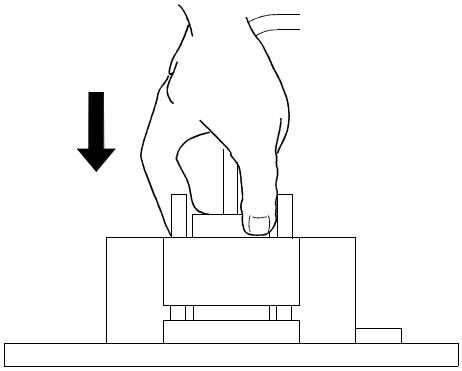


9 - 16

9.5 Connection and Disconnection of 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 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.

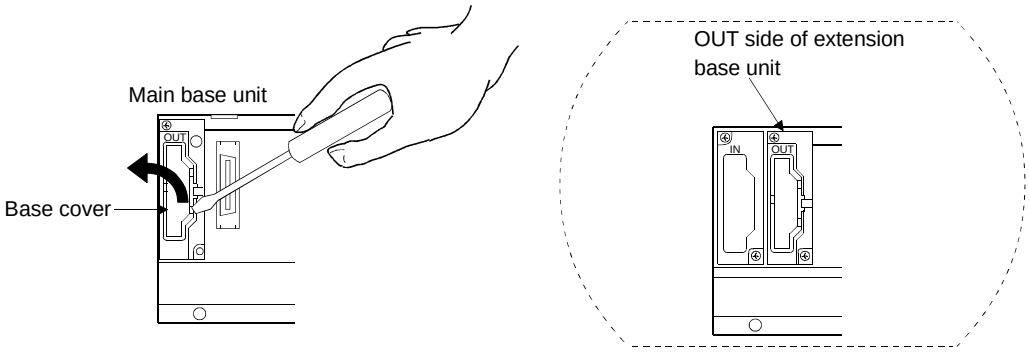


Holding the ferrite core may cause the cable to open within the connector.
Also, if the ferrite core is shifted, the characteristic will change. When handling the cable, take care not to shift the ferrite core positions.

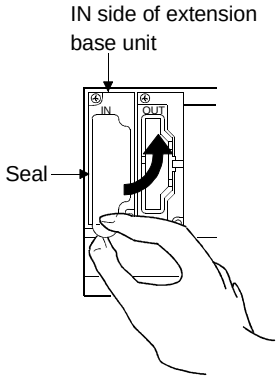
(2) Connection of extension cable

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.

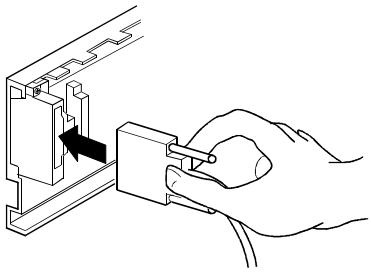
(a) To connect an extension cable to the main base unit, remove the portion under the OUT characters on the base cover with a tool such as a flat-blade screwdriver (5.5 × 75, 6 × 100).
This also applies to a case where an extension cable is connected to the OUT side connector of the extension base unit.



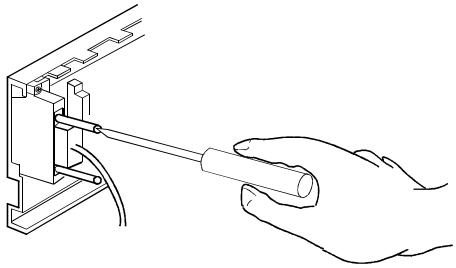
(b) To connect the extension cable to the next extension base unit, remove the seal applied under the IN characters on the base cover.



(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: 20N • 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 - 19

9.6 Wiring

9.6.1 The precautions on the wiring

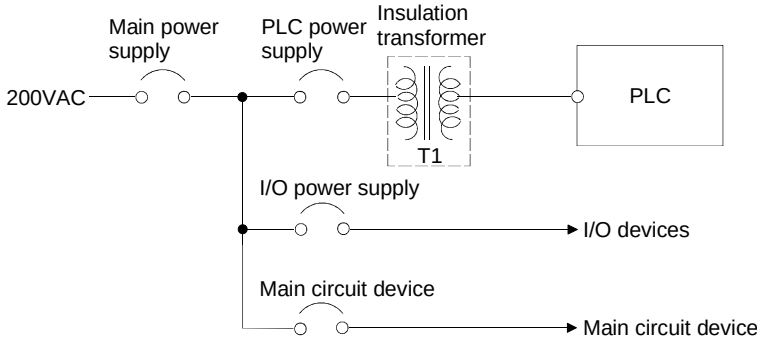
⚠ DANGER	● Completely turn off the external power supply when installing or placing wiring. Not completely turning off all power could result in electric shock or damage to the product. ● When turning on the power supply or operating the module after installation or wiring work, be sure that the module's 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.

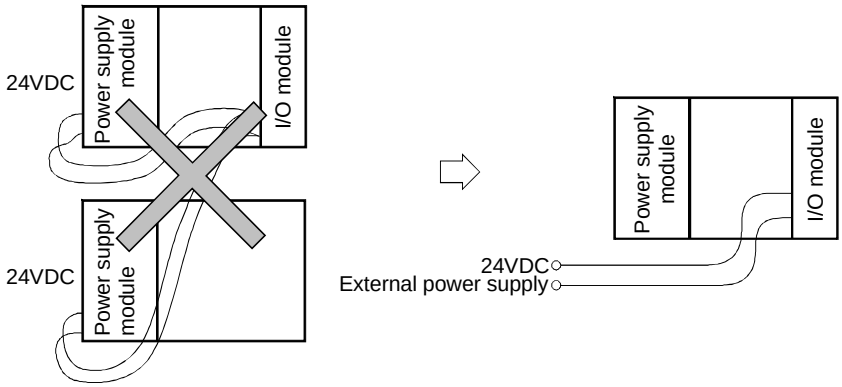
The precautions on the connection of the power cables are described below.

(1) Power supply wiring

(a) Separate the PLC's power supply line from the lines for I/O devices and power devices as shown below.
When there is much noise, connect an insulation transformer.



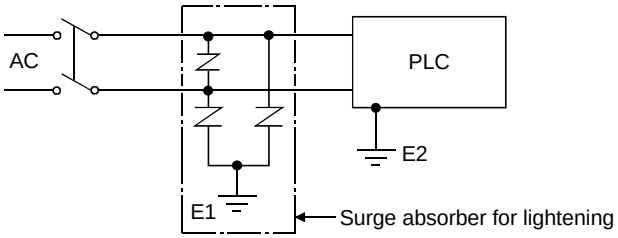
(b) Do not connect the 24VDC outputs of two or more power supply modules in parallel to supply power to one I/O module. Parallel connection will damage the power supply modules.



(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^2).

(d) Do not bundle the 100VAC and 24VDC wires with, or run them close to, the main circuit (high voltage, large current) and I/O signal lines. Reserve a distance of at least 100 mm (3.94 inch) 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 no exceed the maximum allowable circuit voltage even at the time of maximum power supply voltage elevation.

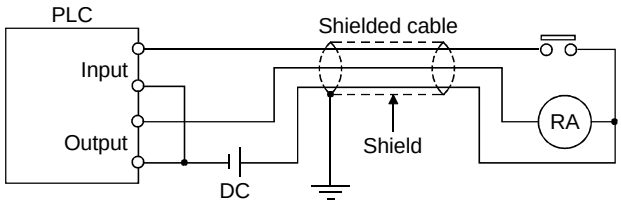
(2) Wiring of I/O equipment

(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^2 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.

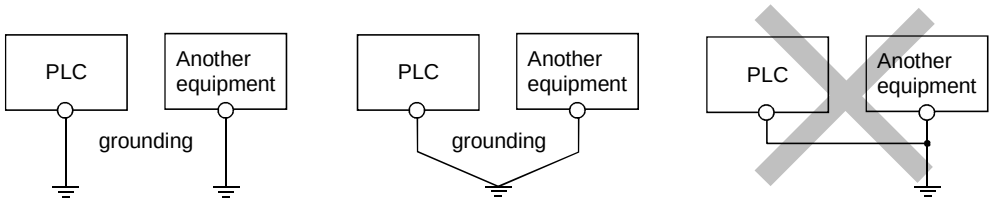
(g) Wiring of 200m (686.67 ft.) or longer distance will give rise to leakage currents due to the line capacity, resulting in a fault.
Refer to Section 11.5 for details.

(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.

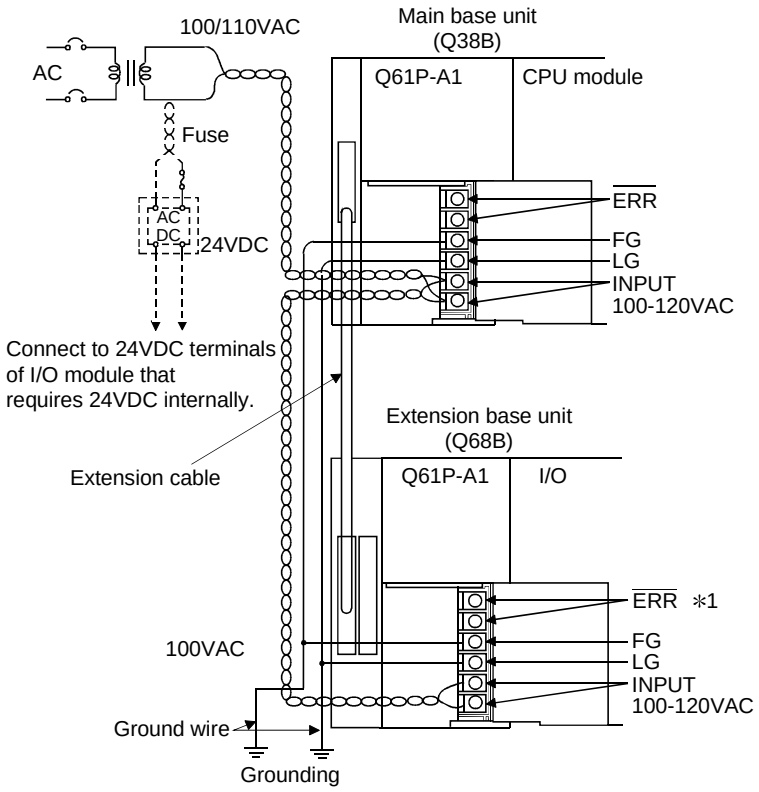


(1) Independent grounding.....Best (2) Common grounding.....Good (3) Joint grounding.....Not allowed

(c) For grounding a cable, use the cable of 2 mm^2 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^2 (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 $\overline{\text{ERR}}$ terminal of the power supply module loaded on the extension base.
To output an error, use the $\overline{\text{ERR}}$ 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 of 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.

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

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 I/O module		Check that the module is not dislocated and the module fixing hook is engaged securely.	The module fixing hook must be engaged and installed securely.	Securely engaged the module fixing hook.
3	Connecting conditions		Check for loose terminal screws.	Screws should not be loose.	Retighten terminal screws
			Proximity of solderless terminals to each other	The proper clearance should be provided between Solderless terminals	Correct.
			Connectors of extension cable	Connections should no be loose.	Retighten connector mounting screws.
4	Module indication LED	Power supply "POWER" LED	Check that the LED is ON.	The LED must be ON. (Abnormal if the LED is OFF.)	Follow Section 11.2.
		CPU "RUN" LED	Check that the LED is ON in RUN status.	The LED must be ON. (Abnormal if the LED is OFF.)	
		CPU "ERR." LED	Check that the LED is OFF.	The LED must be OFF. (Abnormal if the LED is ON or flickering.)	
		CPU "BAT." LED	Check that the LED is OFF.	The LED must be OFF. (Abnormal if the LED is ON.)	
		Input LED	Check that the LED turns ON and OFF.	The LED must be ON when the input power is turned ON. The LED must be extinguished when the input power is turned OFF. (Abnormal if the LED does not turn ON or turn OFF as indicated above.)	
		Output LED	Check that the LED turns ON and OFF.	The LED turns ON when the output power is turned ON. The LED must be extinguished when the output power is turned OFF. (Abnormal if the LED does not turn ON or turn OFF as indicated above.)	

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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 ✻1	
		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, I/O, 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 and SRAM card 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 resisters 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
Bit 1,2	SRAM card

POINTS

The relation between the backups of the memories preformed by the batteries which are installed on the CPU module and SRAM card is described below.
The items that must be considered are the following two points.
1) The battery installed on the CPU module cannot backup the memory of the SRAM card.
2) The battery installed on the SRAM card cannot backup the memory of the CPU module.

Power supply Module	Battery of CPU Module	Battery of SRAM Card	Memory of CPU Module	Memory of SRAM Card
ON	Connection	ON	○	○
		OFF	○	○
	Unconnection	ON	○	○
		OFF	○	○
OFF	Connection	ON	○	○
		OFF	○	×
	Unconnection	ON	×	○
		OFF	×	×

○ : Backup enable ×: Backup unable

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

10.3.1 Battery life

(1) CPU module battery (Q6BAT) life

(a) The CPU module battery life is given below.

CPU Module Type	Energization Time Ratio ∗1	Battery life		
		Guaranteed value (MIN)	Value in actual use (TYP)	After SM51 is energized (Guaranteed time after alarm occurrence)
Q12PHCPU Q25PHCPU	0%	1260hr	4228hr	48hr
	30%	1800hr	6040hr	48hr
	50%	2520hr	8456hr	48hr
	70%	4200hr	14093hr	48hr
	100%	10years	10years	48hr

∗1: The energization time ratio denotes the ratio of power-on time in a day (24 hours). (When power is on for 12 hours and off for 12 hours, the energization time ratio is 50%.)

(b) The Q6BAT life is 10 years when it is used without connecting to the CPU module.

(2) SRAM card battery life

The SRAM card battery life is indicated below.

SRAM card	Energization Time Ratio ∗1	Battery life		
		Guaranteed value (MIN)	Value in actual use (TYP)	After SM51 is energized (Guaranteed time after alarm occurrence)
Q2MEM-2MBS	0%	2400hr	2.7years	20hr
	30%	2880hr	3.6years	20hr
	50%	4320hr	4.5years	20hr
	70%	6480hr	5.0years	20hr
	100%	5.0years	5.0years	50hr
Q2MEM-1MBS Manufacturing control number "□□B" ∗2	0%	2400hr	2.7years	20hr
	30%	2880hr	3.6years	20hr
	50%	4320hr	4.5years	20hr
	70%	6480hr	5.0years	20hr
	100%	5.0years	5.0years	50hr
Q2MEM-1MBS Manufacturing control number "□□A" ∗2	0%	690hr	6336hr	8hr
	100%	11784hr	13872hr	8hr

∗1: The energization time ratio denotes the ratio of power-on time in a day (24 hours) . (When power is on for 12 hours and off for 12 hours, the energization time ratio is 50%.)

∗2: The manufacturing control number is given on the SRAM card rear label (see below).

10 - 5

POINT
Remember that the SRAM card consumes battery power even when the battery is connected to the CPU module and the power is turned ON.

If the special relay SM51 (battery low latch) turns on, immediately replace the battery.
If an alarm has not yet occurred, it is recommended to replace the battery periodically according to the conditions of use.

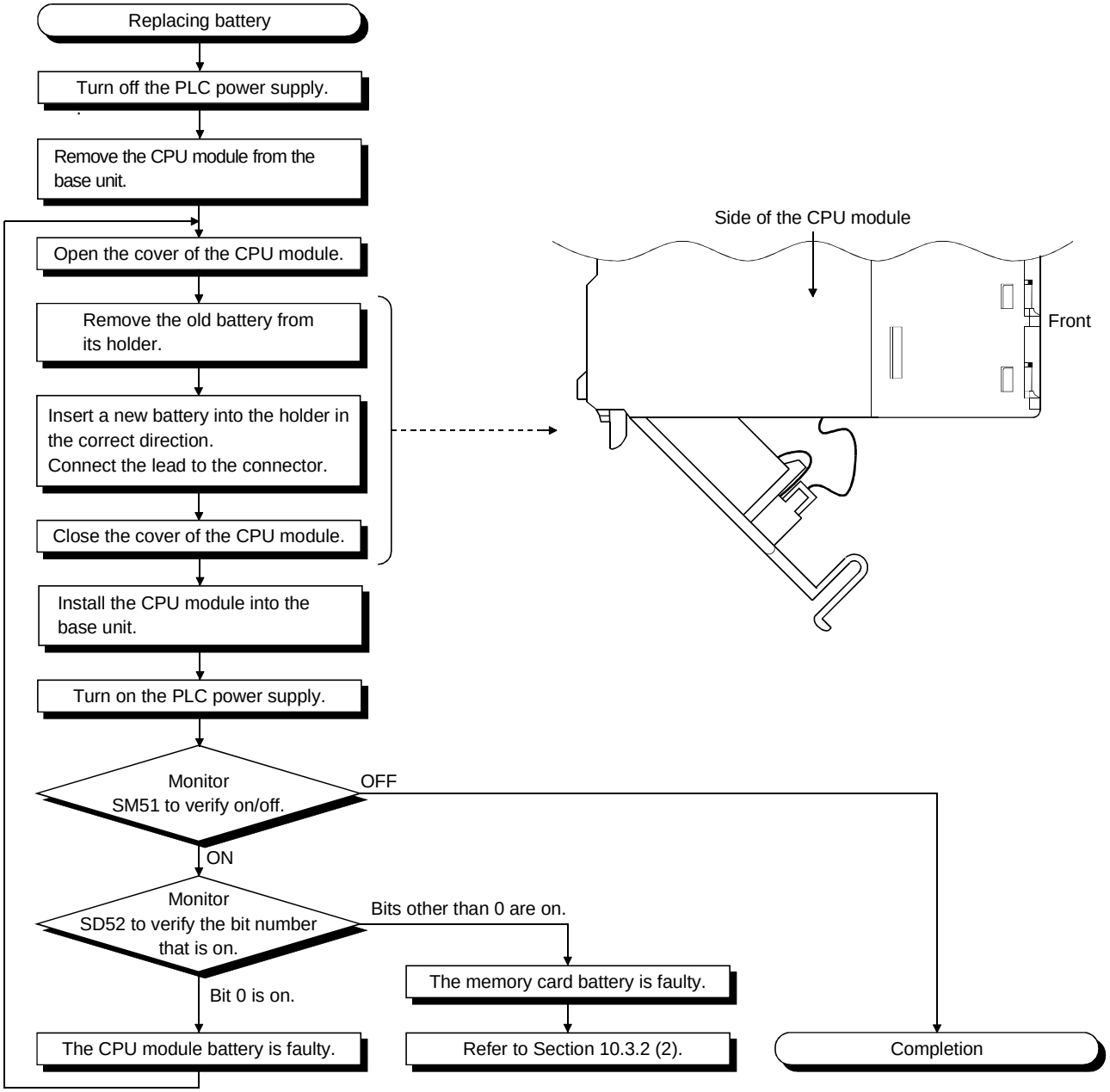
10.3.2 Battery replacement procedure

(1) CPU module battery replacement procedure

When the CPU module battery has been exhausted, replace the battery with a new one according to the procedure shown below. The PLC power must be on for 10 minutes or longer before dismounting the battery.
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



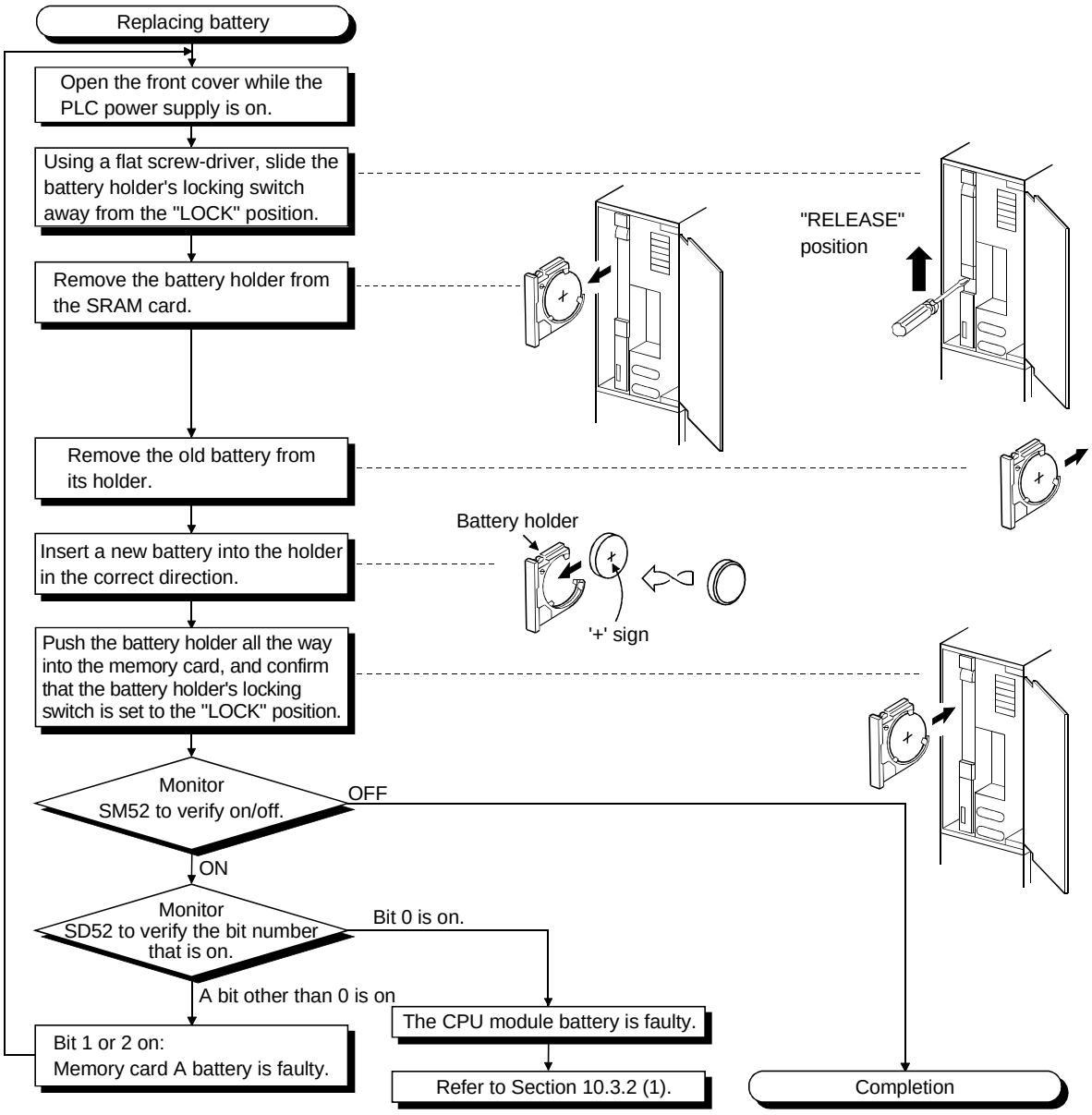
(2) SRAM card CPU module battery replacement procedure

Replace the SRAM card battery in the following procedure.

POINTS

Replace the battery while paying attention to the following.

(a) To back up the data, replace the SRAM card battery with the PLC power supply ON and the SRAM card installed.
(b) Start replacement after backing up the CPU module data using GX Developer.
(c) Since replacement is made with the PLC power supply ON, take extreme care not to get an electric shock.
(d) When dismounting or mounting the battery holder on the SRAM card, take care so that the battery does not come out of the battery holder.
(e) When replacing the battery with the PLC power supply OFF, always back up the data before starting replacement.
[Battery replacement procedure]
1) Back up the SRAM card data using GX Developer.
2) Replace the battery.
3) Write the backed up data from GX Developer to the memory card.



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) Status of input/output devices
4) Power supply module, CPU module, I/O module, intelligent function module, installation condition of extension cable
5) Status of wiring (I/O cables, cables)
6) Display status of various types of indicators ("POWER" LED, "RUN" LED, "ERR." LED, I/O LED)
7) Status of setting of various types of set switches (Setting of No. of stages of extension base unit, power interrupt hold-on status)

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 switch to STOP.
2) Reset the trouble with the RESET/L.CLR 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.

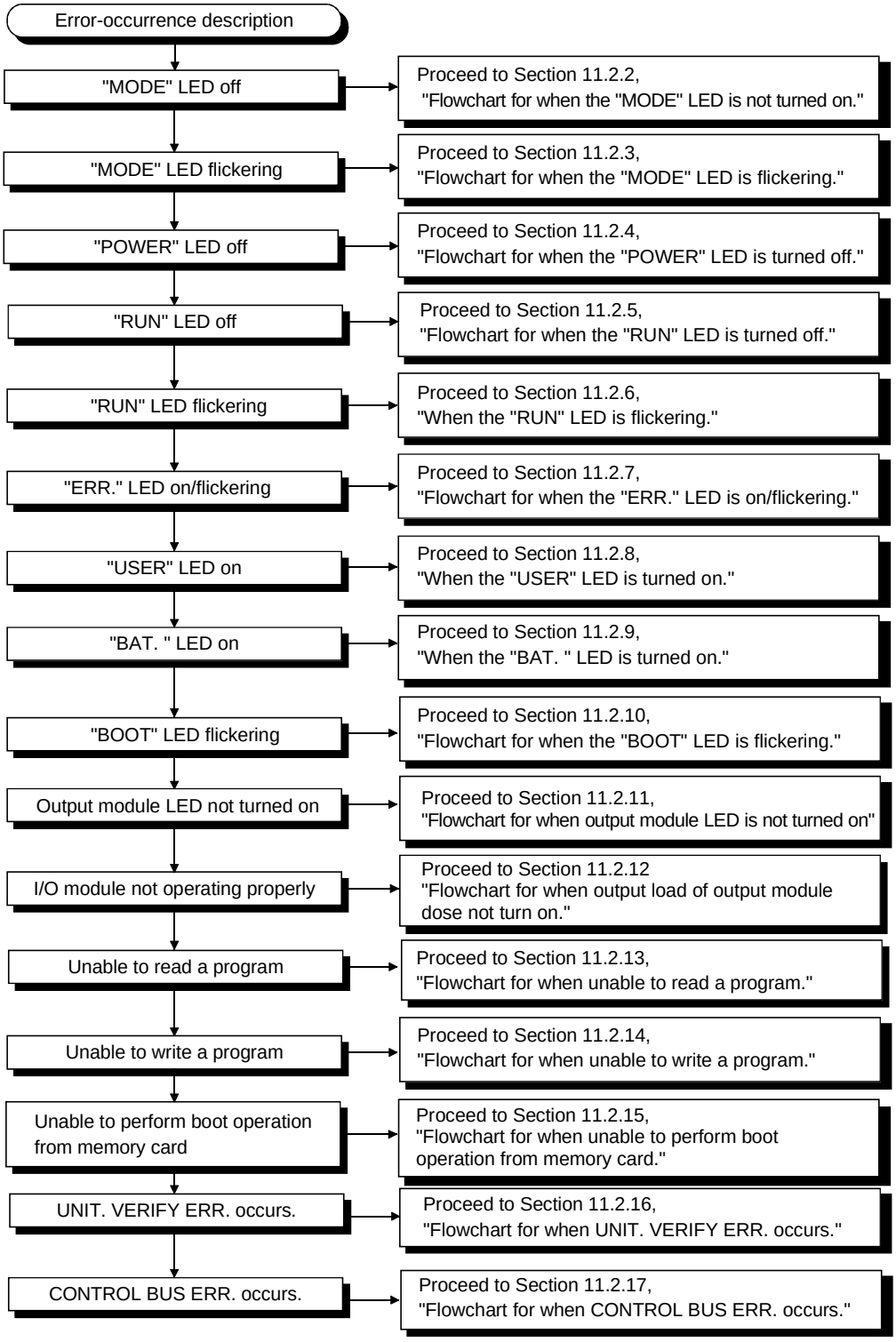
1) PLC or external devices
2) I/O module or others
3) Sequence program

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

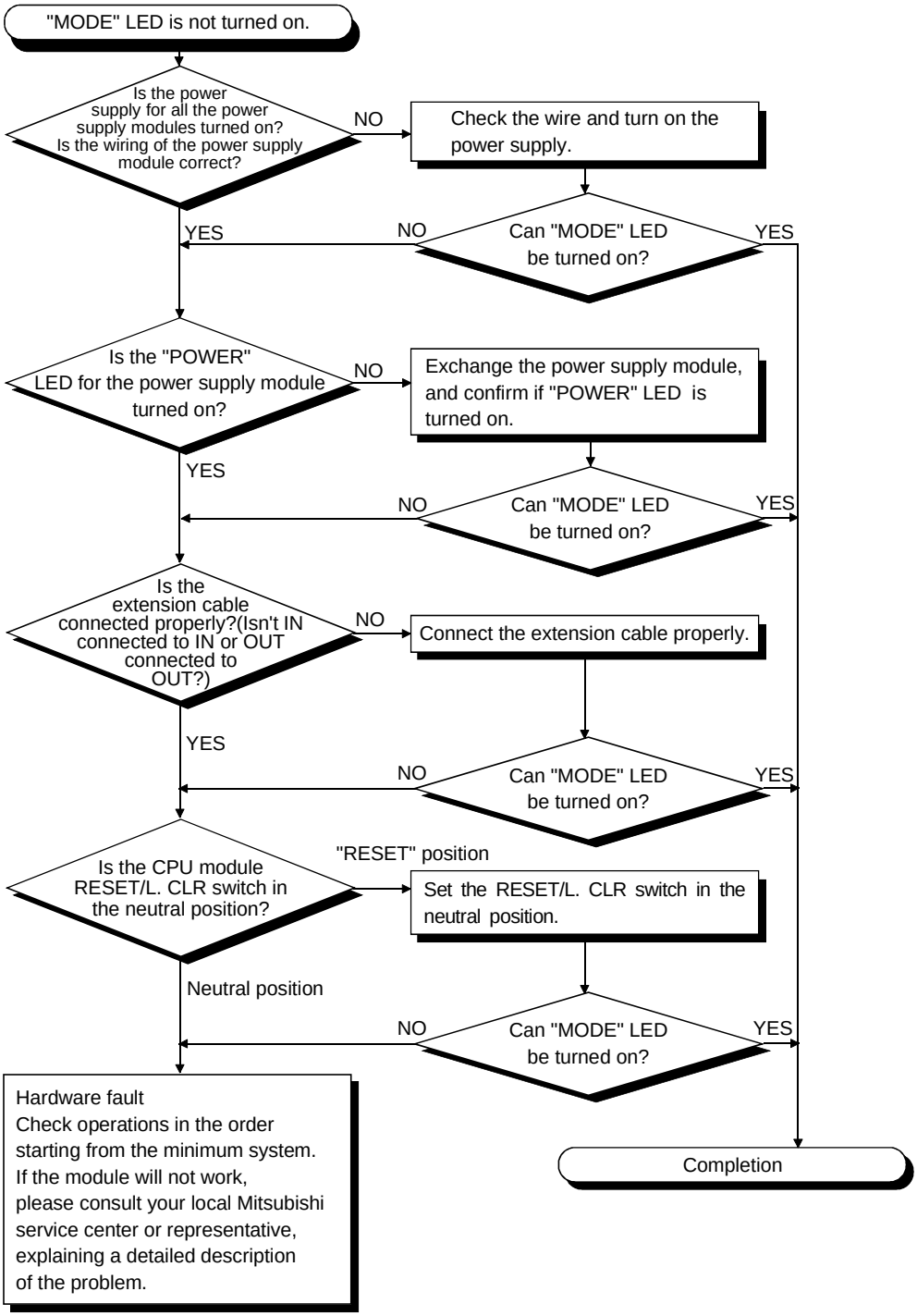
The following shows the contents of the troubles classified into a variety of groups according to the types of events.



11 - 2

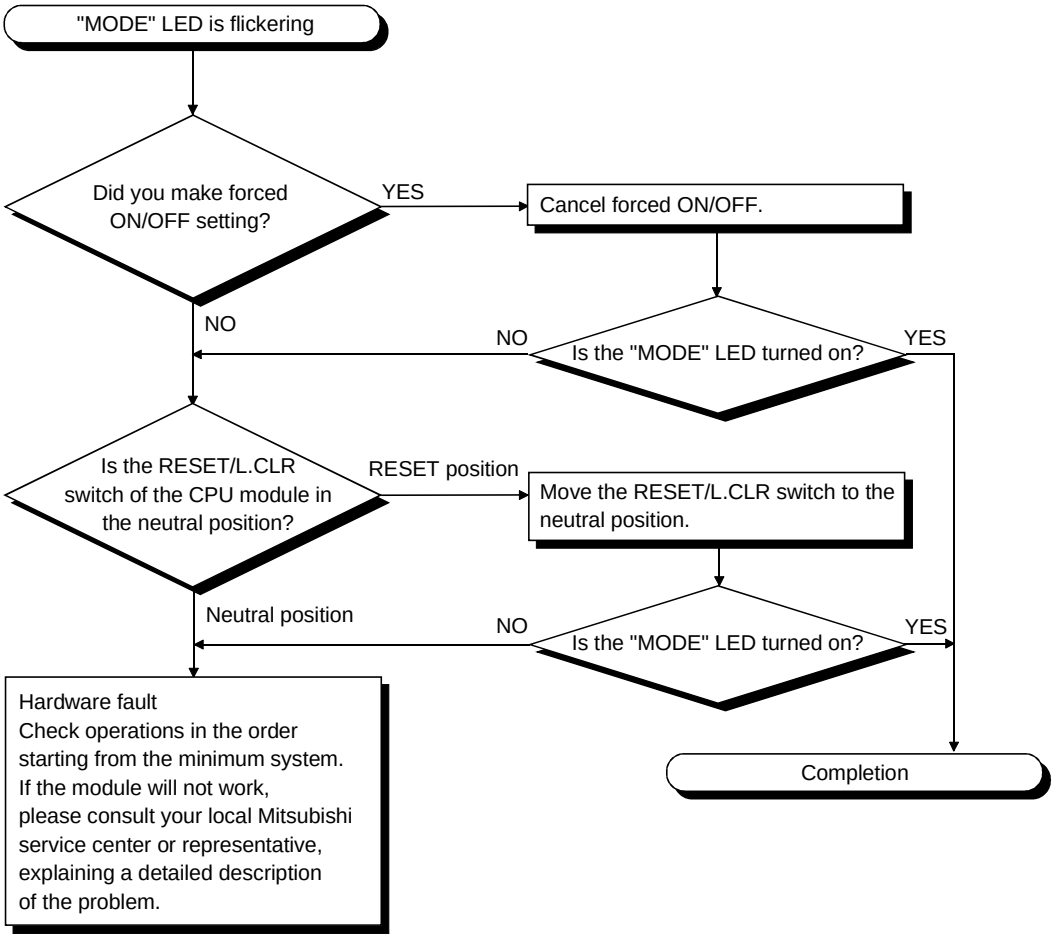
11.2.2 Flowchart for when the "MODE" LED is not turned on

The following shows the flowchart to be followed when the "MODE" LED of the CPU module does not turn on at PLC power-on.



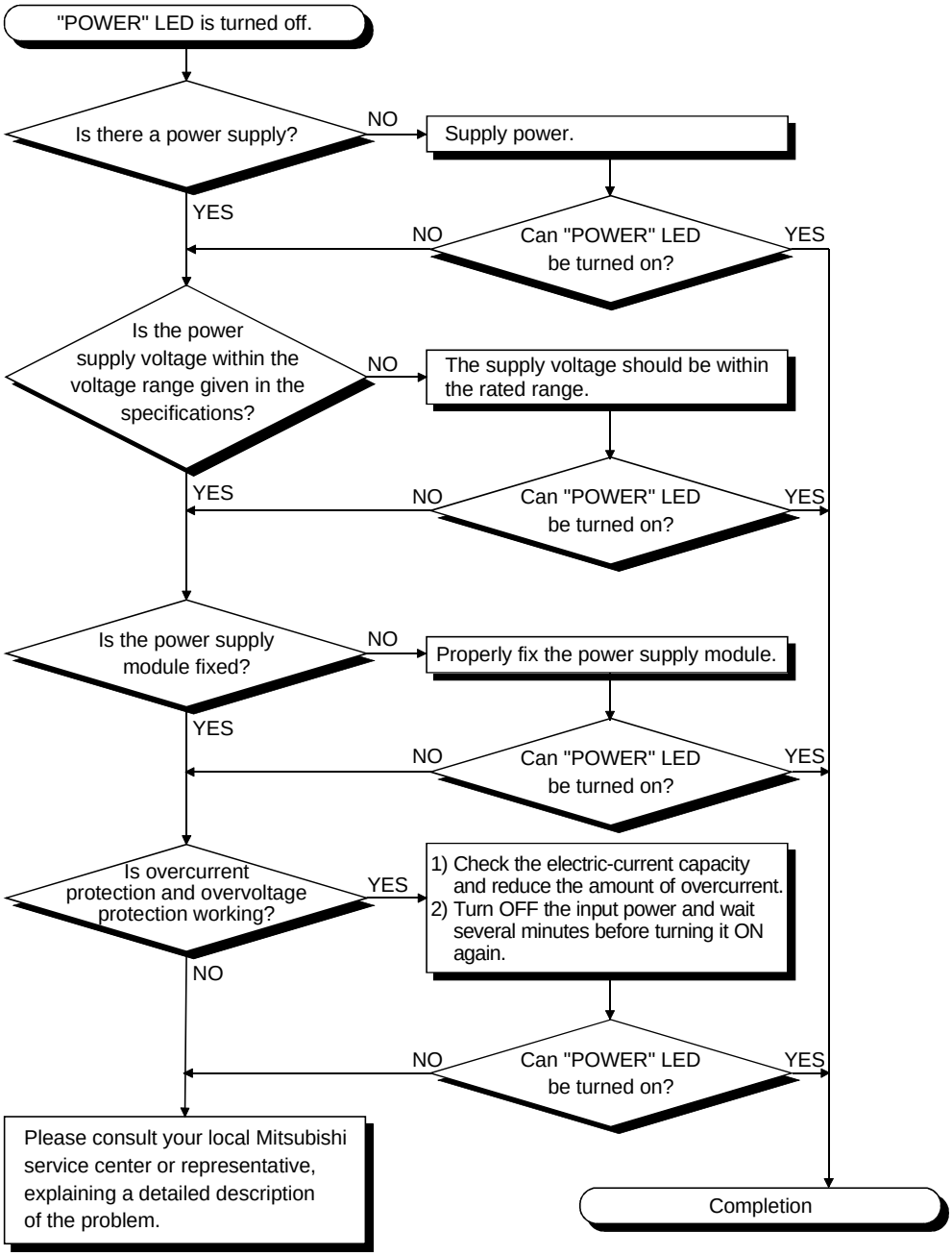
11.2.3 Flowchart for when the "MODE" LED is flickering

The following shows the flowchart to be followed when the "MODE" LED of the CPU module flickers at PLC power-on, at operation start or during operation.



11.2.4 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 turns off at PLC power-on or during operation.



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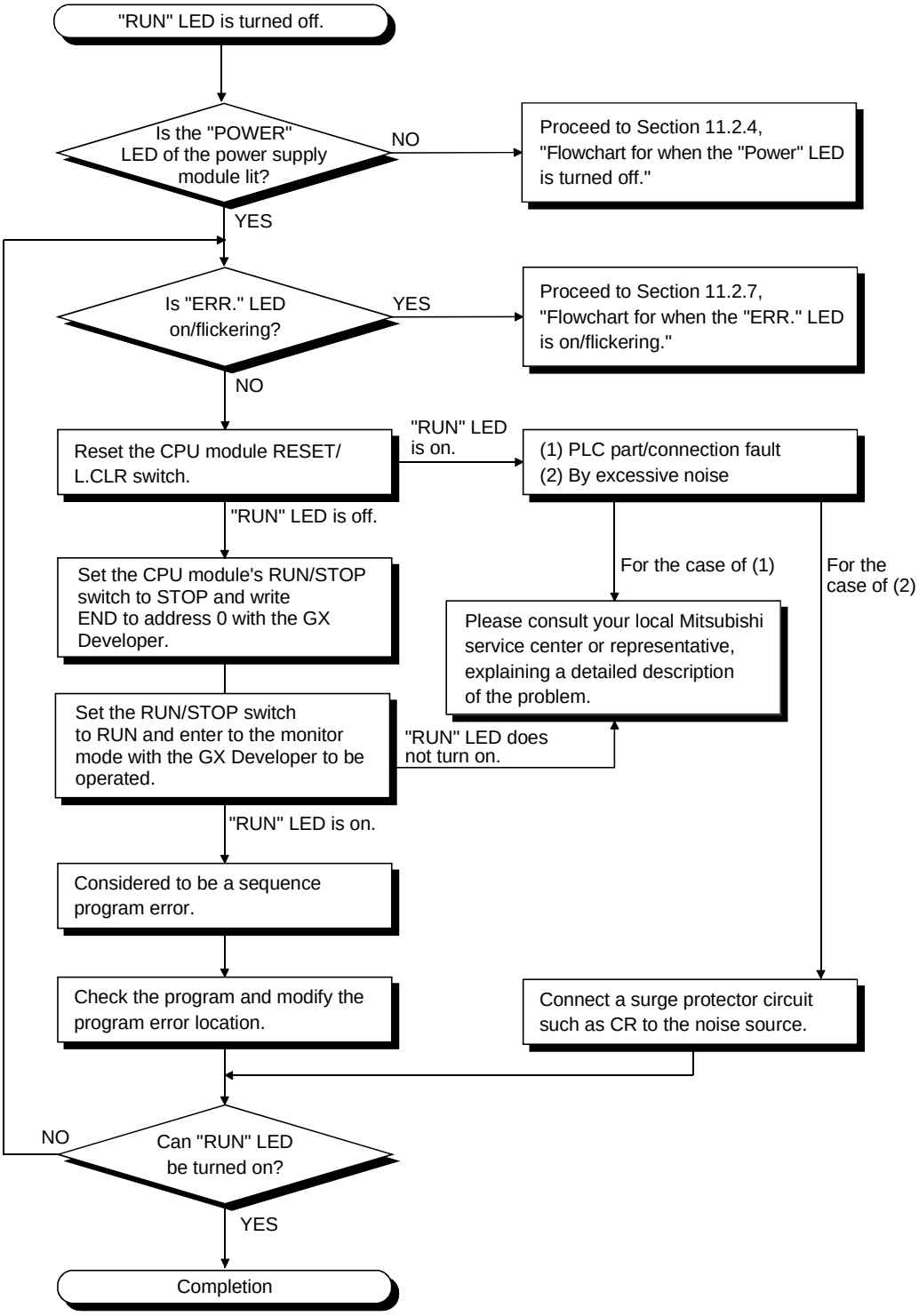
11.2.5 Flowchart for when the "RUN" LED is turned off

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

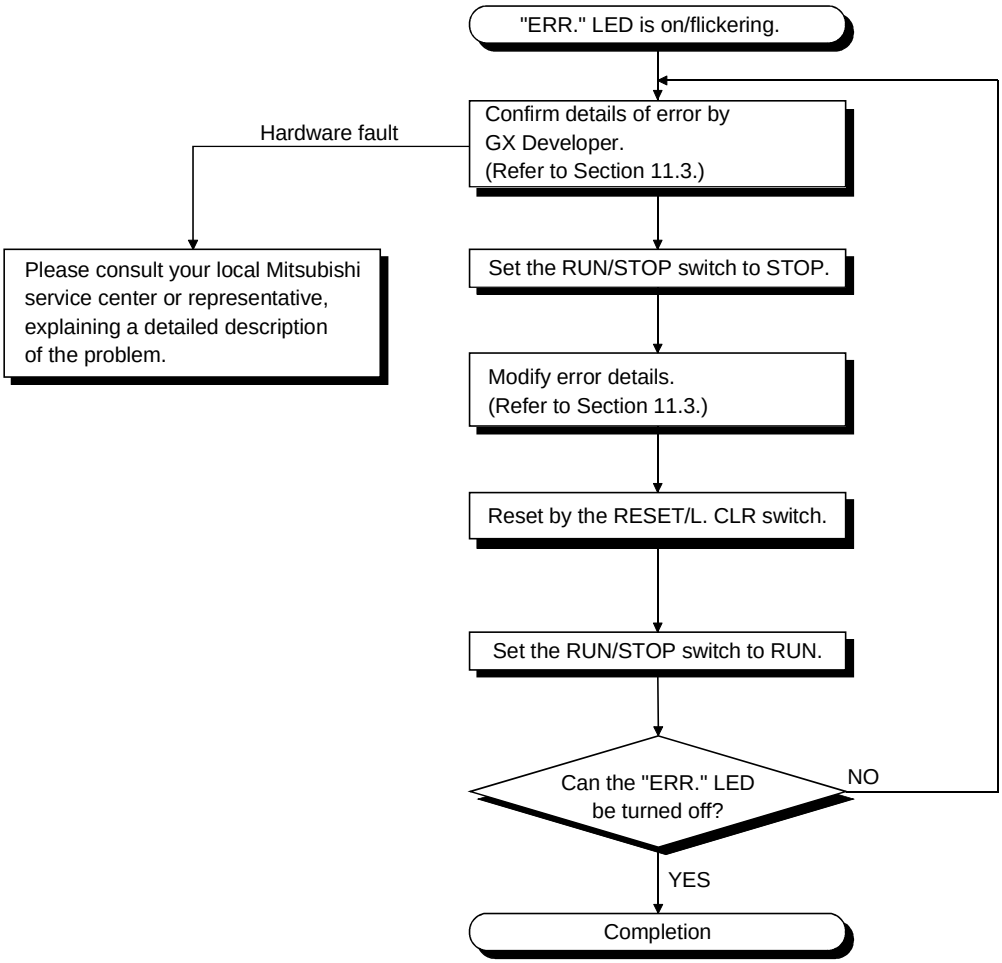


11.2.6 When the "RUN" LED is flickering

If the "RUN" LED flickers, follow the steps below.
The Process CPU flickers the "RUN" LED when the RUN/STOP switch is set from STOP to RUN after the programs or parameters are written in the CPU module 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 status, reset the CPU module with the RESET/L.CLR or set the RUN/STOP switch again from STOP to RUN.
The "RUN" LED turns on.

11.2.7 Flowchart for when the "ERR." LED is on/flickering

The following shows the flowchart to be followed when the "ERR." LED of the CPU module turns on or flickers at PLC power-on, at operation start or during operation.



11.2.8 When the "USER" LED is turned on

If the "USER" LED turns on, follow the steps described below.
The "USER" LED turns on when an error is detected by the CHK instruction or the annunciator (F) turns on.
If the "USER" LED is on, monitor the special relays SM62 and SM80 in the monitor mode of GX Developer.

- When M62 has turned ON
  The annunciator (F) is ON.
  Using SD62 to SD79, check the error cause.
- When SM80 has turned ON
  The "USER" LED was on by the execution of the CHK instruction.
  Using SD80, check the error cause.

Eliminate the error cause after confirming it.
The "USER" LED can be turned off by:

- Making a reset with the RESET/L.CLR switch; or
- Executing the LEDR instruction in the sequence program.

REMARK

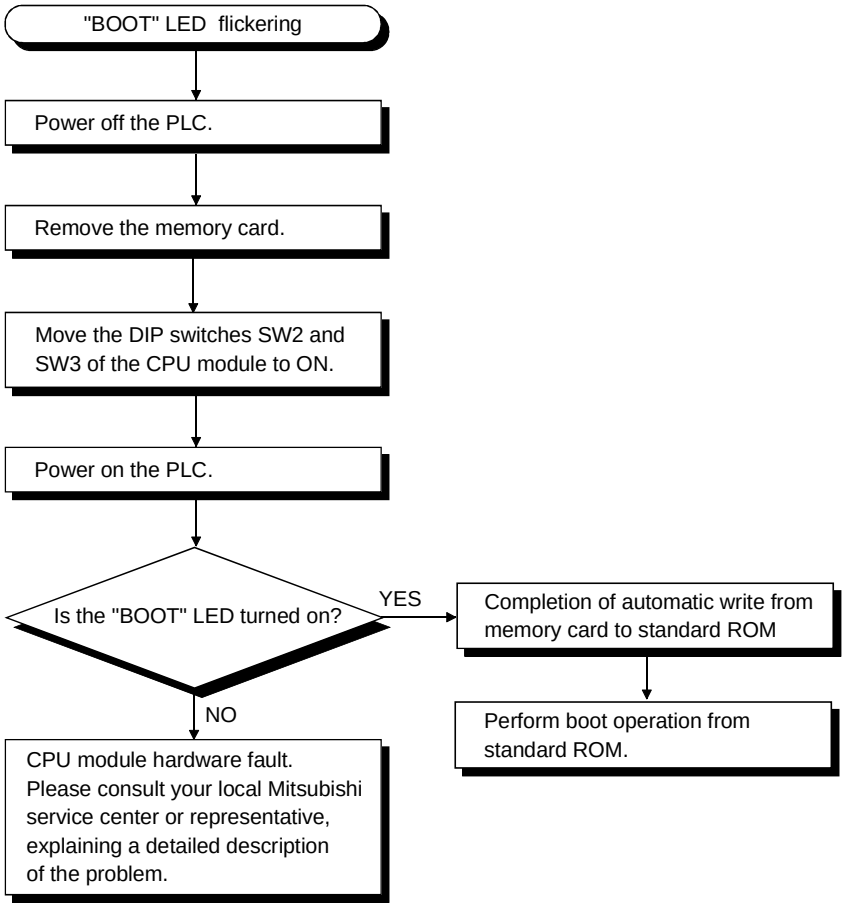
When the RESET/L.CLR switch is tilted to L.CLR several times for latch clear operation, the "USER" LED flickers to indicate that the latch clear processing is under operation.
When the RESET/L.CLR switch is further tilted to L.CLR while the "USER" LED flickers, the "USER" LED turns off and terminates the latch clear processing.

11.2.9 When the "BAT." LED is turned on

If the "BAT." LED turns on, follow the steps described below.
The "BAT." LED turns on when a low battery capacity is detected.
If the "BAT." LED is on, monitor the special relays and special registers in the monitor mode of GX Developer to check which of the CPU module and SRAM card batteries was lowered in capacity. (SM51 to SM52, SD51 to SD52)
After confirmation, replace the battery with a new one, and reset the CPU module with the RESET/L.CLR switch or run the LEDR instruction, and the "BAT. " LED will turns off.

11.2.10 Flowchart for when the "BOOT" LED is flickering

The following shows the flowchart to be followed when the "BOOT" LED of the CPU module flickers at PLC power-on, at operation start or during operation.



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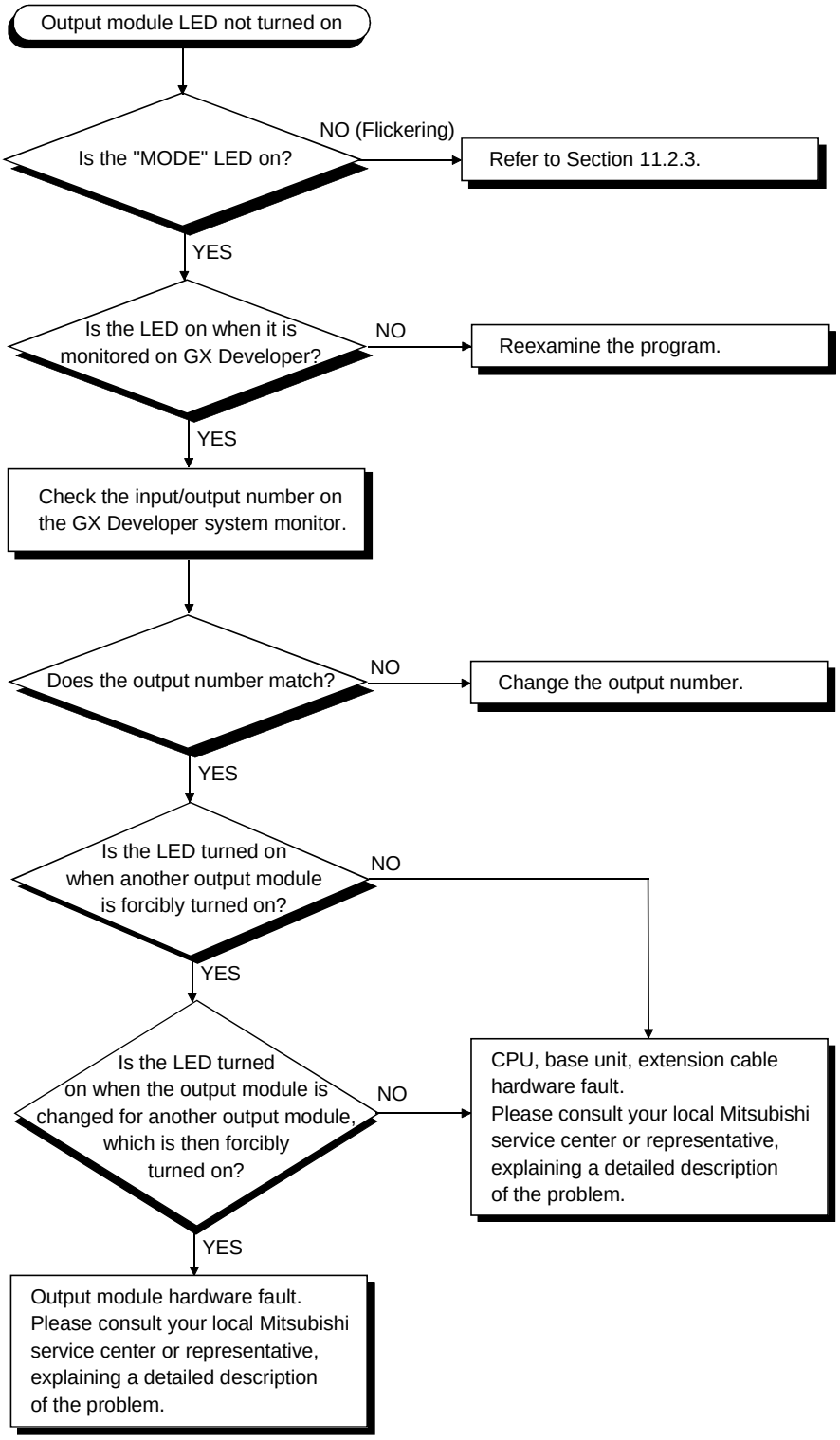
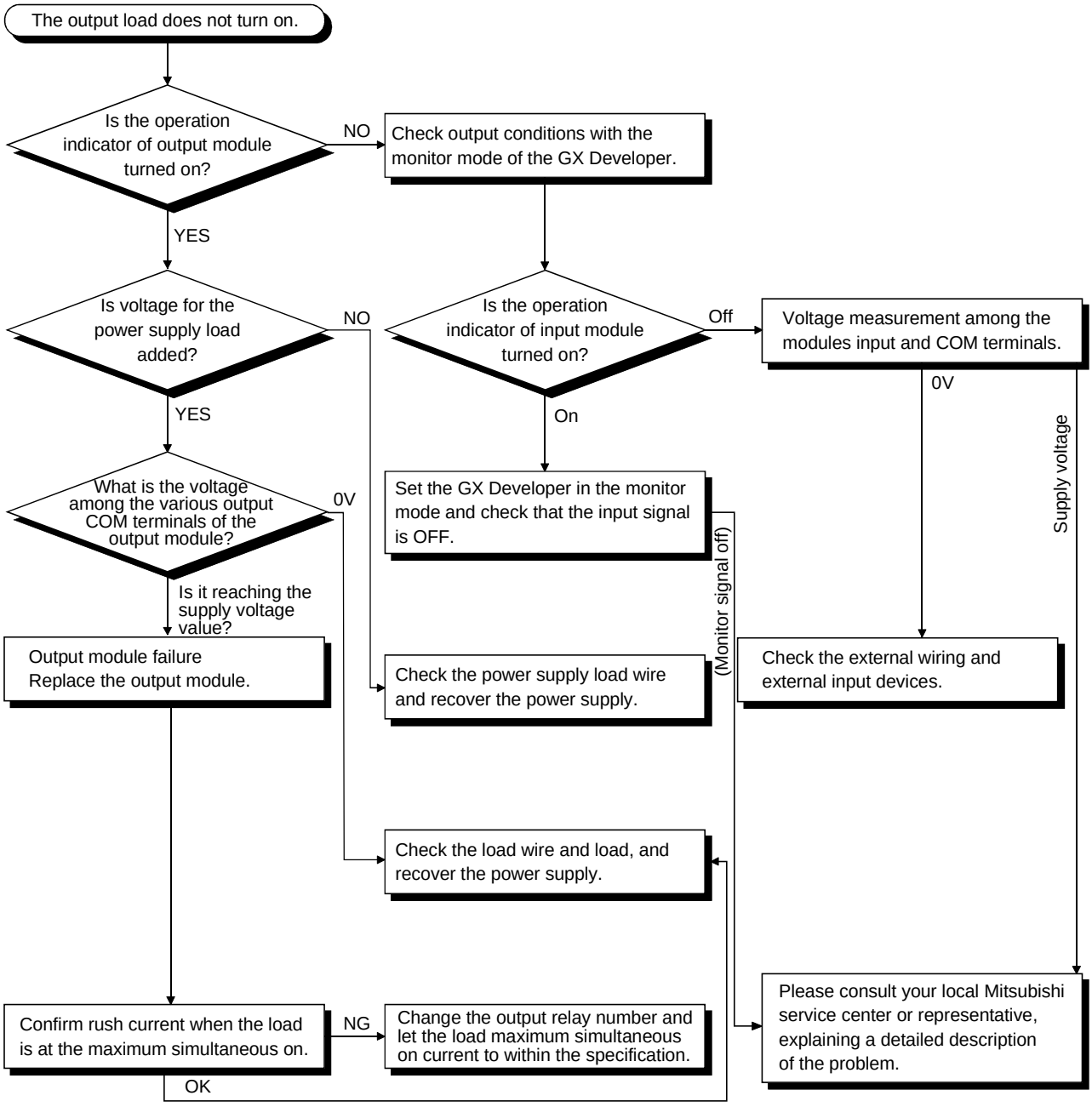
11.2.11 Flowchart for when output module LED is not turned on

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



11.2.12 Flowchart for when output load of output module does not turn on

The following shows the flowchart to be followed when the output load of the output module does not turn on during PLC operation.

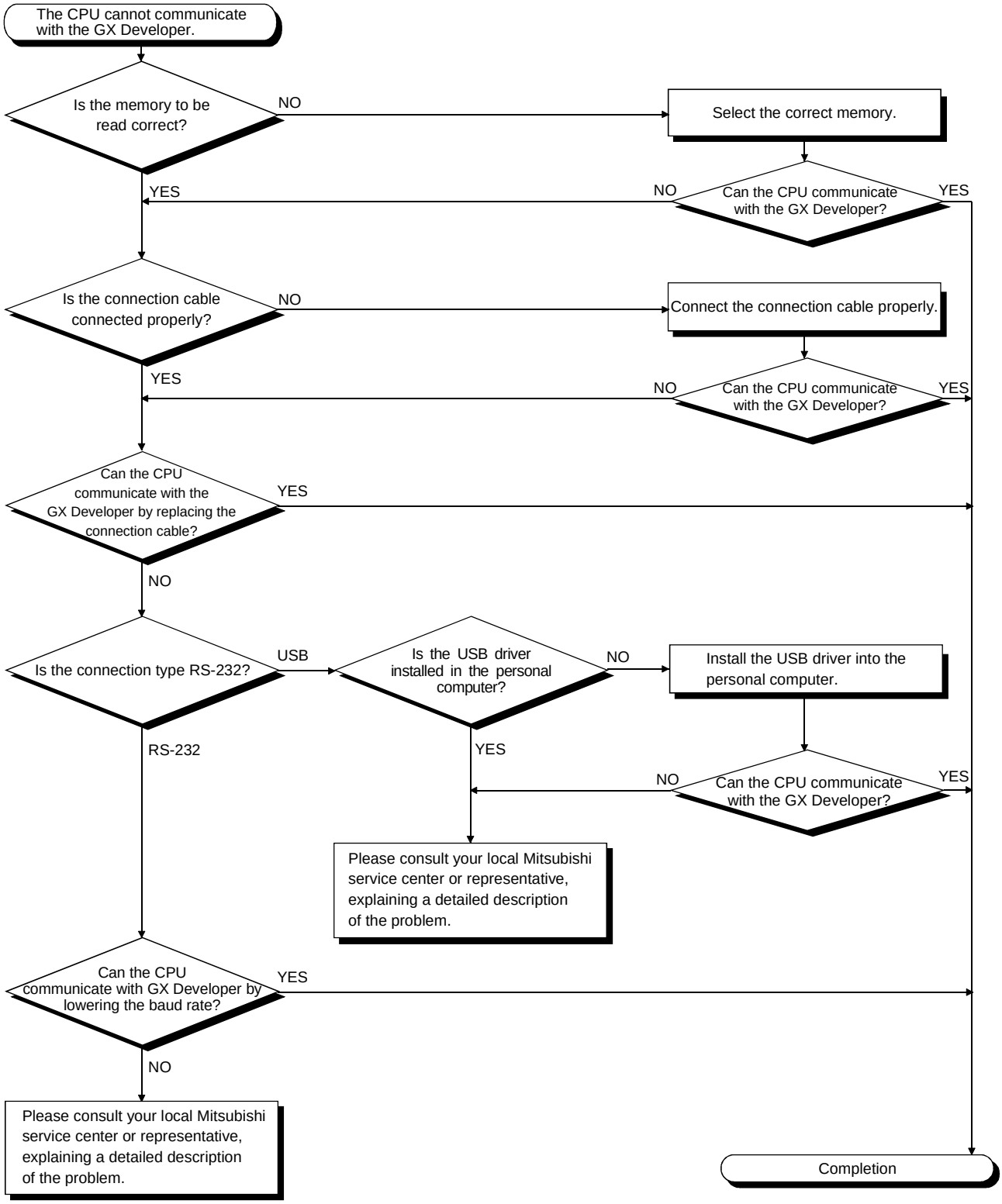


POINT

For the trouble that the input signal to the input module is not turned off, troubleshoot referring to Section 11.5 Examples of I/O ModuleTroubleshooting.

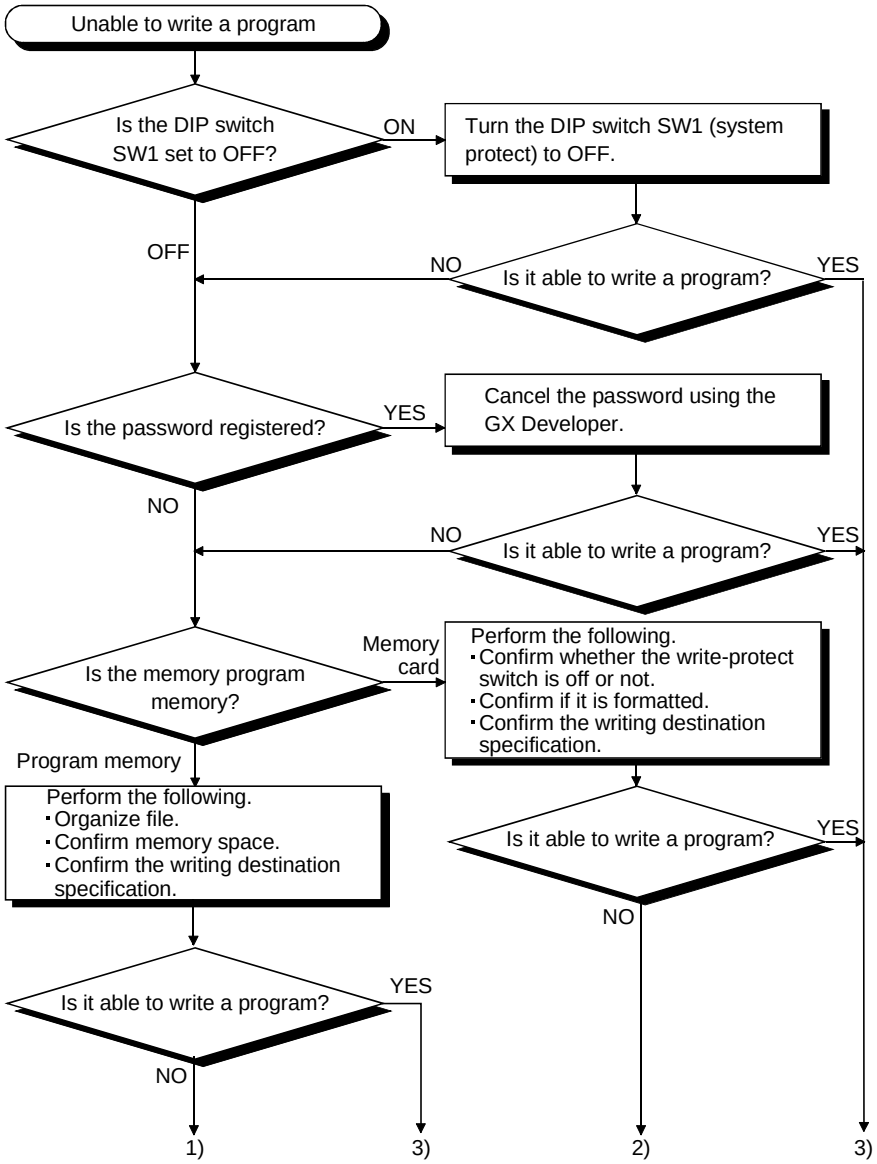
11.2.13 Flowchart for when unable to read a program

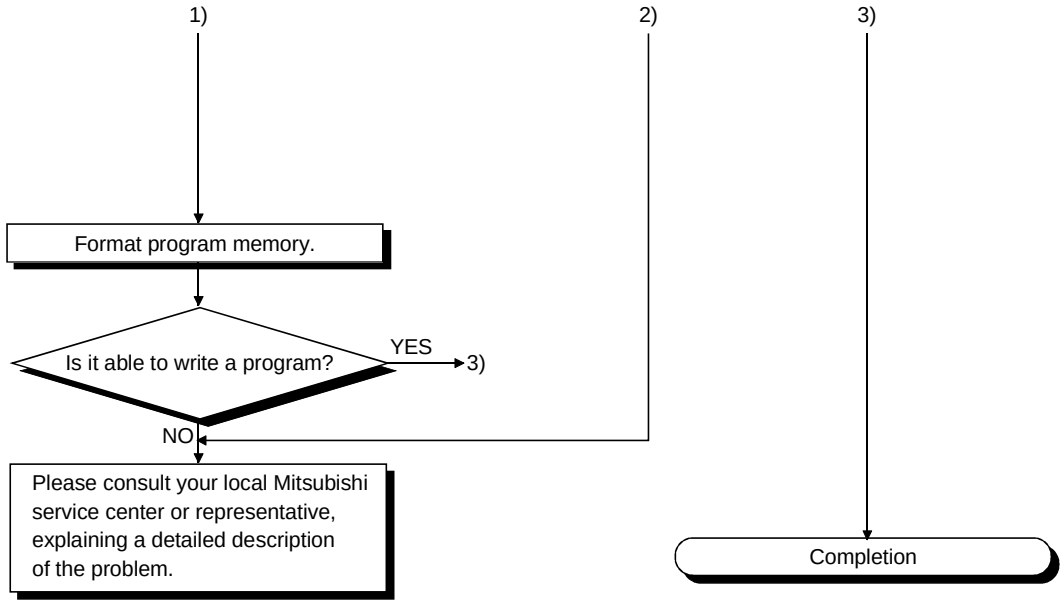
The following shows the flowchart to be followed when communication with GX Developer cannot be made during PLC power-on.



11.2.14 Flowchart for when unable to write a program

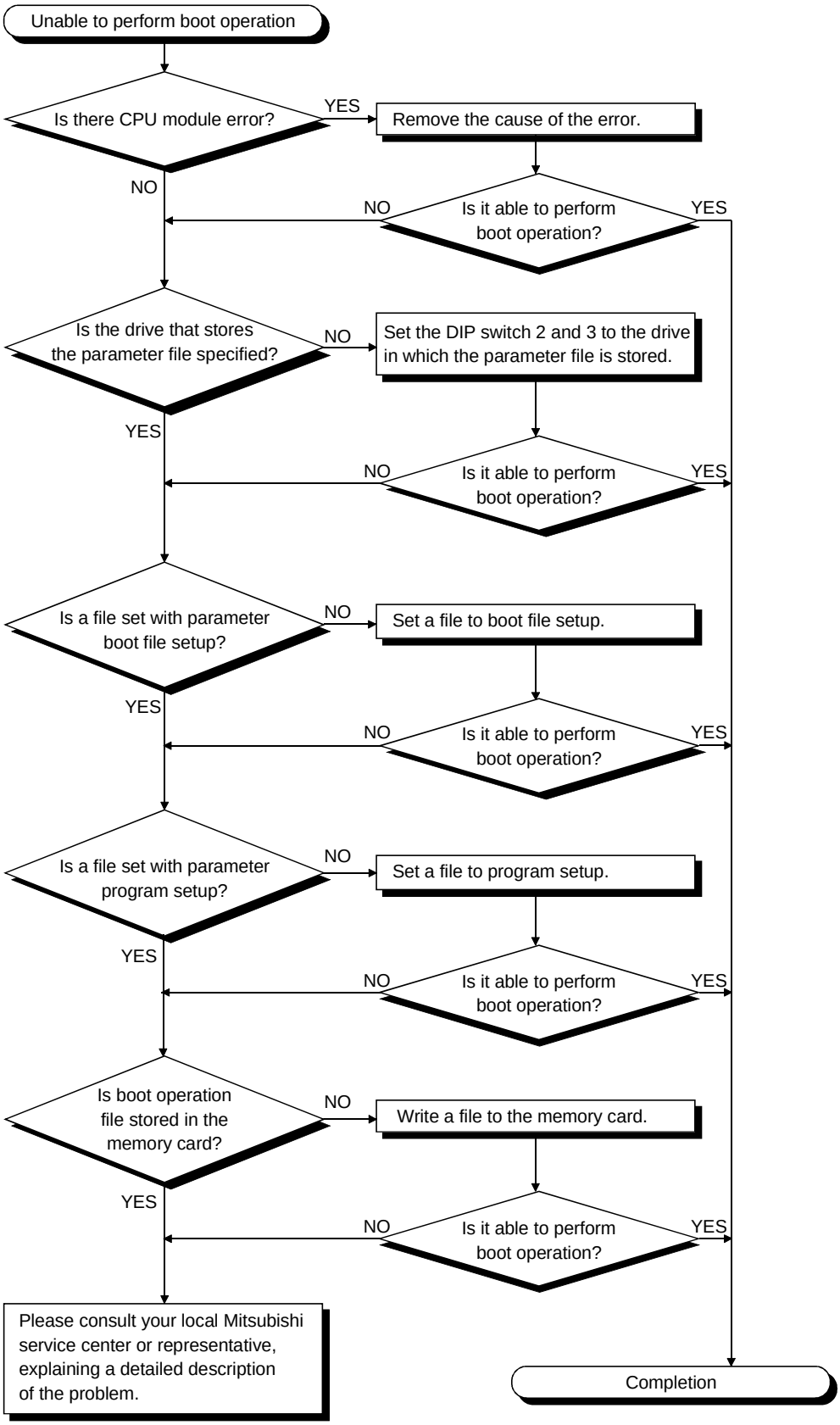
The following shows the flowchart to be followed when programs cannot be written in the CPU module.




1)
2)
3)
Format program memory.
Is it able to write a program?
YES
3)
NO
Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
Completion

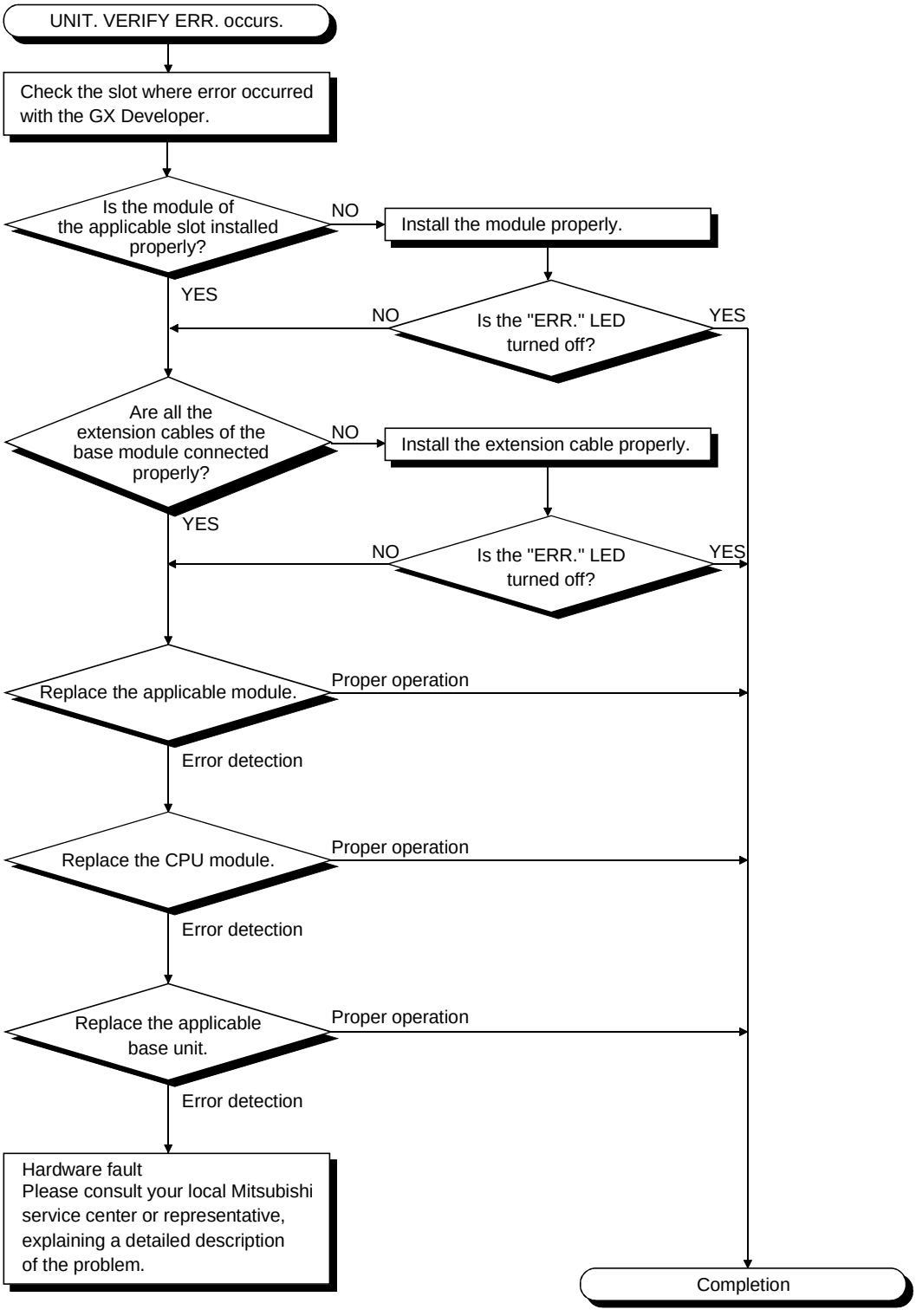
11.2.15 Flowchart for when it is unable to perform boot operation from memory card

The following shows the flowchart that must be followed when the boot operation of the CPU module cannot be performed using the memory card.



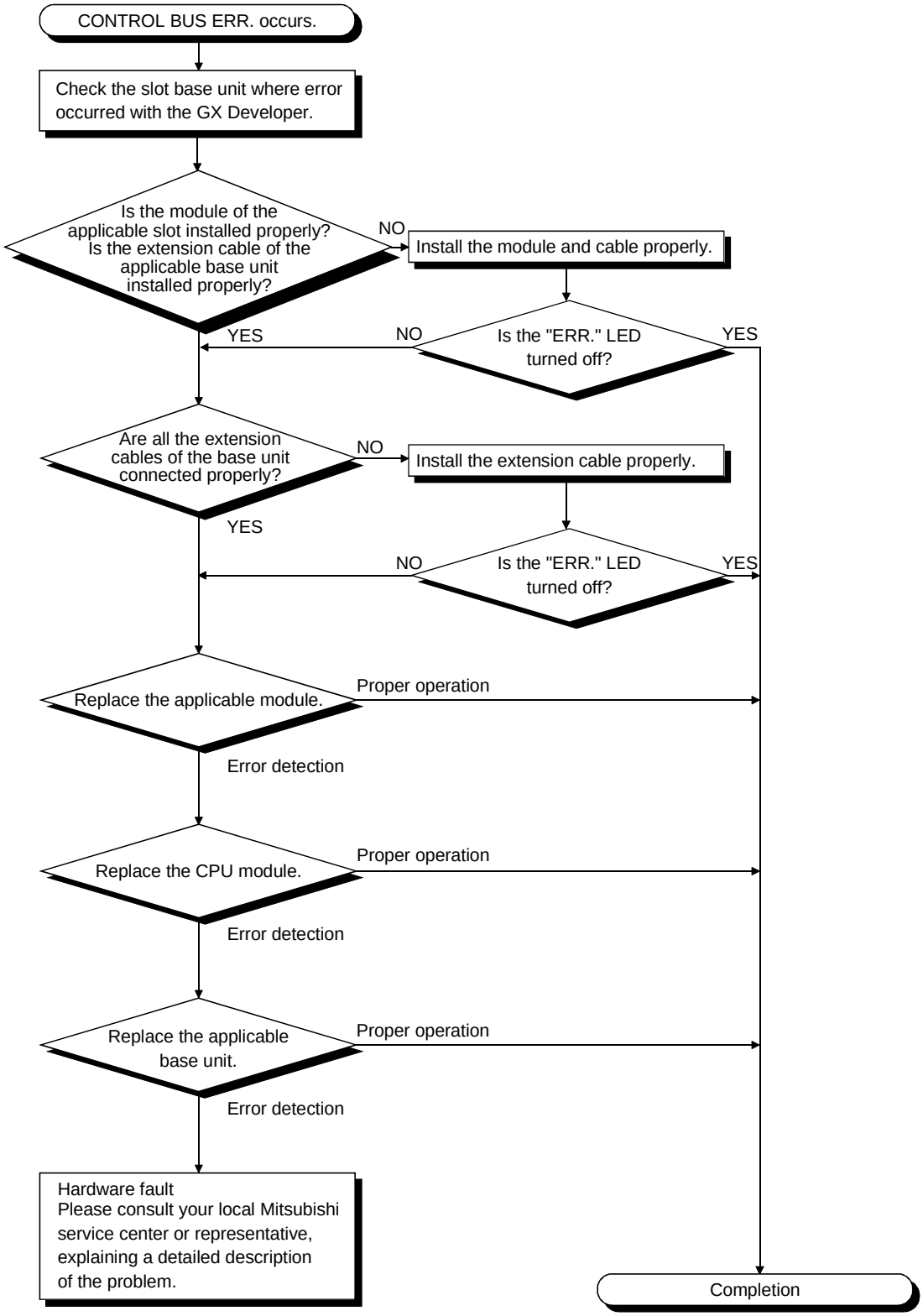
11.2.16 Flowchart for when UNIT VERIFY ERR. occurs

The following shows the flowchart to be followed when UNIT VERIFY ERR. occurs at PLC power-on or during operation.



11.2.17 Flowchart for when CONTROL BUS ERR. occurs

The following shows the flowchart to be followed when CONTROL BUS ERR. occurs at PLC power-on or during 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

If a fault occurs when the PLC power supply is switched on or the stopped CPU module runs or during RUN, the High Performance model QCPU displays an error (on the LED) using the self-diagnosis function and stores the error information into the special relays SM and special registers SD.

REMARK

For the error code (4000H to 4FFFH) developed upon a request for general data processing from the GX Developer, intelligent function module or network system, refer to Appendix 1.

11.3.1 Procedure for reading error codes

When an error occurs, the error code and error message can be read by the GX Developer Version 4 or later.
The procedure for reading error codes by the GX Developer is as follows.

1) Start the GX Developer.
2) Connect the CPU module to the personal computer.
3) Select [Online] - [Read from PLC] Menu by the GX Developer, and also read the project from the High Performance model QCPU.
4) Select the [Diagnostics] - [Diagnostics PLC] 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 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.
"○" in the Corresponding CPU column indicates that the error is applied to Process CPU module.
"Rem" indicates compatibility with the remote I/O module.

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				Off	Flicker	Stop	Always	
1006								
1007								
1008								
1009								
1010	END NOT EXECUTE	———	———	Off	Flicker	Stop	When an END instruction is executed.	
1011								
1012								
1101	RAM ERROR	———	———	Off	Flicker	Stop	At power ON/At reset	
1102								
1103								
1104								
1105								
1200	OPE. CIRCUIT ERR.	———	———	Off	Flicker	Stop	At power ON/At reset	
1201								
1202								
1300	FUSE BREAK OFF	Unit/module No.	———	Off/ON	Flicker/On	Stop/ Continue ∗2	When an END instruction is executed.	
1310	I/O INT ERROR	Unit/module No.	———	Off	Flicker	Stop	During interrupt	

∗1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.
∗2 The CPU module 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	Corres-ponding CPU
	1000	Run mode suspended or failure of main CPU module (1) Malfunctioning due to noise or other reason (2) Hardware fault	(1) Measure noise level. (2) Reset and establish the RUN status again. If the same error is displayed again, this suggests a CPU module hardware error. Contact your nearest Mitsubishi representative.	○
	1001			
	1002			
	1003			
	1004			
	1005			○ + Rem
	1006			○
	1007			
	1008			
	1009	Failure of the power supply module, CPU module, main base unit, extension base unit or extension cable is detected.		
	1010	Entire program was executed without the execution of an END instruction. (1) When the END instruction is executed it is read as another instruction code, e.g. due to noise. (2) The END instruction has been changed to another instruction code somehow.	(1) Measure noise level. (2) Reset and establish the RUN status again. If the same error is displayed again, this suggests a CPU module hardware error. Contact your nearest Mitsubishi representative.	○
	1011			
	1012			
	1101	Error in program memory where CPU module 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 module.		
	1105	CPU shared memory fault	(1) Measure noise level. (2) Reset and establish the RUN status again. If the same error is displayed again, this suggests a CPU module hardware error. Contact your nearest Mitsubishi representative.	○
	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.	(1) Check FUSE LED of the output modules and replace the module whose LED is lit. (2) The module with a blown fuse can also be checked with a GX Developer. Monitor special registers SD1300 to SD1331 and check if there is a bit "1," which corresponds to the module with a blown fuse.	○ + Rem
	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.	○

∗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) ✻1	Individual Information (SD16 to 26) ✻1	LED Status		Operating Statuses of CPU	Diagnostic Timing
				RUN	ERROR		
1401	SP. UNIT DOWN	Unit/module No.	———	Off/On	Flicker/On	Stop/ Continue ✻3	At power ON/At reset/ When intelligent function module is accessed.
1402	SP. UNIT DOWN	Unit/module No.	Program error location	Off/On	Flicker/On	Stop/ Continue ✻3	When an intelligent function module access instruction is executed.
1403			———				When an END instruction is executed.
1411	CONTROL-BUS ERR.	Unit/module No.	Program error location	Off	Flicker	Stop	At power ON/At reset
1412							During execution of FROM/TO instruction set.
1413	CONTROL-BUS. ERR.	———	———	off	Flicker	Stop	Always
1414	CONTROL-BUS. ERR.	Unit/module No.	———	Off	Flicker	Stop	When an END instruction is executed.
	CONTROL-BUS. ERR.	———	———	off	Flicker	Stop	When an END instruction is executed
1415		Base No.		Off	Flicker	Stop	When an END instruction is executed
1416		Unit/module No.					At power ON/At reset
1500	AC DOWN	———	———	On	Off	Continue	Always
1600	BATTERY ERROR	Drive Name	———	ON	On	Continue	Always
1601				BAT.ALM LED On			
2000	UNIT VERIFY ERR.	Unit/module No.	———	Off/On	Flicker/On	Stop/ Continue ✻2	When an END instruction is executed.

✻1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.
✻2 The CPU module 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.

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	Error Code (SD0) ∗1	Error Contents and Cause	Corrective Action	Corres-ponding CPU
	1401	• There was no response from the intelligent function module during initial communication stage. • The size of the buffer memory of the intelligent function module is wrong.	The CPU module is experiencing hardware problems. Contact your nearest Mitsubishi representative.	○ + Rem
	1402	The intelligent function module was accessed in the program, but there was no response.	This suggests a CPU hardware error. Contact your nearest Mitsubishi representative.	○ + Rem
	1403	• There was no response from the intelligent function module when the END instruction is executed. • An error is detected at the intelligent function module.	The intelligent function module that was being accessed is experiencing hardware problems. Contact your nearest Mitsubishi representative.	○ + Rem
	1411	When performing a parameter I/O allocation the 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.	The intelligent function module, the CPU module, or the base unit is experiencing problems. Contact your nearest Mitsubishi representative.	○ + Rem
	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 in the individual information.		○
	1413	The High Performance model QCPU of function version A was loaded in a multiple CPU system configuration.	(1) Change the High Performance model QCPU of function version A for the High Performance model QCPU of function version B. (2) An intelligent function module, CPU module or the base unit is experiencing problems. Contact your nearest Mitsubishi representative.	○
		An error is detected on the system bus. • Wait-length time-out, arbitration time-out.	An intelligent function module, the CPU module, or the base unit is experiencing problems. Contact your nearest Mitsubishi representative.	○ + Rem
	1414	Fault of the loaded module was detected. The High Performance model QCPU of function version A was loaded in a multiple CPU system configuration.	(1) Change the High Performance model QCPU of function version A for the High Performance model QCPU of function version B. (2) An intelligent function module, CPU module or the base unit is experiencing problems. Contact your nearest Mitsubishi representative.	○
		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.	○ + Rem
	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	System bus fault was detected at power-on or reset.		
	1500	A momentary power supply interruption has occurred. The power supply went off.	Check the power supply.	○ Rem
	1600	(1) Voltage in the CPU module battery. (2) The CPU module battery is not connected.	(1) Change the battery. (2) If the battery is for program memory, standard RAM or for the back-up power function, install a lead connector.	○
	1601	Voltage of the battery on memory card 1 has dropped below stipulated level.	Change the battery.	
	2000	I/O module information power ON is changed. I/O module (or intelligent function module) not installed properly or installed on the base unit.	Read the error common information at the GX Developer, and check and/or change the module that corresponds to the numerical value (module number) there. Alternatively, monitor the special registers SD1400 to SD1431 at the GX Developer, and change the fuse at the output module whose bit has a value of "1".	○ Rem
		The High Performance model QCPU of function version A was loaded in a multiple CPU system configuration.	Change the High Performance model QCPU of function version A for the High Performance model QCPU of function version B.	○

∗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) ∗1	Individual Information (SD16 to 26) ∗1	LED Status		Operating Statuses of CPU	Diagnostic Timing	
				RUN	ERROR			
2100	SP. UNIT LAY ERR.	Unit/module No.	———	Off	Flicker	Stop	At power ON/At reset	
2103								
2106								
2107								

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

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Error Code (SD0) ∗1	Error Contents and Cause	Corrective Action	Corres-ponding CPU
2100	Slot loaded with the QI60 is set to other than the Inteli (intelligent function module) or Interrupt (interrupt module) in the parameter I/O assignment.	Make setting again to match the parameter I/O assignment with the actual loading status.	○
	(1) In the parameter I/O allocation settings, an Inteli (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) A general-purpose switch was set to the module with no general-purpose switches.	(1) Reset the parameter I/O allocation setting to conform to the actual status of the intelligent function module and the CPU module. (2) Delete the general-purpose switch settings.	
2103	(1) Two or more QI60 modules are loaded in a single CPU system. (2) Two or more QI60 modules are set to the same control PLC in a multiple CPU system.	(1) Reduce the number of QI60 module loaded in the single CPU system to one. (2) Change the number of QI60 module set to the same control PLC to only one in the multiple CPU system.	○
	The QI60 is loaded.	Remove the QI60.	Rem
2106	• Five or more MELSECNET/H modules are loaded in a whole multiple CPU system. • Five or more Q series Ethernet interface modules are loaded in a whole multiple CPU system.	Reduce the number of modules to four or less in the whole multiple CPU system.	○
	(1) 5 or more MELSECNET/H modules have been installed. (2) 5 or more Q series Ethernet interface modules have been installed. (3) Identical network numbers or station numbers exist in the MELSECNET/10 network system.	(1) Keep the number to 4 or fewer. (2) Keep the number to 4 or fewer. (3) Check the network numbers and station numbers.	○ + Rem
2107	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 intelligent function modules.	○ Rem

∗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) ∗1	Individual Information (SD16 to 26) ∗1	LED Status		Operating Statuses of CPU	Diagnostic Timing
				RUN	ERROR		
2110	SP. UNIT ERROR	Unit/module No.	Program error location	Off/On	Flicker/On	Stop/ Continue ∗2	When instruction executed.
2111							
2112	SP. UNIT ERROR	Unit/module No.	Program error location	Off/On	Flicker/On	Stop/ Continue ∗2	When instruction executed/ STOP → RUN
2113		FFFFH (fixed)					
2114	SP. UNIT ERROR	Unit/module No.	Program error location	Flicker/On	Flicker/On	Continue/ Stop	When instruction is executed
2115							
2116							
2117							
2120	SP. UNIT LAY ERR.	———	———	Off	Flicker	Stop	At power ON/At reset
2121							
2122							
2124							
2125							
2126	SP. UNIT LAY ERR.	Unit/module No.	———	Off	Flicker	Stop	At power ON/At reset
2150	SP. UNIT VER. ERR.	Unit/module 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	Drive Name	———	Off	Flicker	Stop	At power ON/At reset
2300	ICM. OPE. ERROR	Drive Name	———	Off/On	Flicker/On	Stop/ Continue ∗2	When memory card is inserted or removed
2301							
2302							
2400	FILE SET ERROR	File name	Parameter number	Off	Flicker	Stop	At power ON/At reset

∗1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.
∗2 The CPU module operation status when an error occurs can be set at the parameters. (LED display will change accordingly.)

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	Error Code (SD0) ∗1	Error Contents and Cause	Corrective Action	Corres-ponding CPU
	2110	Station not loaded was specified using the instruction whose target was the CPU share memory.	Read the individual information of the error, check the program corresponding that value (program error location), and make correction.	○
		(1) The location designated by the FROM/TO instruction set is not a intelligent function module. (2) The intelligent function module, Network module being accessed is faulty.	(1) Read error individual information, then check and edit the FROM/TO instruction set that corresponds to the numerical value there (Program error location). (2) 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.	
	2111	The location designated by a link direct device (J□\□) is not a network module.		
	2112	(1) The location designated by a intelligent function module dedicated instruction is not a intelligent function module. (2) The network number specified by the network dedicated instruction does not exist, or the network module is not the corresponding one. (3) Alternatively, it is not the relevant intelligent function module.	Read error individual information, then check and edit the special function module (Network module) dedicated instruction that corresponds to the numerical value there (program error location).	○ + Rem
	2113	The one specified in the network-dedicated instruction is not a network module, or a relay target network does not exist.		○
	2114	An instruction, which on execution specifies other stations, has been used for specifying the host station. (An instruction that does not allow the host station to be specified).	Read the individual information of the error, check the program corresponding that value (program error location), and make correction.	
	2115	An instruction, which on execution specifies the host station, has been used for specifying other stations. (An instruction that does not allow other stations to be specified).		
	2116	• An instruction that does not allow the module under the control of another station to be specified is being used for a similar task.	Read the individual information of the error, check the program corresponding that value (program error location), and make correction.	
	2117	A CPU module that cannot be specified in the instruction dedicated to the multiple CPU system was specified.		
	2120	Either a QA1S□B or QA□B is connected.	Use a Q□B.	○ + Rem
	2121	The CPU module is installed at other than the CPU slot or slots 0 to 2.	Check the loading position of the CPU module and reinstall it at the correct slot.	
	2122	QA1S□B is used to the main base unit.	Use Q3□B as the main base unit.	
	2124	(1) A module is installed at 65th or higher slot. (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 4,096th point. (4) A module installed at the 4,096th point occupies higher points.	(1) Remove the module installed at 65th or later slot. (2) Remove the module installed at the slot later than the number of slots specified with base allocation setting. (3) Remove the module installed at the I/O points later than the 4,096th point. (4) Change the last module to a module which does not exceed the 4,096th point.	
	2125	(1) A module which the High Performance model QCPU cannot recognise has been installed. (2) There was no response form the intelligent function module.	(1) Install a module which can be used with the CPU. (2) The intelligent function module is experiencing hardware problems. Contact your nearest Mitsubishi representative.	
	2126	CPU module locations in a multiple CPU system are either of the following. (1) There is an empty slot at the left side of the CPU module. (2) A module other than the High Performance model QCPU/Process CPU, such as motion controller or PC CPU module is installed at the left side of the High Performance model QCPU/Process CPU.	(1) Eliminate empty slots between the CPU modules. (Set empty slots on the right side of the CPU modules.) (2) Remove the modules, which are not the High Performance model QCPU modules, loaded between the High Performance model QCPU modules, and fit the slots with the High Performance model QCPUs. Load the motion controller modules on the right side of the High Performance model QCPUs.	○
	2150	In a multiple CPU system, the control CPU of the intelligent function module incompatible with the multiple CPU system is set to other than station 1.	(1) Change the intelligent function module for the one compatible with the multiple CPU system (function version B). (2) Change the setting of the control CPU of the intelligent function module incompatible with the multiple CPU system to station 1.	
	2200	There is no parameter file at the drive designated by DIP switches as a valid drive.	Check and correct the setting of the parameter enabled drive switch. Put a parameter file in the drive designated by the parameter enabled drive switch.	
	2210	The contents of the boot file are incorrect.	Check the boot setting.	
	2300	(1) A memory card was removed without switching the memory card in/out switch OFF. (2) The memory card in/out switch is turned ON although a memory card is not actually installed.	(1) Remove memory card after placing the memory card in/out switch OFF. (2) Turn on the card insert switch after inserting a memory card.	○
	2301	(1) The memory card has not been formatted. (2) Memory card format status is incorrect.	(1) Format memory card. (2) Reformat memory card. Check memory card.	
	2302	A memory card that cannot be used with the CPU module has been installed.		
	2400	The file designated at the PLC file settings in the parameters cannot be found.	Read the error individual information at the 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 a file set in parameters, and write it to the CPU 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) ∗1	Individual Information (SD16 to 26) ∗1	LED Status		Operating Statuses of CPU	Diagnostic Timing
				RUN	ERROR		
2401	FILE SET ERROR	File name	Parameter number	Off	Flicker	Stop	At power ON/At reset
2410	FILE OPE. ERROR	File name	Program error location	Off/On	Flicker/ON	Stop/ Continue ∗2	When instruction is executed
2411							
2412							
2413							
2500	CAN'T EXE. PRG.	File name	———	Off	Flicker	Stop	At power ON/At reset
2501							
2502							
2503							
2504							
3000	PARAMETER ERROR	File name	Parameter number	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN
3001							
3002							
3003	PARAMETER ERROR	File name/drive name	Parameter number	Off	Flicker	Stop	When an END instruction is executed.
	PARAMETER ERROR	File name	Parameter number	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN
3004	PARAMETER ERROR	File name	Parameter number	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN
3010	PARAMETER ERROR	File name/drive name	Parameter number	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN
3012							
3013							
3014							

∗1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.
∗2 The CPU module operation status when an error occurs can be set at the parameters. (LED display will change accordingly.)

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	Error Code (SD0) ∗1	Error Contents and Cause	Corrective Action	Corres-ponding CPU
	2401	Program memory capacity was exceeded by performing boot operation or automatic write to standard ROM.	(1) Check and correct the parameters (boot setting). (2) Delete unnecessary files in the program memory. (3) Choose "Clear program memory" for boot in the parameter so that boot is started after the program memory is cleared.	○
		The file designated at the parameter PLC RAS settings fault history area has not been created.	Read the error individual information at the 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.	
	2410	The file designated by the sequence program cannot be found.	Read the error individual information at the GX Developer, check to be sure that the program corresponds to the numerical values there (program location), and correct. Create a file set in parameters, and write it to the CPU module.	○
	2411	The sequence program designated a file that cannot be designated by the sequence program (comment file, etc.).	Read the error individual information at the GX Developer, check to be sure that the program corresponds to the numerical values there (program location), and correct.	
	2412	The SFC program file is one that cannot be designated by the sequence program.		
	2413	No data has been written to the file designated by the sequence program.	Read the error individual information at the GX Developer, check to be sure that the program corresponds to the numerical values there (program location), and correct. Check to ensure that the designated file has not been write protected.	
	2500	There is a program file that uses a device that exceeds the device allocation range designated by the parameter device settings.	Read the error common information at the 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	There are multiple program files although "none" has been set at the parameter program settings.	Edit the parameter program setting to "yes". Alternatively, delete unneeded programs.	
	2502	The program file is incorrect. Alternatively, the file contents are not those of a sequence program.	Check whether the program version is ∗ ∗ ∗.QPG, and check the file contents to be sure they are for a sequence program.	○
	2503	There are no program files at all. Two or more SFC normal programs or control programs have been designated.	Check program configuration. Check parameters and program configuration.	
	2504			
	3000	In a multiple CPU system, the intelligent function module under control of another station is specified in the interrupt pointer setting of the parameter.	(1) Specify the first I/O number of the intelligent function module under control of the host station. (2) Delete the interrupt pointer setting of the parameter.	○
		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.	(1) Read the error detailed information at the GX Developer, check the parameter items corresponding to the numerical values (parameter numbers) there, and correct when necessary. (2) 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 standard RAM or on the memory card. Contact your nearest Mitsubishi representative.	○ + Rem
	3001	Parameter contents have been destroyed.		
	3002	When "use the following files" is selected for the file registers in the PLC file setting parameter, the specified file does not exist though the file register capacity has been set.		○
	3003	The automatic refresh range of the multiple CPU system exceeded the file register capacity.	Change the file register file for the one refresh-enabled in the whole range.	
		The number of devices set at the parameter device settings exceeds the possible CPU module range.	(1) Read the error detailed information at the GX Developer, check the parameter items corresponding to the numerical values (parameter numbers) there, and correct when necessary. (2) 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 internal CPU RAM or on the memory card. Contact your nearest Mitsubishi representative.	
	3004	The parameter file is incorrect. Alternatively, the contents of the file are not parameters.	Check whether the parameter file version is ∗ ∗ ∗.QPA, and check the file contents to be sure they are parameters.	
	3010	The parameter-set number of CPU modules differs from the actual number in a multiple CPU system.	Match (preset count of multi-CPU setting) - (CPU (empty) setting in I/O assignment) with the actual number of CPUs loaded.	○
	3012	Multiple CPU setting or control PLC setting differs from that of the reference station in a multiple CPU system.	Match the multi-CPU setting or control CPU setting in the parameter with that of the reference station (station 1).	
	3013	Multiple CPU automatic refresh setting is any of the followings in a multiple CPU system. (1) When a bit device is specified as a refresh device, a number other than a multiple of 16 is specified for the refresh-starting device. (2) The device specified is other than the one that may be specified. (3) The number of send points is an odd number.	Check the following in the multi-CPU automatic refresh parameters and make correction. (1) When specifying the bit device, specify a multiple of 16 for the refresh starting device. (2) Specify the device that may be specified for the refresh device. (3) Set the number of send points to an even number.	
	3014	• The unit that is used as the standard and the contents that are set are different in the online module change parameter (multiple CPU system parameter) during multiple CPU system construction. • During multiple CPU system construction, the online module change settings are enabled even though the CPU installed doesn't support online module change parameters.	• Make sure that the online module change parameter matches the machine number of the unit that is used as the standard. • Disable the online module change settings when a CPU that doesn't support online module change parameters is installed.	○

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

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Error Code List (Continued)

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		
3100	LINK PARA. ERROR	File name	Parameter number	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN
3101							
3102							
3103							
3104							
3105							
3106	LINK PARA. ERROR	File name/drive name	Parameter number	Off	Flicker	Stop	When an END instruction is executed.
	LINK PARA. ERROR	File name	Parameter number	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN
3107	LINK PARA. ERROR	File name	Parameter number	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN
3200	SFC PARA. ERROR	File name	Parameter number	Off	Flicker	Stop	STOP → RUN
3201							
3202							
3203							
3300	SP. PARA. ERROR	File name	Parameter number	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN

∗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
3100	In a multiple CPU system, the MELSECNET/H under control of another station is specified as the first I/O number in the network setting parameter of the MELSECNET/H.	(1) Delete the MELSECNET/H network parameter of the MELSECNET/H under control of another station. (2) Change the setting to the first I/O number of the MELSECNET/H under control of the host station.	○
	The network parameters of the MELSECNET/H operating in the ordinary station were rewritten to the control station, or the network parameters of the MELSECNET/H operating in the control station were rewritten to the ordinary station. (The network parameters are reflected on the module side by making a reset.)	Reset the CPU module.	
	(1) The number of actually installed modules is different from that designated in the number of modules setting parameter of MELSECNET/H. (2) The head I/O number of actually installed modules is different from that designated in the network parameter of MELSECNET/H. (3) Some data in the parameter cannot be handled. (4) The station type of MELSECNET/H has been changed while the power is on. (RESET → RUN is required to change the station type.)	(1) Check the network parameters and the installation state. If inconsistency is found, arrange consistency between the network parameters and the installation state. If network parameters are changed, write the new network parameters to the CPU module. (2) Check the number of extension stages of the extension base unit. (3) Check the connection of the extension base unit and connector. If the display unit is connected to the main base unit or extension base unit, check the connection state. (4) If the error persists after the above items (1) to (3) are checked, the hardware is faulty. Contact your nearest Mitsubishi representative and explain the symptom.	
3101	• When the station number of the MELSECNET/H module is 0, the inter-PLC network parameter setting has been made. • When the station number of the MELSECNET/H module is other than 0, the remote master parameter setting has been made.	Correct the type or station number of the MELSECNET/H module in the parameter to meet the used system.	○
	The network No. specified by a parameter is different from that of the actually mounted network. The head I/O No. specified by a parameter is different from that of the actually mounted I/O unit. The network class specified by a parameter is different from that of the actually mounted network. The network refresh parameter of the MELSECNET/H is out of the specified area.	(1) Check the network parameters and the installation state. If inconsistency is found, arrange consistency between the network parameters and the installation state. If network parameters are changed, write the new network parameters to the CPU module. (2) Check the number of extension stages of the extension base unit. (3) Check the connection state of the extension base unit and connector. If the display unit is connected to the main base unit or extension base unit, check the connection state. (4) If the error persists after the above items (1) to (3) are checked, the hardware is faulty. Contact your nearest Mitsubishi representative and explain the symptom.	
	A multi-remote I/O network was configured using a module that does not support the MELSECNET/H multi-remote I/O network.	Use a module that supports the MELSECNET/H multi-remote I/O network.	
3102	An error was discovered when the network parameter check was made at the network module.	(1) Write after correcting network parameters. (2) If the error persists after corrections have been made, contact your nearest Mitsubishi representative.	
3103	In a multiple CPU system, the Q series Ethernet interface module under control of another station is specified as the first I/O number of the Ethernet setting parameter.	(1) Delete the Ethernet setting parameter of the Q series Ethernet interface module under control of another station. (2) Change the setting to the first I/O number of the Q series Ethernet interface module under control of the host station.	○
	• Though the number of Ethernet module is set to one or more in the parameter, the actually mounted number of units is zero. • The head I/O number for the Ethernet module set parameter is different from that of the actually mounted module.	(1) Write after correcting network parameters. (2) If the error persists after corrections have been made, contact your nearest Mitsubishi representative.	○ Rem
3104	Ethernet and MELSECNET/10 use the same network number. Network number, station number or group number set by the parameter is out of range. I/O number is out of range.	(1) Write after correcting network parameters. (2) If the error persists after corrections have been made, contact your nearest Mitsubishi representative.	○ + Rem
3105	In a multiple CPU system, the Q series CC-Link module under control of another station is specified as the first I/O number of the CC-Link setting parameter.	(1) Delete the CC-Link setting parameter of the Q series CC-Link module under control of another station. (2) Change the setting to the first I/O number of the Q series CC-Link module under control of the host station.	○
	(1) Though the number of CC-Link module set in the network parameters is one or more, the actually mounted number of units is zero. (2) The head I/O number in the common parameters is different from that of the actually mounted module. (3) The station class for the CC-Link module quantity set parameters is different from that of the actually mounted station.	(1) Write after correcting network parameters. (2) If the error persists after corrections have been made, contact your nearest Mitsubishi representative.	○ + Rem
3106	The CC-Link link refresh range exceeded the file register capacity.	Change the file register file for the one refresh-enabled in the whole range.	○
	The network refresh parameter for CC-Link is out of range.	Check the parameter setting.	○ + Rem
3107	The contents of the CC-Link parameter are incorrect.	Check the parameter setting.	○ + Rem
3200	The parameter contents are incorrect.	Write after correcting parameters.	○
3201	The contents of the SFC block attribute information are incorrect.		
3202	The number of step relays designated in the parameters is less than the number used by the program.		
3203	The execution type set for an SFC program in the parameters is other than the scan execution type.		
3300	The first I/O number in the intelligent function module parameter set on GX Configurator differs from the actual I/O number.	Check the parameter setting.	○ + Rem

∗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) ∗1	Individual Information (SD16 to 26) ∗1	LED Status		Operating Statuses of CPU	Diagnostic Timing
				RUN	ERROR		
3301	SP. PARA. ERROR	File name	Parameter number	Off	Flicker	Stop	When an END instruction is executed. At power ON/Reset/ STOP → RUN
3302							At power ON/Reset/ STOP → RUN
3303	SP. PARA. ERROR	File name/drive name	Parameter number	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN
3400	REMOTE PASS. ERROR	———	———	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN
3401							
4000	INSTRCT CODE ERR.	Program error location	———	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN
4001							
4002							
4003							
4004	INSTRCT CODE ERR.	Program error location	———	Off	Flicker	Stop	At power ON/Reset/ STOP → RUN
4010	MISSING END INS.	Program error location	———	Off	Flicker	Stop	
4020	CAN'T SET (P)	Program error location	———	Off	Flicker	Stop	
4021							
4030	CAN'T SET (I)	Program error location	———	Off	Flicker	Stop	
4100	OPERATION ERROR	Program error location	———	Off/On	Flicker/On	Stop/ continue ∗2	When instruction is executed
4101							
4102		Program	Program error location			Stop/ Continue ∗2	
		Program error location	———			Stop/ continue ∗2	
4107		Program	Program error location			Stop/ Continue ∗2	
4200	FOR NEXT ERROR	Program error location	———	Off	Flicker	Stop	When instruction is executed
4201	FOR NEXT ERROR	Program error location	———	Off	Flicker	Stop	When instruction is executed
4202							
4203							

∗1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.
∗2 The CPU module operation status when an error occurs can be set at the parameters. (LED display will change accordingly.)

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	Error Code (SD0) ∗1	Error Contents and Cause	Corrective Action	Corres-ponding CPU
	3301	The refresh setting of the intelligent function module exceeded the file register capacity.	Change the file register file for the one which allows refresh in the whole range.	○
		The intelligent function module's refresh parameter setting is outside the available range.	Check the parameter setting.	○ + Rem
	3302	The intelligent function module's refresh parameter are abnormal.	Check the parameter setting.	○
	3303	In a multiple CPU system, automatic refresh setting or similar parameter setting was made to the intelligent function module under control of another station.	(1) Delete the automatic refresh setting or similar parameter setting of the intelligent function module under control of another station. (2) Change the setting to the automatic refresh setting or similar parameter setting of the intelligent function module under control of the host station.	
	3400	The first I/O number of the target module in the remote password file is set to other than 0H to 0FF0H.	Change the first I/O number of the target module to within the 0H to 0FF0H range.	
	3401	Position specified as the first I/O number of the remote password file is incorrect due to one of the following reasons: • Module is not loaded. • Intelligent function module other than QJ71C24(-R2) or Q series Ethernet interface module • QJ71C24(-R2) or Q series Ethernet interface module of function version A	Load the QJ71C24(-R2) or Q series Ethernet interface module of function version B in the position specified as the first I/O number of the remote password file.	○
		QJ71C24(-R2) or Q series Ethernet interface module of function version B under control of another station is specified in a multiple CPU system.	(1) Change the setting to the QJ71C24(-R2) or Q series Ethernet interface module of function version B under control of the host station. (2) Delete the remote password setting.	
	4000	The program contains an instruction code that cannot be decoded. An unusable instruction is included in the program.	Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	○
	4001	The program contains a dedicated instruction for SFC program although it is not an SFC program.		
	4002	The extension instruction designated by the program has an incorrect instruction name.		○ + Rem
	4003	The extension instruction designated by the program has an incorrect number of devices.		
	4004	The extension instruction designated by the program a device which cannot be used.	Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	○
	4010	There is no END (FEND) instruction in the program.	Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	○
	4020	The total number of internal file pointers used by the program exceeds the number of internal file pointers set in the parameters.		
	4021	The common pointer numbers used by individual files overlap.		
	4030	The allocation pointer numbers used by individual files are overlap.		
	4100	The instruction cannot process the contained data.	Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	○
	4101	The designated device number for data processed by the instruction exceeds the usable range. Alternatively, the stored data or constants for the devices designated by the instruction exceeds the usable range.		
	4102	In a multiple CPU system, the link direct device (J□\G□) was specified for the network module under control of another station.	(1) Delete from the program the link direct device which specifies the network module under control of another station. (2) Using the link direct device, specify the network module under control of the host station.	○
		The network number and station number designated with a dedicated network instruction are not correct. The link direct device (J[ ]\W[ ]) is not set correctly. • The module No./network No./character string count specified by the extension instruction is outside the setting range. • The character string (" ") specified by the extension instruction is unusable.	Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	○ + Rem
	4107	33 or more multiple CPU dedicated instructions were executed from one High Performance model QCPU.	Using the multiple CPU dedicated instruction completion bit, provide interlocks to prevent one CPU module from executing 32 or more multiple CPU dedicated instructions.	○
	4200	No NEXT instruction was executed following the execution of a FOR instruction.	Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	○
		Alternatively, there are fewer NEXT instructions than FOR instructions.		
	4201	A NEXT instruction was executed although no FOR instruction has been executed.	Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	○
		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 error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	

∗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) ∗1	Individual Information (SD16 to 26) ∗1	LED Status		Operating Statuses of CPU	Diagnostic Timing
				RUN	ERROR		
4210	CAN'T EXECUTE (P)	Program error location	———	Off	Flicker	Stop	When instruction is executed
4211							
4212							
4213							
4220	CAN'T EXECUTE (I)	Program error location	———	Off	Flicker	Stop	When instruction is executed
4221							
4223							
4230	INST. FORMAT ERR.	Program error location	———	Off	Flicker	Stop	When instruction is executed
4231							
4235							
4400	SFCP. CODE ERROR	Program error location	———	Off	Flicker	Stop	STOP → RUN
4410	CAN'T SET (BL)	Program error location	———	Off	Flicker	Stop	STOP → RUN
4411							
4420	CAN'T SET (S)	Program error location	———	Off	Flicker	Stop	STOP → RUN
4421							
4422							
4500	SFCP. FORMAT ERR.	Program error location	———	Off	Flicker	Stop	STOP → RUN
4501							
4502							
4503							
4504							
4600	SFCP. OPE. ERROR	Program error location	———	Off/On	Flicker/On	Stop/ Continue ∗2	When instruction is executed
4601							
4602							
4610	SFCP. EXE. ERROR	Program error location	———	On	On	Continue	STOP → RUN
4611							
4620	BLOCK EXE. ERROR	Program error location	———	Off	Flicker	Stop	When instruction is executed
4621							
4630	STEP EXE. ERROR	Program error location	———	Off	Flicker	Stop	When instruction is executed
4631							
4632							
4633							
5000	WDT ERROR	Time (value set)	Time (value actually measured)	Off	Flicker	Stop	Always
5001							
5010	PRG. TIME OVER	Time (value set)	Time (value actually measured)	On	On	Continue	Always
5011							

∗1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.
∗2 The CPU module 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
	4210	The CALL instruction is executed, but there is no subroutine at the specified pointer.	Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	○
	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.		
	4213	More than 16 nesting levels are programmed.	Keep nesting levels at 16 or under.	
	4220	Interrupt input was generated, but no corresponding interrupt pointer was found.	Read the common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	○
	4221	There was no IRET instruction in the executed interrupt program.		
	4223	The IRET instruction was before the FEND instruction in the main program.		
	4230	The number of CHK and CHKEND instructions is not equal.		
	4231	The number of IX and IXEND instructions is not equal.		
	4235	The configuration of the check conditions for the CHK instruction is incorrect. Alternatively, a CHK instruction has been used in a low speed execution program.		
	4400	No SFCP or SFCPEND instruction in SFC program.	Read common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	○
	4410	The block number designated by the SFC program exceeds the range.		
	4411	Block number designations overlap in SFC program.		
	4420	A step number designated in an SFC program exceeds 511.		
	4421	Total number of steps in all SFC programs exceed the range	Reduce total number of steps to below the maximum.	
	4422	Step number designations overlap in SFC program.	Read common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	
	4500	The numbers of BLOCK and BEND instructions in an SFC program are not equal.	Read common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	○
	4501	The configuration of the STEP ∗ to TRAN ∗ to TSET to SEND instructions in the SFC program is incorrect.		
	4502	There was no STEPI ∗ instruction in SFC program block.		
	4503	The step designated by the TSET instruction in the SFC program does not exist.		
	4504	The step designated by the TAND instruction in the SFC program does not exist.		
	4600	The SFC program contains data that cannot be processed.	Read common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem. The program is automatically subjected to an initial start.	○
	4601	Exceeds device range that can be designated by the SFC program.		
	4602	The START instruction in an SFC program is proceeded by an END instruction.		
	4610	The active step information at presumptive start of an SFC program is incorrect.	Read common error information at a GX Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	
	4611	Key-switch was reset during RUN when presumptive start was designated for SFC program.		
	4620	Startup was executed at a block in the SFC program that was already started up.		
	4621	Startup was attempted at a block that does not exist in the SFC program.		
	4630	Startup was executed at a block in the SFC program that was already started up.		○
	4631	Startup was attempted at a block that does not exist in an SFC program.		
	4632	There were too many simultaneous active steps in blocks that can be designated by the SFC program.		
	4633	There were too many simultaneous active steps in all blocks that can be designated.		
	5000	Program scan time for initial execution type programs exceeds the initial execution WDT time setting designated in the PLC RAS parameter.	Read the error individual information at a GX Developer, check the numerical value (time) there, and shorten scan time if necessary.	○
	5001	The program scan time goes over the WDT value set in the parameter PLC RAS parameter.		
	5010	(1) The scan time of the program exceeded the constant scan setting time specified in the PC RAS setting parameter. (2) The low speed program execution time specified in the PC RAS setting parameter exceeded the margin time of constant scan.	(1) Review the constant scan setting time. (2) Review the constant scan time and low speed program execution time in the parameter so that the margin time of constant scan may be fully reserved.	○
	5011	Low speed scan type program scan time goes over the low speed execution WDT set in the parameter PC RAS settings.	Read the error individual information at a GX Developer, check the numerical value (time) there, and shorten scan time if necessary.	

∗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) ✻1	Individual Information (SD16 to 26) ✻1	LED Status		Operating Statuses of CPU	Diagnostic Timing	
7000	MULT CPU DOWN	Unit/module No.	———	Off	Flicker	Stop	Always	
7002							At power ON/Reset	
7003							At power ON/Reset	
7010	MULTI EXE. ERROR	Unit/module No.	———	Off	Flicker	Stop	At power ON/Reset	
7020	MULTI CPU ERROR	Unit/module No.	———	On	On	Continue	Always	
9000	F**** ✻6	Program error location	Annunciator number	On / USER LED On	Off	Continue	When instruction is executed	
9010	<CHK> FRR ***-*** ✻7	Program error location	Failure No.	On / USER LED On	Off	Continue	When instruction is executed	
9020	BOOT OK	———	———	Off	Flicker	Stop	At power ON/Reset	
10000	CONT. UNIT ERROR	———	———	———	———	———	———	

✻1 Characters in parentheses ( ) indicate the special register numbers where individual information is being stored.
✻6 **** indicates detected annunciator number.
✻7 *** indicates detected contact and coil number.

	Error Code (SD0) ∗1	Error Contents and Cause	Corrective Action	Corres-ponding CPU
	7000	(1) In a multiple CPU system, at PLC fault occurred at a station where "all station stop by stop error of PLC " was selected in the operating mode. (2) High Performance model QCPU of function version A was loaded in a multiple CPU system.	(1) Read the individual error information using GX Developer, check the error of the CPU resulting in CPU fault, and remove the error. (2) Remove the High Performance model QCPU of function version A from the main base unit.	○
		In a multiple CPU system, station 1 resulted in stop error at power-on and the other stations cannot start. (This error occurred at stations 2 to 4)	Read the individual error information using GX Developer, check the error of the CPU resulting in CPU fault, and remove the error.	
	7002	(1) There is no response from the target station in a multiple CPU system at initial communication stage. (2) High Performance model QCPU of function version A was loaded in a multiple CPU system configuration.	(1) Reset the High Performance model QCPU and run it again. If the same error is displayed again, it is a hardware fault of any PLC. Consult your sales representative. (2) Remove the High Performance model QCPU of function version A from the main base unit.	
	7003	There is no response from the target station in a multiple CPU system at initial communication stage.	Reset the High Performance model QCPU and run it again. If the same error is displayed again, it is a hardware fault of any PLC. Consult your sales representative.	
	7010	(1) Faulty CPU module is loaded in a multiple CPU system. (2) High Performance model QCPU of function version A is loaded in a multiple CPU system configuration. (An error is detected at the High Performance model QCPU of function version B.) (3) In a multiple CPU system, any of stations 2 to 4 was reset during power-on. (This error occurs at only the station which was reset.)	(1) Read the individual error information using GX Developer and replace the CPU module of the faulty machine. (2) Change the station of function version A for function version B. (3) Do not reset the CPU modules of stations 2 to 4. Reset the Process CPU/High Performance model QCPU of station 1 and restart the multi-CPU system.	○
	7020	In a multiple CPU system, a PLC fault occurred at a station where "all station stop by stop error of PLC" was not selected in the operation mode. (The error is detected at the Process CPU/High Performance model QCPU of other than the station where the PLC fault occurred.)	Read the individual information of the error, check the error of the PLC resulting in PLC fault, and remove the error.	
	9000	Annunciator F was set ON	Read the error individual information at a GX Developer, and check the program corresponding to the numerical value (annunciator number).	○
	9010	Error detected by the CHK instruction.	Read the error individual information at a GX Developer, and check the program corresponding to the numerical value (error number) there.	
	9020	Storage of data onto ROM was completed normally in automatic write to standard ROM. (BOOT LED also flickers.)	Set the parameter enable drive to standard ROM, switch power on again, and perform boot operation from standard ROM.	○
	10000	In the multiple CPU system, an error occurred in the CPU module other than the Process CPU/High Performance model QCPU.	Use the software package of the corresponding CPU module to check the details of the error that occurred.	○

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

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11.4 Canceling of Errors

The Process CPU 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 status 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.

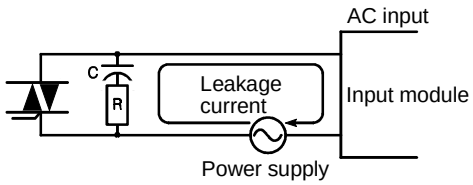
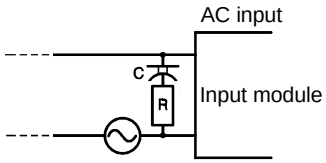
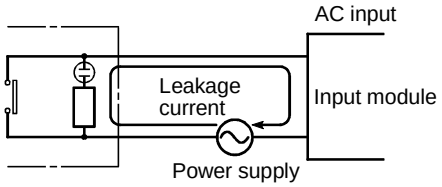
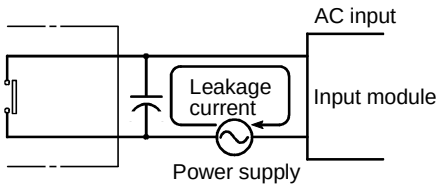
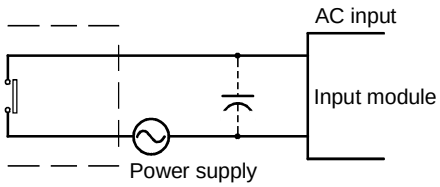
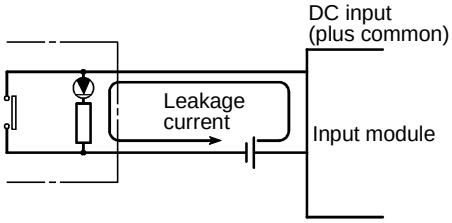
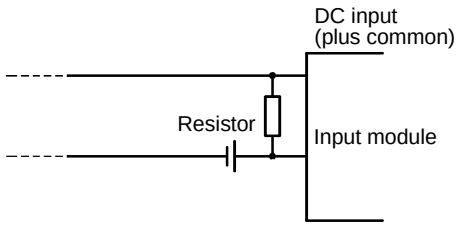
11.5 I/O Module Troubleshooting

This chapter explains possible problems with I/O circuits and their corrective actions.

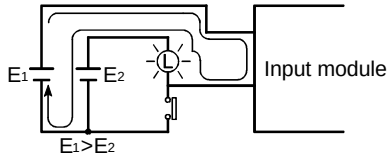
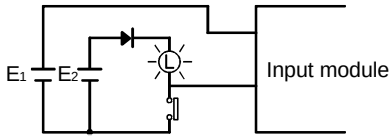
11.5.1 Input circuit troubleshooting

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.	• Leakage current of input switch (e.g. drive by non-contact switch). 	• Connect an appropriate resistor which will make the voltage across the terminals of the input module lower than the OFF voltage value.  It is recommended to use 0.1 to 47 μF + 47 to 120Ω (1/2W) for the CR constant.
Example 2	Input signal does not turn OFF.	• Drive by a limit switch with neon lamp. 	• Same as Example 1. • Or make up another independent display circuit.
Example 3	Input signal does not turn OFF.	• Leakage current due to line capacity of wiring cable. (Line capacity C of twisted pair wire is approx. 100 PF/m). 	• Same as Example 1. • However, leakage current is not generated when the power supply is located in the input equipment side as shown below. 
Example 4	Input signal does not turn OFF.	• Drive by switch with LED indicator. 	• Connect a register which will make the voltage between the input module terminal and common lower than the OFF voltage, as shown below.  * A calculation example of a value for a connected resistor is given on the following page.

Input Circuit Problems and Corrective Actions (Continued)

	Condition	Cause	Corrective Action
Example 5	Input signal does not turn OFF.	• Sneak path due to the use of two power supplies. 	• Use only one power supply. • Connect a sneak path prevention diode. (Figure below) 
Example 6	False input due to noise	Depending on response time setting, noise is imported as input.	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 form 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.)

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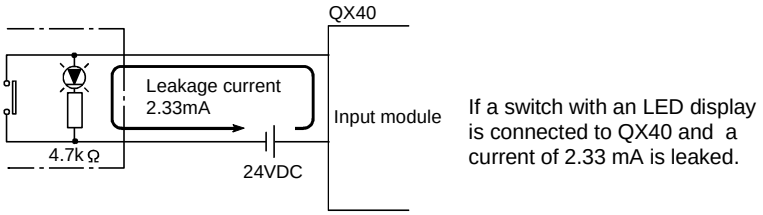
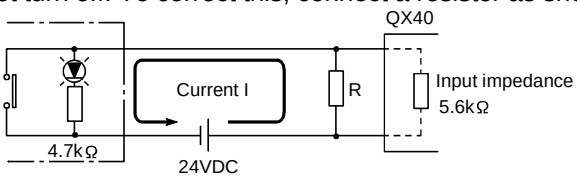
<Calculation example of Example 4>



- Voltage V_{TB} across the terminal and common base is:
  V_{TB} = 2.33[mA]×5.6[kΩ] = 13[V] (Ignore the voltage drop caused by the LED.)
  Because the condition for the OFF voltage (≦11 [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 is:
  (24-11[V]) ÷ 4.7[kΩ] = 2.77[mA]
  Therefore resistor R of flowing current I of 2.77 [mA] or more must be connected.

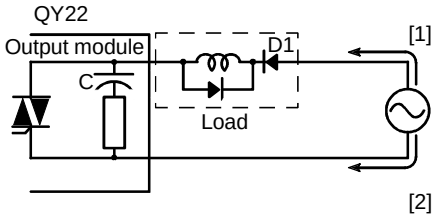
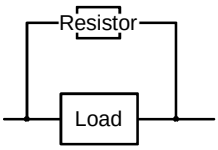
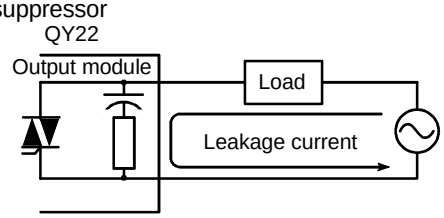
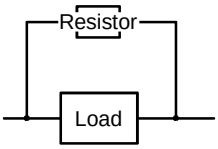
- Calculation of resistance of connected resistor R
  $11[V] \div R > 2.77[mA] - \frac{11[V]}{5.6[k\Omega]}$
  11[V] ÷ R > 2.77-1.96[mA]
  11[V] ÷ 0.81[mA] > R
  13.6[kΩ] > R
  Resistance of the connected resistor R is obtained in the above equations.
  Suppose that the resistance R is 12 [kΩ].
  The power capacity W of the resistor during activation of the switch is:
  W = (Applied voltage) ^{2} / R
  W = $(28.8[V])^2/12[k\Omega]$=0.069[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 explains trouble examples and troubleshooting methods in the output circuit.

Output Circuit Troubleshooting

	Condition	Cause	Corrective Action
Example 1	Excessive voltage is applied to load when output turns off.	• When load is half-wave rectified inside (This is typical of some solenoids.)  • When the polarity of the power supply is [1], the capacitor C is charged. When the polarity is [2], the voltage charged in C plus the power supply voltage is applied to across D1. The maximum value of the voltage is approx. 2.2E. (This usage does not cause problems to the output components but may deteriorate the diode built in the load, causing burnout, etc.)	• Connect a resistor of several ten KΩ to several hundred KΩ across the load. 
Example 2	Load does not turn off. (Triac output)	• Leakage current due to the built-in surge suppressor 	• Connect a resistor across the load. (If the wiring from the output module to the load is long, be careful since there may be a leakage current due to the line capacity.) 

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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)	• Indicates whether the relay is set by the system or user, and, if it is set by the system, when setting is performed. <Set by> S : Set by system U : Set by user (in sequence program or test operation at a GX Developer) S/U : Set by both system and user <When set> Indicated only if setting is done by system. Each END : Set during each END processing Initial : Set only during initial processing (when power supply is turned ON, or when going from STOP to RUN) Status change : Set only when there is a change in status Error : Set when error is generated Instruction execution : Set when instruction is executed Request : Set only when there is a user request (through SM, etc.)
Corresponding ACPU M9□□□	• Indicates special relay M9□□□ corresponding to the ACPU. (Change and notation when there has been a change in contents) • Items indicated as "New" have been newly added for Process CPU.
Corresponding CPU	• Indicates the corresponding CPU module type name. ○+Rem: Can be applied to Process CPU and MELSECNET/H remote I/O modules. ○: Can be applied to Process CPU Remote: Can be applied to the MELSECNET/H remote I/O modules.

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

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

• SFC → QCPU(Q Mode)/QnACPU Programming Manual (SFC)

POINT

(1) SM1200 to SM1255 are used for QnACPU.
These relays are vacant with Process CPU.

Special Relay List

(1) Diagnostic Information

Number	Name	Meaning	Explanation	Set by (When Set)	Corresponding ACPU M9□□□	Applicable CPU
SM0	Diagnostic errors	OFF: No error ON : Error	• ON if diagnosis results show error occurrence (Includes when an annunciator is ON, and when an error is detected with CHK instruction) • Stays ON subsequently even if normal operations restored	S (Error)	New	○+Rem
SM1	Self-diagnosis error	OFF: No self-diagnosis errors ON : Self-diagnosis	• Comes ON when an error occurs as a result of self-diagnosis. (Does not include when annunciator is ON or when error is detected by CHK instruction.) • Stays ON subsequently even if normal operations restored	S (Error)	M9008	
SM5	Error common information	OFF: No error common information ON : Error common information	• When SM0 is ON, ON if there is error common information	S (Error)	New	
SM16	Error individual information	OFF: No error common information ON : Error common information	• When SM0 is ON, ON if there is error individual information	S (Error)	New	
SM50	Error reset	OFF →ON : Error reset	• Conducts error reset operation	U	New	
SM51	Battery low latch	OFF: Normal ON : Battery low	• ON if battery voltage at CPU module or memory card drops below rated value. Stays ON subsequently even after normal operation is restored • Synchronous with BAT. ALARM LED	S (Error)	M9007	○
SM52	Battery low	OFF: Normal ON : Battery low	• Same as SM51, but goes OFF subsequently when battery voltage returns to normal.	S (Error)	M9006	
SM53	AC/DC DOWN detection	OFF: AC/DC DOWN not detected ON : AC/DC DOWN detected	• Comes ON it a momentary power interruption of less than 20ms occurred during use of the AC power supply module, and reset by turning the power OFF, then ON. • Comes ON if a momentary power interruption of less than 10ms occurred during use of the DC power supply module, and reset by turning power OFF, then ON.	S (Error)	M9005	
SM56	Operation Errors	OFF: Normal ON : Operation error	• ON when operation error is generated • Stays ON subsequently even if normal operations restored	S (Error)	M9011	○
SM60	Blown fuse detection	OFF: Normal ON : Module with blown fuse	• Comes ON even if there is only one output module with a blown fuse, and remains ON even after return to normal • Blown fuse status is checked even for remote I/O station output modules.	S (Error)	M9000	○+Rem
SM61	I/O module verification error	OFF: Normal ON : Error	• Comes ON if there is a discrepancy between the actual I/O modules and the registered information when the power is turned on • I/O module verification is also conducted for remote I/O station modules.	S (Error)	M9002	
SM62	Annunciator detection	OFF: Not detected ON : Detected	• Goes ON if even one annunciator F goes ON.	S (Instruction execution)	M9009	○
SM80	CHK detection	OFF: Not detected ON : Detected	• Goes ON if error is detected by CHK instruction. • Stays ON subsequently even after normal operation is restored.	S (Instruction execution)	New	
SM90	Startup of watchdog timer for step transition (Enabled only when SFC program exists)	OFF: Not started (watchdog timer reset) ON : Started (watchdog timer started)	Corresponds to SD90	• Goes ON when measurement of step transition watchdog timer is commenced. • Resets watchdog timer when it goes OFF.	U	M9108
SM91			Corresponds to SD91			M9109
SM92			Corresponds to SD92			M9110
SM93			Corresponds to SD93			M9111
SM94			Corresponds to SD94			M9112
SM95			Corresponds to SD95			M9113
SM96			Corresponds to SD96			M9114
SM97			Corresponds to SD97			New
SM98			Corresponds to SD98			New
SM99			Corresponds to SD99			New

Special Relay List

(2) System information

Number	Name	Meaning	Explanation	Set by (When Set)	Corresponding ACPU M9□□□	Applicable CPU
SM202	LED off command	OFF →ON : LED off	• When this relay goes from OFF to ON, the LEDs corresponding to the individual bits at SD202 go off	U	New	○
SM203	STOP contact	STOP status	• Goes ON at STOP status	S (Status change)	M9042	
SM204	PAUSE contact	PAUSE status	• Goes ON at PAUSE status	S (Status change)	M9041	
SM205	STEP-RUN contact	STEP-RUN status	• Goes ON at STEP-RUN status	S (Status change)	M9054	
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	M9040	
SM211	Clock data error	OFF: No error ON : Error	• ON when error is generated in clock data (SD210 to SD213) value, and OFF if no error is detected.	S (Request)	M9026	
SM213	Clock data read request	OFF: Ignored ON : Read request	• When this relay is ON, clock data is read to SD210 to SD213 as BCD values.	U	M9028	
SM235	Online module change flag	OFF:Online module change is not in progress ON: Online module change in progress	• Turns on during online module change.	S (During online module change)	New	
SM236	Flag that turns ON only one scan after online module change	OFF:Online module change incomplete ON: Online module change complete	Turns ON for one scan after online module change is complete. This contact point can only be used by the scan program.(for local unit)	S (When online module change is complete)	New	
SM240	No. 1 CPU reset flag	OFF: PLC No. 1 reset cancel ON : PLC No. 1 resetting	• Goes OFF when reset of the PLC No. 1 is canceled. • Comes ON when the PLC No. 1 is resetting (including the case where the PLC is removed from the base unit). The other PLCs are also put in reset status.	S (Status change)	New	
SM241	No. 2 CPU reset flag	OFF: PLC No. 2 reset cancel ON : PLC No. 2 resetting	• Goes OFF when reset of the PLC No. 2 is canceled. • Comes ON when the PLC No. 2 is resetting (including the case where the PLC is removed from the base unit). The other PLCs result in "MULTI CPU DOWN" (error code: 7000).			
SM242	No. 3 CPU reset flag	OFF: PLC No. 3 reset cancel ON : PLC No. 3 resetting	• Goes OFF when reset of the PLC No. 3 is canceled. • Comes ON when the PLC No. 3 is resetting (including the case where the PLC is removed from the base unit). The other PLCs result in "MULTI CPU DOWN" (error code: 7000).			
SM243	No. 4 CPU reset flag	OFF: PLC No. 4 reset cancel ON : PLC No. 4 resetting	• Goes OFF when reset of the PLC No. 4 is canceled. • Comes ON when the PLC No. 4 is resetting (including the case where the PLC is removed from the base unit). The other PLCs result in "MULTI CPU DOWN" (error code: 7000).			
SM244	No. 1 CPU error flag	OFF: PLC No. 1 normal ON : PLC No. 1 during stop error	• Goes OFF when the PLC No. 1 is normal (including a continuation error). • Comes ON when the PLC No. 1 is during a stop error.			
SM245	No. 2 CPU error flag	OFF: PLC No. 2 normal ON : PLC No. 2 during stop error	• Goes OFF when the PLC No. 2 is normal (including a continuation error). • Comes ON when the PLC No. 2 is during a stop error.			
SM246	No. 3 CPU error flag	OFF: PLC No. 3 normal ON : PLC No. 3 during stop error	• Goes OFF when the PLC No. 3 is normal (including a continuation error). • Comes ON when the PLC No. 3 is during a stop error.			
SM247	No. 4 CPU error flag	OFF: PLC No. 4 normal ON : PLC No. 4 during stop error	• Goes OFF when the PLC No. 4 is normal (including a continuation error). • Comes ON when the PLC No. 4 is during a stop error.			
SM250	Max. loaded I/O read	OFF: Ignored ON : Read	• When this relay goes from OFF to ON, maximum loaded I/O number is read to SD250.	U	New	○+Rem
SM254	All stations refresh command	OFF: Refresh arrival station ON : Refresh all stations	• Effective for the batch refresh (also effective for the low speed cyclic) • Designate whether to receive arrival stations only or to receive all slave stations.	U (Every END)	New	○

Special Relay List (Continued)

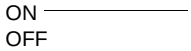
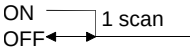
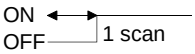
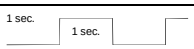
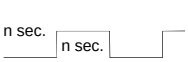
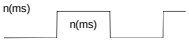
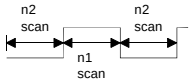
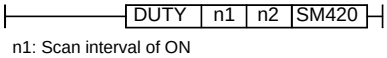
Number	Name	Meaning	Explanation	Set by (When Set)	Corresponding ACPU M9□□□	Applicable CPU
SM255	MELSECNET/H module 1 information	OFF: Operative network ON : Standby network	• Goes ON for standby network (If no designation has been made concerning active or standby, active is assumed.)	S (Initial)	New	○
SM256		OFF: Reads ON : Does not read	• For refresh from link to CPU (B, W, etc.) indicate whether to read from the link module.	U	New	
SM257		OFF: Writes ON : Does not write	• For refresh from CPU to link (B, W, etc.), designate whether to write to the link module.	U	New	
SM260	MELSECNET/H module 2 information	OFF: Operative network ON : Standby network	• Goes ON for standby network (If no designation has been made concerning active or standby, active is assumed.)	S (Initial)	New	
SM261		OFF: Reads ON : Does not read	• For refresh from link to CPU (B, W, etc.) indicate whether to read from the link module.	U	New	
SM262		OFF: Writes ON : Does not write	• For refresh from CPU to link (B, W, etc.), designate whether to write to the link module.	U	New	
SM265	MELSECNET/H module 3 information	OFF: Operative network ON : Standby network	• Goes ON for standby network (If no designation has been made concerning active or standby, active is assumed.)	S (Initial)	New	
SM266		OFF: Reads ON : Does not read	• For refresh from link to CPU (B, W, etc.) indicate whether to read from the link module.	U	New	
SM267		OFF: Writes ON : Does not write	• For refresh from CPU to link (B, W, etc.), designate whether to write to the link module.	U	New	
SM270	MELSECNET/H module 4 information	OFF: Operative network ON : Standby network	• Goes ON for standby network (If no designation has been made concerning active or standby, active is assumed.)	S (Initial)	New	
SM271		OFF: Reads ON : Does not read	• For refresh from link to CPU (B, W, etc.) indicate whether to read from the link module.	U	New	
SM272		OFF: Writes ON : Does not write	• For refresh from CPU to link (B, W, etc.), designate whether to write to the link module.	U	New	
SM280	CC-Link error	OFF: Normal ON : Error	• Goes ON when a CC-Link error is detected in any of the installed QJ61QBT11. Goes OFF when normal operation is restored.	S (Status change)	New	○+Rem
SM320	Presence/absence of SFC program	OFF: SFC program absent ON : SFC program present	• ON if SFC program is correctly registered, and OFF if not registered. • Goes OFF if SFC dedicated instruction is not correct.	S (Initial)	M9100	○
SM321	Start/stop SFC program	OFF: SFC program stop ON : SFC program start	• Initial value is set at the same value as SM320. (Goes ON automatically if SFC program is present.) • SFC program will not execute if this goes OFF prior to SFC program processing • Starts the SFC program when this relay goes from OFF to ON. • Stops the SFC program when this relay goes from ON to OFF.	S (Initial) U	M9101 format change	
SM322	SFC program start status	OFF: Initial start ON : Restart	• Initial value is set at ON or OFF depending on parameters. • When this relay is OFF, all execution statuses at stop of SFC program are cleared and execution starts from the initial step of the block where the start request is made. • When this relay is ON, execution starts from the execution block and execution step that were active at stop of SFC program. (ON is enabled only when resumptive start has been designated at parameters.) • SM902 is not automatically designated for latch.	S (Initial) U	M9102 format change	
SM323	Presence/absence of continuous transition for entire block	OFF: Continuous transition not effective ON : Continuous transition effective	• When this relay is OFF, transition to one scan/one step occurs in all blocks. • When this relay is ON, transition to one continuous scan occurs in all blocks. • In designation of individual blocks, priority is given to the continuous transition bit of the block. (Designation is checked when block starts.)	U	M9103	
SM324	Continuous transition prevention flag	OFF: When transition is executed ON : When no transition	• When continuous transition is effective, goes ON when continuous transition is not being executed; goes OFF when continuous transition is being executed. • Normally ON when continuous transition is not effective.	S (Instruction execution)	M9104	
SM325	Output mode at block stop	OFF: OFF ON : Preserves	When block stops, selects active step operation output. • When this relay is OFF, all coil outputs are set to OFF. • When this relay is ON, coil outputs are maintained.	S (Initial) U	M9196	

Special Relay List (Continued)

Number	Name	Meaning	Explanation	Set by (When Set)	Corresponding ACPU M9□□□	Applicable CPU
SM326	SFC device clear mode	OFF: Clear device ON : Preserves device	Selects the device status when the stopped CPU module is run after the sequence program or SFC program has been modified when the SFC program exists.	U	New	○
SM327	Output during end step execution	OFF: OFF ON : Preserves	Selects the output action of the step being held when a block is ended by executing the end step. • When this relay is OFF, all coil outputs are set to OFF. • When this relay is ON, coil outputs are maintained.	S (Initial) U	New	
SM330	Operation mode for low speed execution type program	OFF: Asynchronous mode ON : Synchronous mode	Select whether low speed execution type programs are executed in asynchronous or synchronous mode. • Asynchronous mode Mode where the operations for the low speed execution type program are continued during the excess time. • Synchronous mode Mode where the operations for the low speed execution type program are started from the next scan even when there is the excess time.	U	New	
SM390	Access execution flag	When ON, access to the intelligent function module is completed	• Stores the status of the intelligent function module access instruction executed immediately before. (This information will be overwritten when the intelligent function module access instruction is executed again.) • This flag is used by the user in a program as the completion bit.	S (Status change)	New	

Special Relay List

(3) System clocks/counters

Number	Name	Meaning	Explanation	Set by (When Set)	Corresponding ACPU M9□□□	Applicable CPU
SM400	Always ON		• Normally is ON	S (Every END processing)	M9036	
SM401	Always OFF		• Normally is OFF	S (Every END processing)	M9037	
SM402	ON for 1 scan only after RUN		• After RUN, ON for 1 scan only. • This contact can be used for scan execution type programs only.	S (Every END processing)	M9038	
SM403	After RUN, OFF for 1 scan only		• After RUN, OFF for 1 scan only. • This contact can be used for scan execution type programs only.	S (Every END processing)	M9039	
SM404	Low speed execution type program ON for 1 scan only after RUN		• After RUN, ON for 1 scan only. • This contact can be used for low speed execution type programs only.	S (Every END processing)	New	
SM405	Low speed execution type program After RUN, OFF for 1 scan only		• After RUN, OFF for 1 scan only. • This contact can be used for low speed execution type programs only.	S (Every END processing)	New	
SM409	0.01 second clock		• This relay repeats ON/OFF at every 5 ms. • Starts from OFF when the PLC power is turned ON or the CPU module is reset. • Note that the ON-OFF status changes when the designated time has elapsed during the execution of the program.	S (Status change)	New	○
SM410	0.1 second clock		• This relay repeats ON/OFF at every predefined constant time. • Starts from OFF when the PLC power is turned ON or the CPU module is reset. • Note that the ON-OFF status changes when the designated time has elapsed during the execution of the program.	S (Status change)	M9030	
SM411	0.2 second clock				M9031	
SM412	1 second clock				M9032	
SM413	2 second clock				M9033	
SM414	2n second clock		• This relay repeats ON/OFF in accordance with the number of seconds designated by SD414. • Starts from OFF when the PLC power is turned ON or the CPU module is reset. • Note that the ON-OFF status changes when the designated time has elapsed during the execution of the program.	S (Status change)	M9034 format change	
SM415	2n (ms) clock		• This relay repeats ON/OFF in accordance with the number of milliseconds designated by SD415. • Starts from OFF when the PLC power is turned ON or the CPU module is reset. • Note that the ON-OFF status changes when the designated time has elapsed during the execution of the program.	S (Status change)	New	
SM420	User timing clock No.0		• This relay repeats ON/OFF at designated scan intervals. • Starts from OFF when the PLC power is turned ON or the CPU module is reset. • The ON/OFF scan intervals are set by the DUTY instruction.  n1: Scan interval of ON n2: Scan interval of OFF	S (Every END processing)	M9020	○
SM421	User timing clock No.1				M9021	
SM422	User timing clock No.2				M9022	
SM423	User timing clock No.3				M9023	
SM424	User timing clock No.4				M9024	
SM430	User timing clock No.5		• For low speed execution type programs of SM420 to SM424	S (Every END processing)	New	
SM431	User timing clock No.6					
SM432	User timing clock No.7					
SM433	User timing clock No.8					
SM434	User timing clock No.9					

Special Relay List

(4) Scan information

Number	Name	Meaning	Explanation	Set by (When Set)	Corresponding ACPU M9□□□	Applicable CPU
SM510	Low speed exection type program execution flag	OFF: Completed or not executed ON : Execution under way.	• Goes ON when low speed execution type program is executed.	S (Every END processing)	New	○
SM551	Reads module service interval	OFF: Ignored ON : Read	• Reads the module service interval designated by SD550 to SD551 and SD552 when this relay switches from OFF to ON.	U	New	○+Rem

(5) Memory cards

Number	Name	Meaning	Explanation	Set by (When Set)	Corresponding ACPU M9□□□	Applicable CPU
SM600	Memory card usable flags	OFF: Unusable ON : Use enabled	• ON when memory card is ready for use by user	S (Initial)	New	○
SM601	Memory card protect flag	OFF: No protect ON : Protect	• Goes ON when memory card protect switch is ON	S (Initial)	New	
SM602	Drive 1 flag	OFF: No drive 1 ON : Drive 1 present	• Goes ON when loaded memory card is RAM.	S (Initial)	New	
SM603	Drive 2 flag	OFF: No drive 2 ON : Drive 2 present	• Goes ON when loaded memory card is ROM.	S (Initial)	New	
SM604	Memory card in-use flag	OFF: Not in use ON : In use	• Goes ON when memory card is in use	S (Initial)	New	
SM605	Memory card remove/insert prohibit flag	OFF: Remove/insert enabled ON : Remove/insert prohibited	• Goes ON when memory card cannot be inserted or removed	U	New	
SM609	Memory card remove/insert enable flag	OFF: Remove/insert prohibited ON : Remove/insert enabled	• Turned ON by user to enable the removal/insertion of memory card. • Turned OFF by the system after the memory card is removed.	U/S	New	
SM620	Memory card B usable flags	OFF: Unusable ON : Use enabled	• Always ON	S (Initial)	New	
SM621	Memory card B protect flag	OFF: No protect ON : Protect	• Always ON	S (Initial)	New	
SM622	Drive 3 flag	OFF: No drive 3 ON : Drive 3 present	• Always ON	S (Initial)	New	
SM623	Drive 4 flag	OFF: No drive 4 ON : Drive 4 present	• Always ON	S (Initial)	New	QCPU
SM640	File register use	OFF: File register not in use ON : File register in use	• Goes ON when file register is in use	S (Status change)	New	○
SM650	Comment use	OFF: File register not in use ON : File register in use	• Goes ON when comment file is in use	S (Status change)	New	
SM660	Boot operation	OFF: Internal memory execution ON : Boot operation in progress	• Goes ON while boot operation is in process • Goes OFF if boot designation switch is OFF	S (Status change)	New	
SM672	Memory card A file register access range flag	OFF: Within access range ON : Outside access range	• Goes ON when access is made to area outside the range of file register R of memory card A (Set within END processing.) • Reset at user program	S/U	New	

(6) Instruction-Related Special Relays

Number	Name	Meaning	Explanation	Set by (When Set)	Corresponding ACPU M9□□□	Applicable CPU
SM700	Carry flag	OFF: Carry OFF ON : Carry ON	• Carry flag used in application instruction	S (Instruction execution)	M9012	
SM701	Number of output characters selection	OFF: 16 characters output ON : Outputs until NUL	• Outputs up to NUL (00h) ASCII code when SM701 is OFF. • Outputs ASCII code of 16 characters when SM701 is ON.	U	M9049	
SM702	Search method	OFF: Search next ON : 2-part search	• Designates method to be used by search instruction. • Data must be arranged for 2-part search.	U	New	○
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	New	
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)	New	
SM710	CHK instruction priority ranking flag	OFF: Conditions priority ON : Pattern priority	• Remains as originally set when OFF. • CHK priorities updated when ON.	S (Instruction execution)	New	○
SM715	EI flag	OFF: During DI ON : During EI	• ON when EI instruction is being executed.	S (Instruction execution)	New	○
SM720	Comment read completion flag	OFF: Comment read not completed ON : Comment read completed	• Switches ON for only one scan when COMRD or PRC instruction is completed.	S (Status change)	New	
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)	New	QCPU
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	New	
SM736	PKEY instruction execution in progress flag	OFF: Instruction not executed ON : Instruction execution	• ON when PKEY instruction is being executed. Goes OFF when CR is input, or when input character string reaches 32 characters.	S (Instruction execution)	New	
SM737	Keyboard input reception flag for PKEY instruction	OFF: Keyboard input reception enabled ON : Keyboard input reception disabled	• Goes ON when keyboard input is being conducted. Goes when keyboard input has been stored at the CPU module.	S (Instruction execution)	New	
SM738	MSG instruction reception flag	OFF: Instruction not executed ON : Instruction execution	• Goes ON when MSG instruction is executed.	S (Instruction execution)	New	
SM775	Selection of link refresh processing during COM instruction execution	OFF: Performs link refresh ON : No link refresh performed	• Selects whether only the general data process is performed for the execution of the COM instruction or the link refresh process is also performed.	U	New	○
SM776	Enable/disable local device at CALL	OFF: Local device disabled ON : Local device enabled	• Determines whether to enable/disable the local device in the program CALLED at CALL.	U (Status change)	New	
SM777	Enable/disable local device in interrupt program	OFF: Local device disabled ON : Local device enabled	• Determines whether to enable/disable the local device at the execution of interrupt programs.	U (Status change)	New	

(7) Debug

Number	Name	Meaning	Explanation	Set by (When Set)	Corresponding ACPU M9□□□	Applicable CPU
SM800	Trace preparation	OFF: Not ready ON : Ready	• Switches ON when the trace preparation is completed.	S (Status change)	New	○
SM801	Trace start	OFF: Suspend ON : Start	• Trace is started when this relay switches ON. • Trace is suspended when this relay switches OFF. (All related special Ms switches OFF.)	U	M9047	
SM802	Trace execution in progress	OFF: Suspend ON : Start	• Switches ON during execution of trace.	S (Status change)	M9046	
SM803	Trace trigger	OFF →ON: Start	• Trace is triggered when this relay switches from OFF to ON. (Identical to TRACE instruction execution status)	U	M9044	
SM804	After trace trigger	OFF: Not after trigger ON : After trigger	• Switches ON after trace is triggered.	S (Status change)	New	
SM805	Trace completed	OFF: Not completed ON : End	• Switches ON at completion of trace.	S (Status change)	9043	
SM820	Step trace preparation	OFF: Not ready ON : Ready	• Goes ON after program trace registration, at ready.	U	New	
SM821	Step trace starts	OFF: Suspend ON : Start	• When this goes ON, step trace is started • Suspended when OFF (Related special M all OFF)	S (Status change)	M9182 format change	
SM822	Step trace execution underway	OFF: Suspend ON : Start	• Goes ON when step trace execution is underway • Goes OFF at completion or suspension	S (Status change)	M9181	
SM823	After step trace trigger	OFF: Not after trigger ON : Is after first trigger	• Goes ON if even 1 block within the step trace being executed is triggered. • Goes OFF when step trace is commenced.	S (Status change)	New	
SM824	After Step trace trigger	OFF: Is not after all triggers ON : Is after all triggers	• Goes ON if all blocks within the step trace being executed are triggered. • Goes OFF when step trace is commenced.	S (Status change)	New	
SM825	Step tracecompleted	OFF: Not completed ON : End	• Goes ON at step trace completion. • Goes OFF when step trace is commenced.	S (Status change)	M9180	
SM826	Trace error	OFF: Normal ON : Errors	• Switches ON if error occurs during execution of trace.	S (Status change)	New	

(8) Latch area

Number	Name	Meaning	Explanation	Set by (When Set)	Corresponding ACPU M9□□□	Applicable CPU
SM910	RKEY registration flag	OFF: Keyboard input notregistered ON : Keyboard input registered	• Goes ON at registration of keyboard input. OFF if keyboard input is not registered.	S (Instruction execution)	New	○

(9) A to Q/QnA conversion correspondences

Special relays SM1000 to SM1255 are the relays which correspond to ACPU special relays M9000 to M9255 after A to Q/QnA conversion.

All of these special relays are controlled by the system so that users cannot turn them ON/OFF in the program.

If users want to turn these relays ON/OFF, the program should be modified to use QCPU/QnACPU special relays.

For SM1084 and SM1200 through SM1255, however, if a user can turn ON/OFF some of special relays M9084 and M9200 through M9255 before conversion, the user can also turn ON/OFF the corresponding relays among SM1084 and SM1200 through SM1255 after the conversion.

For details on the ACPU special relays, see the user's manuals for the individual CPUs, and MELSECNET or MELSECNET/B Data Link System Reference Manuals.

POINT

The processing time may be longer when converted special relays are used with QCPU.
Uncheck "A-series CPU compatibility setting" within the PC system setting in GX Developer PC parameters when converted special relays are not used.

REMARK

The following are additional explanations about the Special Relay for Modification column.

① When a special relay for modification is provided, the device number should be changed to the provided QCPU/QnACPU special relay.

② When ⊟ is provided, the converted special relay can be used for the device number.

③ When ⊠ is provided, the device number does not work with QCPU/QnACPU.

Special Relay List

ACPU Special Relay	Special Relay after Conversion	Special Relay for Modification	Name	Meaning	Details	Applicable CPU
M9000	SM1000	—	Fuse blown	OFF: Normal ON : Fuse blown module with blown fuse present	• Turned on when there is one or more output units of which fuse has been blown.Remains on if normal status is restored. Output modules of remote I/O stations are also checked fore fuse condition.	○
M9002	SM1002	—	I/O module verification error	OFF: Normal ON : Error	• Turned on if the states of I/O module is different form entered states when power is turned on. Remains on if normal states is restored. I/O module verification is done also to remote I/O station modules. (Reset is enabled only when special registers SD1116 to SD1123 are reset.)	
M9004	SM1004	—	NIMI link error	OFF: Normal ON : Error	• Turned on when the MINI(S3) link error is detected on even one of the MELSECNET/MINI master modules being loaded.Remains on if normal status is restored.	QnA
M9005	SM1005	—	AC DOWN detection	OFF: AC DOWN not detected ON : AC DOWN detected	• Comes ON it a momentary power interruption of less than 20ms occurred during use of the AC power supply module, and reset by turning power OFF, then ON.	○
					• Comes ON if a momentary power interruption of less than 10ms occurred during use of the DC power supply module, and reset by turning power OFF, then ON.	
					• Comes ON if a momentary power interruption of less than 1ms occurred during use of the DC power supply module, and reset by turning power OFF, then ON.	

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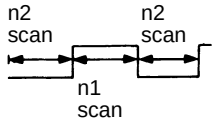
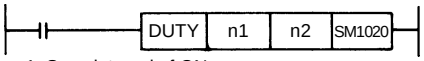
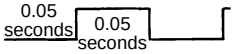
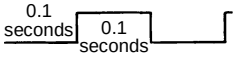
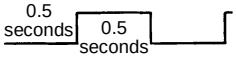
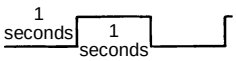
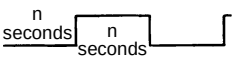
Special Relay List (Continued)

ACPU Special Relay	Special Relay after Conversion	Special Relay for Modification	Name	Meaning	Details	Applicable CPU
M9006	SM1006	—	Battery low	OFF: Normal ON : Battery low	• Turned on when battery voltage reduces to less than specified. Turned off when battery voltage becomes normal.	○
M9007	SM1007	—	Battery low latch	OFF: Normal ON : Battery low	• Turned on when battery voltage reduces to less than specified. Remains on if battery voltage becomes normal.	
M9008	SM1008	SM1	Self-diagnosis error	OFF: No error ON : Error	• Turned on when error is found as a result of self-diagnosis.	
M9009	SM1009	SM62	Annunciator detection	OFF: No F number detected ON : F number detected	• Turned on when OUT F of SET F instruction is executed. Switched off when SD1124 data is zeroed.	○
M9011	SM1011	SM56	Operation error flag	OFF: No error ON : Error	• Turned on when operation error occurs during execution of application instruction. Remains on if normal status is restored.	
M9012	SM1012	SM700	Carry flag	OFF: Carry OFF ON : Carry ON	• Carry flag used in application instruction.	
M9016	SM1016		Data memory clear flag	OFF: Ignored ON : Output claered	• Clears the data memory including the latch range (other than special relays and special registers) in remote run mode from computer, etc. when SM1016 is on.	
M9017	SM1017		Data memory clear flag	OFF: Ignored ON : Output claered	• Clears the unlatched data memory (other than special relays and registers) in remote run mode from computer, etc. when SM1017 is on.	
M9020	SM1020	—	User timing clock No.0		• This relay repeats ON/OFF at designated scan intervals. • Starts from OFF when the PLC power is turned ON or the CPU module is reset. • The ON/OFF scan intervals are set by the DUTY instruction.  n1: Scan interval of ON n2: Scan interval of OFF	
M9021	SM1021	—	User timing clock No.1			
M9022	SM1022	—	User timing clock No.2			
M9023	SM1023	—	User timing clock No.3			
M9024	SM1024	—	User timing clock No.4			
M9025	SM1025	—	Clock data set request	OFF: Ignored ON : Set request present used	• Writes clock data from SD1025 to SD1028 to the clock element after the END instruction is executed during the scan in which SM1025 has changed from off to on.	
M9026	SM1026	—	Clock data error	OFF: No error ON : Error	• Switched on by clock data (SD1025 to SD1028) error	
M9027	SM1027	—	Clock data display	OFF: Ignored ON : Display	• Clock data is read from SD1025 to SD1028 and month, day, hour, minute and minute are indicated on the CPU front LED display.	
M9028	SM1028	—	Clock data read request	OFF: Ignored ON : Read request	• Reads clock data to SD1025 to SD1028 in BCD when SD1028 is on.	
M9029	SM1029		Batch processing of data communications requests	OFF: Batch processing not conducted ON : Batch processing conducted	• The SM1029 relay is turned on using a sequence program to process all data communication requests accepted during one scan in the END processing of that scan. • The batch processing of the data communication requests can be turned on and off during running. • The default is OFF (processed one at a time for each END processing in the order in which data communication requests are accepted).	
M9030	SM1030	—	0.1 second clock		• Generates each of 0.1 sec, 0.2 sec, 1 sec and 2 sec clocks. • This relay does not turn ON/OFF for each scan; it turns ON/OFF when the predefined time elapses even during scanning. • Starts from OFF when the PLC power is turned ON or the CPU module is reset.	
M9031	SM1031	—	0.2 second clock			
M9032	SM1032	—	1 second clock			
M9033	SM1033	—	2 second clock			
M9034	SM1034	—	2n minute clock (1 minute clock) ✻		• Alternates between ON and OFF according to the seconds specified at SD414. (Default: n = 30) • Not turned on or off per scan but turned on and off even during scan if corresponding time has elapsed. • Starts from OFF when the PLC power is turned ON or the CPU module is reset.	

✻: 1 minute clock indicates the name of the special relay (M9034) of the ACPU.

Special Relay List (Continued)

ACPU Special Relay	Special Relay after Conversion	Special Relay for Modification	Name	Meaning	Details	Applicable CPU
M9036	SM1036	—	Always ON	ON OFF	• Used as dummy contacts of initialization and application instruction in sequence program. • SM1038 and SM1037 are turned on and off without regard to position of key switch on CPU module front. SM1038 and SM1039 are under the same condition as RUN status except when the key switch is at STOP position, and turned off and on. Switched off if the key switch is in STOP position. SM1038 is on for one scan only and SM1039 is off for one scan only if the key switch is not in STOP position.	
M9037	SM1037	—	Always OFF	ON OFF		
M9038	SM1038	—	ON for 1 scan only after RUN	ON OFF 1 scan		
M9039	SM1039	—	RUN flag(After RUN, OFF for 1 scan only)	ON 1 scan OFF		
M9040	SM1040	SM206	PAUSE enable coil	OFF: PAUSE disabled ON : PAUSE enabled	• When remote pause contact has turned on and SM204 is on, PAUSE mode is set and SM206 is turned on.	
M9041	SM1041	SM204	USE statuscontact	OFF: PAUSE not in effect ON : PAUSE in effect		
M9042	SM1042	SM203	STOP status contact	OFF: STOP not in effect ON : STOP in effect	• Switched on when the RUN key switch is in STOP position.	
M9043	SM1043	SM805	SamplingTrace completed	OFF: Sampling trace in progress ON : Sampling trace completed	• Turned on upon completion of sampling trace performed the number of times preset by parameter after [STRA] instruction is executed. Reset when [STRAR] instruction is executed.	
M9044	SM1044	SM803	Sampling trace	OFF →ON: [STRA] Same as execution ON →OFF: [STRAR] Same as execution	• Turning on/off SM803 can execute [STRA] / [STRAR] instruction. (SM803 is forcibly turned on/off by a peripheral device.) When switched from OFF to ON: [STRA] instruction When switched from ON to OFF: [STRAR] instruction The value stored in SD1044 is used as the condition for the sampling trace. At scanning, at time → Time (10 msec unit)	○
M9045	SM1045		Watchdog timer (WDT) reset	OFF: Does not reset WDT ON : Resets WDT	• The SM1015 relay is turned on to reset the WDT when the ZCOM instruction and data communication request batch processing are executed (used when the scan time exceeds 200 ms).	
M9046	SM1046	SM802	Sampling trace	OFF: Trace not in progress ON : Trace in progress	• Switched on during sampling trace.	
M9047	SM1047	SM801	Sampling trace preparations	OFF: Sampling trace suspended ON : Sampling trace started	• Sampling trace is not executed unless SM801 is turned ON. Sampling trace is suspended when SM801 goes OFF.	
M9049	SM1049	SM701	Selection of number of characters output	OFF: Output until NULL code encountered ON : 16 characters output	• When SM701 is OFF, characters up to NUL (00H) code are output. • When SM701 is ON, ASCII codes of 16 characters are output.	
M9051	SM1051		CHG instruction execution disable	OFF: Enabled ON : Disable	• Switched ON to disable the CHG instruction. • Switched ON when program transfer is requested. Automatically switched OFF when transfer is complete.	
M9052	SM1052		SEG instruction switch	OFF: 7SEG segment display ON : I/O partial refresh	• When SM1052 is ON, the SEG instruction is executed as an I/O partial refresh instruction. • When SM1052 is OFF, the SEG instruction is executed as a 7-SEG display instruction.	
M9054	SM1054	SM205	STEP RUN flag	OFF: STEP RUN not in effect ON : STEP RUN in effect	• Switched on when the RUN key switch is in STEP RUN position.	QnA
M9055	SM1055	SM808	Status latch completion flag	OFF: Not completed ON : Completed	• Turned on when status latch is completed. Turned off by reset instruction.	
M9056	SM1056		Main side P, I set request	OFF: Other than when P, I set being requested ON : P, I set being requested	• Provides P, I set request after transfer of the other program (for example subprogram when main program is being run) is complete during run. Automatically switched off when P, I setting is complete.	○
M9057	SM1057		Sub side P, I set request	OFF: Other than when P, I set being requested ON : P, I set being requested		
M9058	SM1058		Main program P, I set completion	Momentarily ON at P, I set completion	• Turned ON once when the P, I set has been completed, and then turned OFF again.	
M9059	SM1059		Sub program P, I set completion	Momentarily ON at P, I set completion		
M9060	SM1060		Sub program 2 P, I set request	OFF: Other than when P, I set being requested ON : P, I set being requested	• Provides P, I set request after transfer of the other program (for example subprogram when main program is being run) is complete during run. Automatically switched off when P, I setting is complete.	

Special Relay List (Continued)

ACPU Special Relay	Special Relay after Conversion	Special Relay for Modification	Name	Meaning	Details	Applicable CPU
M9061	SM1061		Sub program 3 P, I set request	OFF: Other than when P, I set being requested ON : P, I set being requested	• Provides P, I set request after transfer of the other program (for example subprogram when main program is being run) is complete during run. Automatically switched off when P, I setting is complete.	○
M9065	SM1065	SM711	Divided processing execution detection	OFF: Divided processing not underway ON : During divided processing	• Turned on when canvas screen transfer to AD57(S1)/AD58 is done by divided processing, and turned off at completion of divided processing.	QnA
M9066	SM1066	SM712	Divided processing request flag	OFF: Batch processing ON : Divided processing	• Turned on when canvas screen transfer to AD57(S1)/AD58 is done by divided processing.	
M9070	SM1070		A8UPU/A8PUJrequired search time	OFF: Read time not shortened ON : Read time shortened	• Turned ON to shorten the search time in the A8UPU/A8PUJ. (In this case, the scan time is extended by 10 %.) * The A8UPU/A8PUJ cannot be used in the QCPU/QnACPU special relays.	○
M9081	SM1081	SM714	Communication request registration area BUSY signal	OFF: Empty spaces in communication request registration area ON : No empty spaces in communication request registration area	• Indication of communication enable/disable to remote terminal modules connected to the MELSECNET/MINI master, A2C or A52G.	QnA
M9084	SM1084		Error check	OFF: Error check executed ON : No error check	• It is set whether the error checks below are performed or not when the END instruction is processed (to set the END instruction processing time). • Check for breakage of fuse. • Collation check of I/O unit • Check of battery	○
M9091	SM1091		Instruction error flag	OFF: No error ON : Error	• Set when an operation error detail factor is stored at SD1091, and remains set after normal status is restored. • Set when an error occurred at execution of the microcomputer program package, and remains set after normal status is restored.	
M9094	SM1094	SM251	I/O change flag	OFF: Replacement ON : No replacement	• After the head address of the required I/O module is set to SD251, switching SM251 on allows the I/O module to be changed in online mode. (One module is only allowed to be changed by one setting.) • To be switched on in the program or peripheral device test mode to change the module during CPU RUN. To be switched on in peripheral device test mode to change the module during CPU STOP. • RUN/STOP mode must not be changed until I/O module change is complete.	QnA
M9100	SM1100	SM320	Presence/absence of SFC program	OFF: SFC programs not used ON : SFC programs used	• Turned on if the SFC program is registered, and turned off if it is not.	○
M9101	SM1101	SM321	Start/stop SFC program	OFF: SFC programs stop ON : SFC programs start	• Should be turned on by the program if the SFC program is to be started. If turned off, operation output of the execution step is turned off and the SFC program is stopped.	
M9102	SM1102	SM322	SFC program start status	OFF: Initial Start ON : Continue	• Selects the starting step when the SFC program is restarted using SM322. ON: All execution conditions when the SFC program stopped are cleared, and the program is started with the initial step of block 0. OFF: Started with the step of the block being executed when the program stopped. • Once turned on, the program is latched in the system and remains on even if the power is turned off. Should be turned off by the sequence program when turning on the power, or when starting with the initial step of block 0.	
M9103	SM1103	SM323	Presence/absence of continuous transition	OFF: Continuous transition not effective ON : Continuous transition effective	• Selects consecutive or step-by-step transfer of steps of which transfer conditions are established when all of the transfer conditions of consecutive steps are established. ON: Consecutive transfer is executed. OFF: One step per one scan is transferred.	

Special Relay List (Continued)

ACPU Special Relay	Special Relay after Conversion	Special Relay for Modification	Name	Meaning	Details	Applicable CPU
M9104	SM1104	SM324	Continuous transition suspension flag	OFF: When transition is completed ON : When no transition	• Set when consecutive transfer is not executed with consecutive transfer enabled. Reset when transfer of one step is completed. Consecutive transfer of a step can be prevented by writing an AND condition to corresponding M9104.	
M9108	SM1108	SM90	Step transition watchdog timer start (equivalent of D9108)	OFF: Watchdog timer reset ON : Watchdog timer reset start	• Turned on when the step transfer monitoring timer is started. Turned off when the monitoring timer is reset.	
M9109	SM1109	SM91	Step transition watchdog timer start (equivalent of D9109)			
M9110	SM1110	SM92	Step transition watchdog timer start (equivalent of D9110)			
M9111	SM1111	SM93	Step transition watchdog timer start (equivalent of D9111)			
M9112	SM1112	SM94	Step transition watchdog timer start (equivalent of D9112)			
M9113	SM1113	SM95	Step transition watchdog timer start (equivalent of D9113)			
M9114	SM1114	SM96	Step transition watchdog timer start (equivalent of D9114)			
M9180	SM1180	SM825	Active step sampling trace completion flag	OFF: Trace started ON : Trace completed	• Set when sampling trace of all specified blocks is completed. Reset when sampling trace is started.	○
M9181	SM1181	SM822	Active step sampling trace execution flag	OFF: Trace not being executed ON : Trace execution under way	• Set when sampling trace is being executed. Reset when sampling trace is completed or suspended.	
M9182	SM1182	SM821	Active step sampling trace permission	OFF: Trace disable/suspend ON : Trace enable	• Selects sampling trace execution enable/disable. ON: Sampling trace execution is enabled. OFF: Sampling trace execution is disabled. If turned off during sampling trace execution, trace is suspended.	
M9196	SM1196	SM325	Operation output at block stop	OFF: Coil output OFF ON : Coil output ON	• Selects the operation output when block stop is executed. ON: Retains the ON/OFF status of the coil being used by using operation output of the step being executed at block stop. OFF: All coil outputs are turned off. (Operation output by the SET instruction is retained regardless of the ON/OFF status of M9196.)	
M9197	SM1197		Switch between blown fuse and I/O verification error display	SM1197 / SM1198 / I/O numbers to be displayed: OFF / OFF / X/Y 0 to 7F0 ON / OFF / X/Y 800 to FF0 OFF / ON / X/Y 1000 to 17F0 ON / ON / X/Y 1800 to 1FF0	Switches I/O numbers in the fuse blow module storage registers (SD1100 to SD1107) and I/O module verify error storage registers (SD1116 to SD1123) according to the combination of ON/OFF of the SM1197 and SM1198.	
M9198	SM1198					
M9199	SM1199		Data recovery of online sampling trace/status latch	OFF: Data recovery disabled ON : Data recovery enabled	• Recovers the setting data stored in the CPU at restart when sampling trace/status latch is executed. • SM1199 should be ON to execute again. (Unnecessary when writing the data again from peripheral devices.)	

Special Relay List (Continued)

ACPU Special Relay	Special Relay after Conversion	Special Relay for Modification	Name	Meaning	Details	Applicable CPU
M9200	SM1200	—	ZNRD instruction (LRDP instruction for ACPU) reception (for master station)	OFF: Not accepted ON : Accepted	• Depends on whether or not the ZNRD (word device read) instruction has been received. • Used in the program as an interlock for the ZNRD instruction. • Use the RST instruction to reset.	QnA
M9201	SM1201	—	ZNRD instruction (LRDP instruction for ACPU) completion (for master station)	OFF: Not completed ON : End	• Depends on whether or not the ZNRD (word device read) instruction execution is complete. • Used as a condition contact for resetting SM1202 and SM1203 after the ZNRD instruction is complete. • Use the RST instruction to reset.	
M9202	SM1202	—	ZNWR instruction (LWTP instruction for ACPU) reception (for master station)	OFF: Not accepted ON : Accepted	• Depends on whether or not the ZNWR (word device write) instruction has been received. • Used in the program as an interlock for the ZNWR instruction. • Use the RST instruction to reset.	
M9203	SM1203	—	ZNWR instruction (LWTP instruction for ACPU) completion (for master station)	OFF: Not completed ON : End	• Depends on whether or not the ZNWR (word device write) instruction execution is complete. • Used as a condition contact to reset SM1202 and SM1203 after the ZNWR instruction is complete. • Use the RST instruction to reset.	
M9204	SM1204	—	ZNRD instruction (LWTP instruction for ACPU) reception (for local station)	OFF: Not completed ON : End	On indicates that the ZNRD instruction is complete at the local station.	
M9205	SM1205	—	ZNWR instruction (LRDP instruction for ACPU) recep-tion (for local station)	OFF: Not completed ON : End	On indicates that the ZNWR instruction is complete at the local station.	
M9206	SM1206	—	Host station link parameter error	OFF: Normal ON : Abnormal	Depends on whether or not the link parameter setting of the host is valid.	
M9207	SM1207	—	Link parameter check results	OFF: YES ON : NO	Depends on whether or not the link parameter setting of the master station in tier two matches that of the master station in tier three in a three-tier system. (Valid only for the master stations in a three-tier system.)	
M9208	SM1208	—	Sets master station B and W transmission range (for lower link master stations only)	OFF: Transmits to tier2 and tier 3 ON : Transmits to tier2 only	• Depends on whether or not the B and W data controlled by higher-link master station (host station) is sent to lower-link local stations (tertiary stations). • When SM1208 is OFF .....B and W of host station is sent to tertiary stations. • When SM1208 is ON .....B and W of host station is not sent to tertiary stations.	
M9209	SM1209	—	Link parameter check command (for lower link master stations only)	OFF: Executing the check function ON : Check non-execution	• Set to ON not to match B and W of the higher and lower links. (When SM1209 is ON, the link parameters of the higher and lower links are not checked.) • When SM1209 is OFF, the link parameters of the higher and lower links are checked.	
M9210	SM1210	—	Link card error (for master station)	OFF: Normal ON : Abnormal	Depends on presence or absence of the link card hardware error. Judged by the CPU.	
M9211	SM1211	—	Link module error (for local station use)	OFF: Normal ON : Abnormal	Depends on presence or absence of the link card hardware error. Judged by the CPU.	
M9224	SM1224	—	Link status	OFF: Online ON : Offline,station-to-station test, or self-loopback test	Depends on whether the master station is online or offline or is in station-to-station test or self-loopback test mode.	
M9225	SM1225	—	Forward loop error	OFF: Normal ON : Abnormal	Depends on the error condition of the forward loop line.	
M9226	SM1226	—	Reverse loop error	OFF: Normal ON : Abnormal	Depends on the error condition of the reverse loop line.	
M9227	SM1227	—	Loop test status	OFF: Not being executed ON : Forward or reverse loop test execution underway	Depends on whether or not the master station is executing a forward or a reverse loop test.	
M9232	SM1232	—	Local station operation status	OFF: RUN or STEP RUN status ON : STOP or PAUSE status	Depends on whether or not a local station is in STOP or PAUSE mode.	

Special Relay List (Continued)

ACPU Special Relay	Special Relay after Conversion	Special Relay for Modification	Name	Meaning	Details	Applicable CPU
M9233	SM1233	—	Local station error detect status	OFF: No errors ON : Error detection	Depends on whether or not a local station has detected an error in another station.	QnA
M9235	SM1235	—	Local station, remote I/O station parameter error detect status	OFF: No errors ON : Error detection	Depends on whether or not a local or a remote I/O station has detected any link parameter error in the master station	
M9236	SM1236	—	Local station, remote I/O station initial communications status	OFF: No communications ON : Communications underway	Depends on the results of initial communication between a local or remote I/O station and the master station. (Parameter communication, etc.)	
M9237	SM1237	—	Local station, remote I/O station error	OFF: Normal ON : Abnormal	Depends on the error condition of a local or remote I/O station.	
M9238	SM1238	—	Local station, remote I/O station forward or reverse loop error	OFF: Normal ON : Abnormal	Depends on the error condition of the forward and reverse loop lines of a local or a remote I/O station.	
M9240	SM1240	—	Link status	OFF: Online ON : Offline, station-to-stationtest, or self-loopback test	Depends on whether the local station is online or offline, or is in station-to-station test or self-loopback test mode.	
M9241	SM1241	—	Forward loop line error	OFF: Normal ON : Abnormal	Depends on the error condition of the forward loop line.	
M9242	SM1242	—	Reverse loop line error	OFF: Normal ON : Abnormal	Depends on the error condition of the reverse loop line.	
M9243	SM1243	—	Loopback implementation	OFF: Loopback not being conducted ON : Loopback implementation	Depends on whether or not loopback is occurring at the local station.	
M9246	SM1246	—	Data not received	OFF: Reception ON : No reception	Depends on whether or not data has been received from the master station.	
M9247	SM1247	—	Data not received	OFF: Reception ON : No reception	Depends on whether or not a tier three station has received data from its master station in a three-tier system.	
M9250	SM1250	—	Parameters not received	OFF: Reception ON : No reception	Depends on whether or not link parameters have been received from the master station.	
M9251	SM1251	—	Link relay	OFF: Normal ON : Abnormal	Performs control depending on whether the host station has suspended data link or not.	
M9252	SM1252	—	Loop test status	OFF: Not being executed ON : Forward or reverse loop test execution underway	Depends on whether or not the local station is executing a forward or a reverse loop test.	
M9253	SM1253	—	Master station operation status	OFF: RUN or STEP RUN status ON : STOP or PAUSE status	Depends on whether or not the master station is in STOP or PAUSE mode.	
M9254	SM1254	—	Local station other than host station operation status	OFF: RUN or STEP RUN status ON : STOP or PAUSE status	Depends on whether or not a local station other than the host is in STOP or PAUSE mode.	
M9255	SM1255	—	Local station other than host station error	OFF: Normal ON : Abnormal	Depends on whether or not a local station other than the host is in error.	

(10) Process control instructions

Number	Name	Meaning	Explanation	Set by (When Set)	ACPU M9□□□	Applicable CPU
SM1500	Hold mode	OFF: No-hold ON : Hold	• Specifies whether or not to hold the output value when a range over occurs for the S.IN instruction range check.	U	New	○
SM1501	Hold mode	OFF: No-hold ON : Hold	• Specifies whether or not the output value is held when a range over occurs for the S.OUT instruction range check.	U	New	

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 modules and remote I/O modules.
Data stored in the special registers are stored as BIN values if no special designation has been made to the contrary.

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)	• Indicates whether the relay is set by the system or user, and, if it is set by the system, when setting is performed. <Set by> S : Set by system U : Set by user (sequence programs or test operations from GX Developer) S/U : Set by both system and user <When set> Indicated only for registers set by system Each END : Set during each END processing Initial : Set only during initial processing (when power supply is turned ON, or when going from STOP to RUN) Status change : Set only when there is a change in status Error : Set when error occurs Instruction execution : Set when instruction is executed Request : Set only when there is a user request (through SM, etc.)
Corresponding ACPU M9□□□	• Indicates corresponding special register in ACPU (D9□□□)(Change and notation when there has been a change in contents) • Items indicated as "New" have been newly added for Process CPU
Corresponding CPU	• Indicates the corresponding CPU module type name. ○+Rem: Can be applied to Process CPU and MELSECNET/H remote I/O modules. ○: Can be applied to all types of CPU Remote: Can be applied to the MELSECNET/H remote I/O modules.

For details on the following items, see these manuals:

- Networks → • For Q Corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network)
  • For Q Corresponding MELSECNET/H Network System Reference Manual (Remote I/O network)
- SFC → QCPU(Q mode)/QnACPU Programming Manual (SFC)

POINT

SD1200 to SD1255 are used for QnACPU.
These relays are vacant with Process CPU.

Special Register List

(1) Diagnostic Information

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding ACPU D9□□□	Corresponding CPU
SD0	Diagnostic errors	Diagnosis error code	• Error codes for errors found by diagnosis are stored as BIN data. • Contents identical to latest fault history information.	S (Error)	D9008 format change	○+Rem
SD1	Clock time for diagnosis error occurrence	Clock time for diagnosis error occurrence	• Year (last two digits) and month that SD0 data was updated is stored as BCD 2-digit code. B15 to B8 B7 to B0 Year (0 to 99) | Month (1 to 12) (Example) : October, 95 H9510	S (Error)	New	
SD2			• The day and hour that SD0 was updated is stored as BCD 2-digit code. B15 to B8 B7 to B0 Day (1 to 31) | Hour (0 to 23) (Example) : 10 a.m. on 25th H2510			
SD3			• The minute and second that SD0 data was updated is stored as BCD 2-digit code. B15 to B8 B7 to B0 Minutes (0 to 59) | Seconds (0 to 59) (Example) : 35 min. 48 sec. (past the hour) H3548			
SD4	Error information categories	Error information category code	• 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. B15 to B8 B7 to B0 Individual information category codes | Common information category codes • 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 5 : Switch cause (for Q4AR only) ✻ : For a multiple CPU system, the module number or PLC number is stored depending on the error that occurred. (Refer to the corresponding error code for which number has been stored.) PLC No. 1: 1, PLC No. 2: 2, PLC No. 3: 3, PLC No. 4: 4 • 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 7 : Check instruction malfunction number	S (Error)	New	

Special Register List (Continued)

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD5
SD6
SD7
SD8
SD9
SD10
SD11
SD12
SD13
SD14
SD15</td><td>Error common information</td><td>Error common information</td><td>• Common information corresponding to the error codes (SD0) is stored here.
• The following four types of information are stored here:
① Slot No.
<table>
<tr><th>Number</th><th>Meaning</th></tr>
<tr><td>SD5</td><td>Slot No./PLC No./Base No. *1*2</td></tr>
<tr><td>SD6</td><td>I/O No.</td></tr>
<tr><td>SD7
SD8
SD9
SD10
SD11
SD12
SD13
SD14
SD15</td><td>(Vacant)</td></tr>
</table>
(Not used for base No.)
*1: For a multiple CPU system, the slot number or PLC number is stored depending on the error that occurred.
Slot 0 in the multiple CPU system is the one on the slot on the right of the rightmost CPU module.
(Refer to the corresponding error code for which number has been stored.)
PLC No. 1: 1, PLC No. 2: 2, PLC No. 3: 3, PLC No. 4: 4
*2: If a fuse blown or I/O verify error occurred in the module loaded in the MELSECNET/H remote I/O station, the network number is stored into the upper 8 bits and the station number into the lower 8 bits.
Use the I/O No. to check the module where the fuse blown or I/O verify error occurred.
② File name/Drive name
<table>
<tr><th>Number</th><th colspan="2">Meaning</th></tr>
<tr><td>SD5</td><td colspan="2">Drive</td></tr>
<tr><td>SD6
SD7
SD8
SD9</td><td colspan="2">File name
(ASCII code: 8 characters)</td></tr>
<tr><td>SD10</td><td>Extension*3</td><td>2EH(.)</td></tr>
<tr><td>SD11</td><td colspan="2">(ASCII code: 3 characters)</td></tr>
<tr><td>SD12
SD13
SD14
SD15</td><td colspan="2">(Vacant)</td></tr>
</table>
(Example)
File name= ABCDEFGH. IJK
<table>
<tr><th>B15 to B8</th><th>B7 to B0</th></tr>
<tr><td>42H(B)</td><td>41H(A)</td></tr>
<tr><td>44H(D)</td><td>43H(C)</td></tr>
<tr><td>46H(F)</td><td>45H(E)</td></tr>
<tr><td>48H(H)</td><td>47H(G)</td></tr>
<tr><td>49H(I)</td><td>2EH(.)</td></tr>
<tr><td>4BH(K)</td><td>4AH(J)</td></tr>
</table>
(Continued to next page)</td><td>S (Error)</td><td>New</td><td>○+Rem</td></tr>
</table>

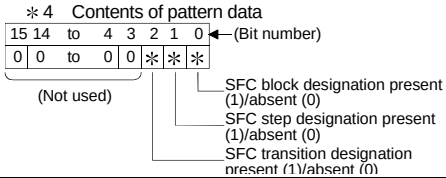
* 3: Refer to REMARK.

REMARK

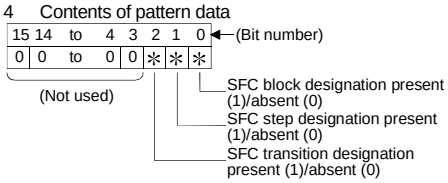
1) Extensions are shown below.

SD10	SD11		Extension name	File type
Higher8 bits	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	49H	QDI	Device initial value
51H	44H	52H	QDR	File register
51H	44H	53H	QDS	Simulation data
51H	44H	4CH	QDL	Local device
51H	54H	52H	QTR	SFC trace file
51H	46H	44H	QFD	Trouble history data

Special Register List (Continued)

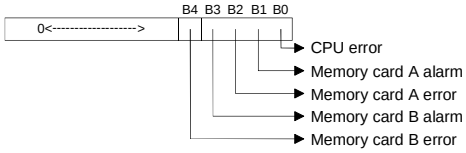
<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD5
SD6
SD7
SD8
SD9
SD10
SD11
SD12
SD13
SD14
SD15</td><td>Error common information</td><td>Error common information</td><td>③ 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
SD8
SD9
SD10
SD11
SD12
SD13
SD14
SD15</td><td>(Vacant)</td></tr></table>④ Program error location
<table><tr><th>Number</th><th>Meaning</th></tr><tr><td>SD5
SD6
SD7
SD8</td><td>File name
(ASCII code: 8 characters)</td></tr><tr><td>SD9</td><td>Extension 2EH(.)</td></tr><tr><td>SD10</td><td>(ASCII code: 3 characters)</td></tr><tr><td>SD11</td><td>Pattern ∗4</td></tr><tr><td>SD12</td><td>Block No.</td></tr><tr><td>SD13</td><td>Step No./transition No.</td></tr><tr><td>SD14</td><td>Sequence step No. (L)</td></tr><tr><td>SD15</td><td>Sequence step No. (H)</td></tr></table>∗4 Contents of pattern data
  </td><td>S (Error)</td><td>New</td><td>○+Rem</td></tr>
</table>

Special Register List (Continued)

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD16
SD17
SD18
SD19
SD20
SD21
SD22
SD23
SD24
SD25
SD26</td><td>Error individual information</td><td>Error individual information</td><td>
• Individual information corresponding to error codes (SD0) is stored here.
① File name/Drive name
<table>
<tr><th>Number</th><th colspan="2">Meaning</th></tr>
<tr><td>SD16</td><td colspan="2">Drive</td></tr>
<tr><td>SD17</td><td colspan="2" rowspan="5">File name
(ASCII code: 8 characters)</td></tr>
<tr><td>SD18</td></tr>
<tr><td>SD19</td></tr>
<tr><td>SD20</td></tr>
<tr><td>SD21</td><td>Extension</td><td>2EH(.)</td></tr>
<tr><td>SD22</td><td colspan="2">(ASCII code: 3 characters)</td></tr>
<tr><td>SD23</td><td colspan="2" rowspan="4">(Vacant)</td></tr>
<tr><td>SD24</td></tr>
<tr><td>SD25</td></tr>
<tr><td>SD26</td></tr>
</table>
(Example)
File name= ABCDEFGH. IJK
<table>
<tr><th>B15 to B8</th><th>B7 to B0</th></tr>
<tr><td>42H(B)</td><td>41H(A)</td></tr>
<tr><td>44H(D)</td><td>43H(C)</td></tr>
<tr><td>46H(F)</td><td>45H(E)</td></tr>
<tr><td>48H(H)</td><td>47H(G)</td></tr>
<tr><td>49H(I)</td><td>2EH(.)</td></tr>
<tr><td>4BH(K)</td><td>4AH(J)</td></tr>
</table>
② Time (value actually measured)
<table>
<tr><th>Number</th><th>Meaning</th></tr>
<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>
③ Program error location
<table>
<tr><th>Number</th><th colspan="2">Meaning</th></tr>
<tr><td>SD16</td><td colspan="2" 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</td><td>2EH(.)</td></tr>
<tr><td>SD21</td><td colspan="2">(ASCII code: 3 characters)</td></tr>
<tr><td>SD22</td><td colspan="2">Pattern ∗4</td></tr>
<tr><td>SD23</td><td colspan="2">Block No.</td></tr>
<tr><td>SD24</td><td colspan="2">Step No./transition No.</td></tr>
<tr><td>SD25</td><td colspan="2">Sequence step No. (L)</td></tr>
<tr><td>SD26</td><td colspan="2">Sequence step No. (H)</td></tr>
</table>
∗4 Contents of pattern data


④ Parameter number ⑤ Annunciator number / CHK instruction malfunction number ⑥ Intelligent function module parameter error (for QCPU only)
<table>
<tr><th>Number</th><th>Meaning</th></tr>
<tr><td>SD16</td><td>Parameter No.∗5</td></tr>
<tr><td>SD17</td><td rowspan="9">(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>
<table>
<tr><th>Number</th><th>Meaning</th></tr>
<tr><td>SD16</td><td>No.</td></tr>
<tr><td>SD17</td><td rowspan="9">(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>
<table>
<tr><th>Number</th><th>Meaning</th></tr>
<tr><td>SD16</td><td>Parameter No. ∗5</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>
∗5 For details of the parameter numbers, refer to the user's manual of the CPU module used.
</td><td>S (Error)</td><td>New</td><td>○+Rem</td></tr>
</table>

Special Register List (Continued)

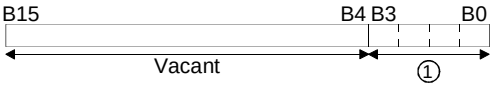
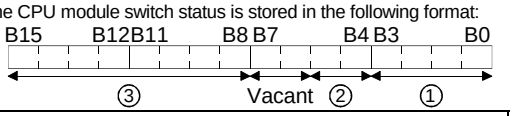
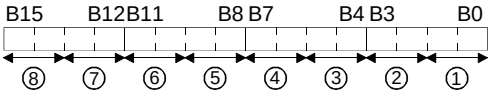
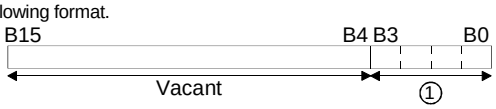
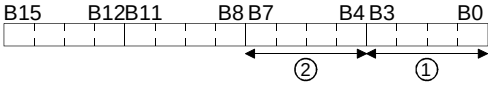
Number	Name	Meaning	Explanation	Set by (When set)	Corresponding ACPU D9□□□	Corresponding CPU
SD50	Error reset	Error code that performs error reset	• Stores error code that performs error reset	U	New	○+Rem
SD51	Battery low latch	Bit pattern indicating where battery voltage drop occurred	• All corresponding bits go ON when battery voltage drops. • Subsequently, these remain ON even after battery voltage has been returned to normal.  • When Process CPU is used, this flag is always OFF because memory card B is used as standard memory.	S (Error)	New	○
SD52	Battery low	Bit pattern indicating where battery voltage drop occurred	• Same configuration as SD51 above • Subsequently, goes OFF when battery voltage is restored to normal. • When Process CPU is used, this flag is always OFF because memory card B is used as standard memory.	S (Error)	New	
SD53	AC DOWN detection	Number of times for AC 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 1 and stored in BIN code.	S (Error)	D9005	○+Rem
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)	D9000	○+Rem
SD61	I/O module verification error number	I/O module verification error module number	• The lowest I/O number of the module where the I/O module verification number took place.	S (Error)	D9002	
SD62	Annunciator number	Annunciator number	• The first annunciator number to be detected is stored here.	S (Instruction execution)	D9009	○
SD63	Number of annunciators	Number of annunciators	• Stores the number of annunciators searched.	S (Instruction execution)	D9124	

Special Register List (Continued)

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD64</td><td rowspan="16">Table of detected annunciator numbers</td><td rowspan="16">Annunciator detection number</td><td rowspan="16">When F goes ON due to [OUT F] or [SET F], the F numbers which go progressively ON from SD64 through SD79 are registered.
F numbers turned OFF by [RST F] are deleted from SD64 to SD79, and are shifted to the data register following the data register where the deleted F numbers had been stored.
Execution of the [LEDR] instruction shifts the contents of SD64 to SD79 up by one.
(This can also be done by using the INDICATOR RESET switch on the front of the Q3A/Q4ACPU.)
After 16 annunciators have been detected, detection of the 17th will not be stored from SD64 through SD79.
SET SET SET RST SET SET SET SET SET SET SET SET
F50 F25 F99 F25 F15 F70 F65 F38 F110 F151 F210 LEDR
SD62: 0 50 50 50 50 50 50 50 50 50 50 50 99 ...(Number detected)
SD63: 0 1 2 3 2 3 4 5 6 7 8 9 8 ...(Number of annunciators detected)
SD64: 0 50 50 50 50 50 50 50 50 50 50 50 99
SD65: 0 0 25 25 99 99 99 99 99 99 99 99 15
SD66: 0 0 0 99 0 15 15 15 15 15 15 15 70
SD67: 0 0 0 0 0 0 70 70 70 70 70 70 65
SD68: 0 0 0 0 0 0 0 65 65 65 65 65 38
SD69: 0 0 0 0 0 0 0 0 38 38 38 38 110
SD70: 0 0 0 0 0 0 0 0 0 110 110 110 151
SD71: 0 0 0 0 0 0 0 0 0 0 151 151 210
SD72: 0 0 0 0 0 0 0 0 0 0 0 210 0 (Number detected)
SD73: 0 0 0 0 0 0 0 0 0 0 0 0 0
SD74: 0 0 0 0 0 0 0 0 0 0 0 0 0
SD75: 0 0 0 0 0 0 0 0 0 0 0 0 0
SD76: 0 0 0 0 0 0 0 0 0 0 0 0 0
SD77: 0 0 0 0 0 0 0 0 0 0 0 0 0
SD78: 0 0 0 0 0 0 0 0 0 0 0 0 0
SD79: 0 0 0 0 0 0 0 0 0 0 0 0 0</td><td rowspan="16">S (Instruction execution)</td><td>D9125</td><td rowspan="25">○</td></tr>
<tr><td>SD65</td><td>D9126</td></tr>
<tr><td>SD66</td><td>D9127</td></tr>
<tr><td>SD67</td><td>D9128</td></tr>
<tr><td>SD68</td><td>D9129</td></tr>
<tr><td>SD69</td><td>D9130</td></tr>
<tr><td>SD70</td><td>D9131</td></tr>
<tr><td>SD71</td><td>D9132</td></tr>
<tr><td>SD72</td><td>New</td></tr>
<tr><td>SD73</td><td>New</td></tr>
<tr><td>SD74</td><td>New</td></tr>
<tr><td>SD75</td><td>New</td></tr>
<tr><td>SD76</td><td>New</td></tr>
<tr><td>SD77</td><td>New</td></tr>
<tr><td>SD78</td><td>New</td></tr>
<tr><td>SD79</td><td>New</td></tr>
<tr><td>SD80</td><td>CHK number</td><td>CHK number</td><td colspan="2">• Error codes detected by the CHK instruction are stored as BCD code.</td><td>S (Instruction execution)</td><td>New</td></tr>
<tr><td>SD90</td><td rowspan="10">Step transition watchdog timer setting value (Enabled only when SFC program exists)</td><td rowspan="10">F number for timer set value and time over error</td><td>Corresponds to SM90</td><td rowspan="10">• F numbers which go ON at step transition watchdog timer set value and watchdog timer over errors.
B15 B8 B7 B0
F number setting (0 to 255)
Timer time limit setting (1 to 255 s: (1-s units))
• Timer is started by turning SM90 through SM99 ON during active step, and if the transition conditions for the relevant steps are not met within the timer limits, the designated annunciator (F) will go ON.</td><td rowspan="10">U</td><td>D9108</td></tr>
<tr><td>SD91</td><td>Corresponds to SM91</td><td>D9109</td></tr>
<tr><td>SD92</td><td>Corresponds to SM92</td><td>D9110</td></tr>
<tr><td>SD93</td><td>Corresponds to SM93</td><td>D9111</td></tr>
<tr><td>SD94</td><td>Corresponds to SM94</td><td>D9112</td></tr>
<tr><td>SD95</td><td>Corresponds to SM95</td><td>D9113</td></tr>
<tr><td>SD96</td><td>Corresponds to SM96</td><td>D9114</td></tr>
<tr><td>SD97</td><td>Corresponds to SM97</td><td>New</td></tr>
<tr><td>SD98</td><td>Corresponds to SM98</td><td>New</td></tr>
<tr><td>SD99</td><td>Corresponds to SM99</td><td>New</td></tr>
<tr><td>SD105</td><td>CH1 transmission speed setting (RS-232)</td><td>Stores the preset transmission speed when GX Developer is used.</td><td colspan="2">3 : 300bps, 6 : 600bps, 24 : 2400bps, 48 : 4800bps
96 : 9600bps, 192 : 19.2kbps, 384 : 38.4kbps
576 : 57.6kbps, 1152 : 115.2kbps</td><td>S</td><td>New</td><td>○+Rem</td></tr>
</table>

Special Register List

(2) System information

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding ACPU D9□□□	Corresponding CPU
SD200	Status of switch	Status of CPU switch	• The switch status of the remote I/O module is stored in the following format.  ① Remote I/O module switch status Always 1: STOP	S (Always)	New	Remote
			• The CPU module switch status is stored in the following format:  ①: CPU switch status 0: RUN, 1: STOP, 2: L.CLR ②: Memory card switch Always OFF ③: DIP switch B8 through BC correspond to SW1 through SW5 of system setting switch 1. 0: OFF, 1: ON. BD through BF are vacant.	S(Every END processing)	New	○
SD201	LED status	Status of CPU-LED	• The following bit patterns are used to store the statuses of the LEDs on the CPU:  ①: RUN ⑤: BOOT ②: ERROR ⑥: Vacant ③: USER ⑦: Vacant ④: BAT.ALARM ⑧: MODE Bit patterns for MODE 0: OFF, 1: Green, 2: Orange	S (Status change)	New	QCPU
SD203	Operating status of CPU	Operating status of CPU	• The operating status of the remote I/O module is stored in the following format.  ① Remote I/O module operating status Always 2: STOP	S (Always)	New	Rem
			• The CPU module operating status is stored as indicated in the following figure:  ①: Operating status of CPU 0 :RUN, 1 :STOP, 2 :PAUSE ②: STOP/PAUSE cause 0 :Switch, 1 :Remote contact, 2 : Remote operation from the GX Developer or Serial Communication., 3 :Internal program instruction, 4 :Errors Note: Priority is earliest first	S (Every END processing)	D9015 format change	○

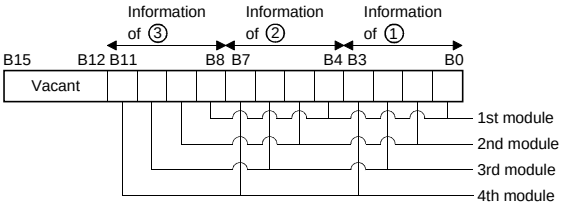
Special Register List (Continued)

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by
(When set)</th><th>Corresponding
ACPU
D9□□□</th><th>Corresponding
CPU</th></tr>
<tr><td>SD206</td><td>Device test execution type</td><td>0: Test not yet executed
1: During X device test
2: During Y device test
3: During X/Y device test</td><td>• Set when the device test mode is executed on GX Developer.</td><td>S
(Request)</td><td>New</td><td>Rem</td></tr>
<tr><td>SD207</td><td rowspan="3">LED display priority ranking</td><td>Priorities 1 to 4</td><td rowspan="3">• When error is generated, the LED display (flicker) is made according to the error number setting priorities.
• The setting areas for priorities are as follows:
B15 B12 B11 B8 B7 B4 B3 B0
SD207: Priority 4 | Priority 3 | Priority 2 | Priority 1
SD208: Priority 8 | Priority 7 | Priority 6 | Priority 5
SD209: Priority 10 | Priority 9
Default Value SD207=H4321
SD208=H8765
SD207=H00A9
• No display is made if "0" is set.
However, even if "0" has been set, information concerning CPU operation stop (including parameter settings) errors will be indicated by the LEDs without conditions.</td><td rowspan="3">U</td><td>D9038</td><td rowspan="3">○</td></tr>
<tr><td>SD208</td><td>Priorities 5 to 8</td><td>D3039 format change</td></tr>
<tr><td>SD209</td><td>Priorities 9 to 10</td><td>New</td></tr>
<tr><td>SD210</td><td>Clock data</td><td>Clock data (year, month)</td><td>• The year (last two digits) and month are stored as BCD code at SD210 as shown below:
B15 to B12 B11 to B8 B7 to B4 B3 to B0 Example : July, 93 H9307
Year Month</td><td rowspan="3">S/U
(Request)</td><td>D9025</td><td rowspan="3">○+Rem</td></tr>
<tr><td>SD211</td><td>Clock data</td><td>Clock data (day, hour)</td><td>• The day and hour are stored as BCD code at SD211 as shown below:
B15 to B12 B11 to B8 B7 to B4 B3 to B0 Example : 31st, 10 a.m. H3110
Day Hour</td><td>D9026</td></tr>
<tr><td>SD212</td><td>Clock data</td><td>Clock data (minute, second)</td><td>• The minutes and seconds (after the hour) are stored as BCD code at SD212 as shown below:
B15 to B12 B11 to B8 B7 to B4 B3 to B0 Example : 35 min., 48 sec. (after the hour) H3548
Minute Second</td><td>D9027</td></tr>
<tr><td>SD213</td><td>Clock data</td><td>Clock data (day of week)</td><td>• Stores the year (two digits) and the day of the week in SD213 in the BCD code format as shown below.
B15 to B12 B11 to B8 B7 to B4 B3 to B0 Example : Friday H0005
Higher digits of year (0 to 99)
Day of week: 0 Sunday; 1 Monday; 2 Tuesday; 3 Wednesday; 4 Thursday; 5 Friday; 6 Saturday</td><td>S/U
(Request)</td><td>D9028</td><td>○+Rem</td></tr>
</table>

Special Register List (Continued)

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD220
SD221
SD222
SD223
SD224
SD225
SD226
SD227</td><td>LED display data</td><td>Display indicator data</td><td>• LED display ASCII data (16 characters) stored here.
B15 to B8 B7 to B0
SD220: 15th character from the right | 16th character from the right
SD221: 13th character from the right | 14th character from the right
SD222: 11th character from the right | 12th character from the right
SD223: 9th character from the right | 10th character from the right
SD224: 7th character from the right | 8th character from the right
SD225: 5th character from the right | 6th character from the right
SD226: 3rd character from the right | 4th character from the right
SD227: 1st character from the right | 2nd character from the right</td><td>S (When changed)</td><td>New</td><td>○</td></tr>
<tr><td>SD235</td><td>Unit to which Online module change is being performed</td><td>The header I/O number of the unit to which Online module cxchange is being performed ÷ 10H</td><td>• Head I/O No. of module being changed online ÷ 10H is stored.</td><td>S(During Online module Exchange)</td><td>New</td><td></td></tr>
<tr><td>SD240</td><td>Base mode</td><td>0: Automatic mode
1: Detail mode</td><td>• Stores the base mode.</td><td>S (Initial)</td><td>New</td><td rowspan="5">○+Rem</td></tr>
<tr><td>SD241</td><td>No. of extension bases</td><td>0: Main base only
1 to 7: No. of extension bases</td><td>• Stores the maximum number of the extension bases unit being installed.</td><td>S (Initial)</td><td>New</td></tr>
<tr><td>SD242</td><td>A/Q base differentiation</td><td>Base type differentiation
0: QA＊＊B is installed (A mode)
1: Q＊＊B is installed (Q mode)</td><td>B7 B2 B1 B0
Fixed to 0 | to
Main base unit
1st extension base
2nd extension base
to
7th extension base
When no extension base is installed, the value is fixed to 0.</td><td>S (Initial)</td><td>New</td></tr>
<tr><td>SD243
SD244</td><td>No. of base slots</td><td>No. of base slots</td><td>B15 B12 B11 B8 B7 B4 B3 B0
SD243: Extension 3 | Extension 2 | Extension 1 | Main
SD244: Extension 7 | Extension 6 | Extension 5 | Extension 4
• As shown above, each area stores the number of slots being installed.</td><td>S (Initial)</td><td>New</td></tr>
<tr><td>SD250</td><td>Loaded maximum I/O</td><td colspan="2">Loaded maximum I/O No.</td><td>• 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.</td><td>S (Request END)</td><td>New</td><td>○+Rem</td></tr>
<tr><td>SD254</td><td rowspan="10">MELSECNET/H information</td><td colspan="2">Number of modules installed</td><td>• Indicates the number of modules installed on MELSECNET/H</td><td rowspan="10">S (Initial)</td><td rowspan="10">New</td><td rowspan="10">○</td></tr>
<tr><td>SD255</td><td rowspan="5">Information from 1st module</td><td>I/O No.</td><td>• MELSECNET/H I/O number of first module installed</td></tr>
<tr><td>SD256</td><td>Network No.</td><td>• MELSECNET/H network number of first module installed</td></tr>
<tr><td>SD257</td><td>Group number</td><td>• MELSECNET/H group number of first module installed</td></tr>
<tr><td>SD258</td><td>Station No.</td><td>• MELSECNET/H station number of first module installed</td></tr>
<tr><td>SD259</td><td>Standby information</td><td>• In the case of standby stations, the module number of the standby station is stored. (1 to 4)</td></tr>
<tr><td>SD260 to SD264</td><td colspan="2">Information from 2nd module</td><td>• Configuration is identical to that for the 2nd module.</td></tr>
<tr><td>SD265 to SD269</td><td colspan="2">Information from 3rd module</td><td>• Configuration is identical to that for the 3rd module.</td></tr>
<tr><td>SD270 to SD274</td><td colspan="2">Information from 4th module</td><td>• Configuration is identical to that for the 4th module.</td></tr>
</table>

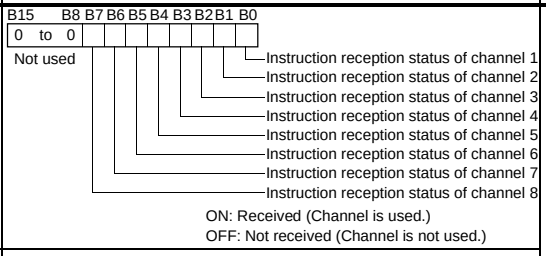
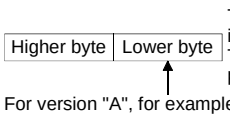
Special Register List (Continued)

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding ACPU D9□□□	Corresponding CPU
SD280	CC-Link error	Error detection status	① When Xn0 of the installed CC-Link goes ON, the bit corresponding to the station switches ON. ② When either Xn1 or XnF of the installed CC-Link switch OFF, the bit corresponding to the station switches ON. ③ Switches ON when the CPU module cannot communicate with the installed CC-Link. 	S (Error)	New	QCPU Remote
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)	New	○+Rem
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			○+Rem
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			○+Rem
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		Number of points allocated for T	• Stores the number of points currently set for T device			
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		Number of points allocated for D	• Stores the number of points currently set for D devices	S (Initial)	New	○+Rem
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	Reserves the designated time for communication processing with GX Developer or other units. The greater the value is designated, the shorter the response time for communication with other devices (GX Developer, serial communication units) becomes. The scan time becomes longer by the designated time. Setting range: 1 to 100 ms If the designated value is out of the range above, it is assumed to no setting.	END processing	New	○

Special Register List (Continued)

Number	Name	Meaning		Explanation	Set by (When set)	Corresponding ACPU D9□□□	Corresponding CPU
SD340	Ethernet information	No. of modules installed		• Indicates the number of modules installed on Ethernet.	S (Initial)	New	QCPU Remote
SD341		Information of 1st module	I/O No.	• Ethernet I/O No. of the 1st module installed.			
SD342			Network No.	• Ethernet network No. of the 1st module installed.			
SD343			Group No.	• Ethernet group No. of the 1st module installed.			
SD344			Station No.	• Ethernet station No. of the 1st module installed.			
SD345 to SD346			Empty	• Empty (The Ethernet IP address of the 1st module is stored in buffer memory.)			
SD347			Empty	• Empty (The Ethernet error code of the 1st module is read with the ERRORRD instruction.)			
SD348 to SD354		Information from 2nd module		• Configuration is identical to that for the first module.	S (Initial)	New	
SD355 to SD361		Information from 3rd module		• Configuration is identical to that for the first module.			
SD362 to SD368		Information from 4th module		• Configuration is identical to that for the first module.			
SD340	Ethernet information	No. of modules installed		• Indicates the number of modules installed on Ethernet.	S (Initial)	New	QnA
SD341		Information of 1st module	I/O No.	• Ethernet I/O No. of the 1st module installed.			
SD342			Network No.	• Ethernet network No. of the 1st module installed.			
SD343			Group No.	• Ethernet group No. of the 1st module installed.			
SD344			Station No.	• Ethernet station No. of the 1st module installed.			
SD345 to SD346			IP address	• Ethernet IP address of the 1st module installed.			
SD347			Error code	• Ethernet error code of the 1st module installed.			
SD348 to SD354		Information from 2nd module		• Configuration is identical to that for the first module.			
SD355 to SD361		Information from 3rd module		• Configuration is identical to that for the first module.			
SD362 to SD368		Information from 4th module		• Configuration is identical to that for the first module.			

Special Register List (Continued)

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding ACPU D9□□□	Corresponding CPU
SD380	Ethernet instruction reception status	Instruction reception status of 1st module		S (Initial)	New	QnA
SD381		Instruction reception status of 2nd module	• Configuration is identical to that for the first module.			
SD382		Instruction reception status of 3rd module	• Configuration is identical to that for the first module.			
SD383		Instruction reception status of 4th module	• Configuration is identical to that for the first module.			
SD392	Software version	Internal system software version	• Stores the internal system software version in ASCII code.  The software version is stored in the lower byte position. The data in the higher byte position is indefinite. For version "A", for example, "41H" is stored. Note: The internal system software version may differ from the version indicated by the version symbol printed on the case.	S (Initial)	D9060	
SD395	Multiple CPU number	Multiple CPU number	• In a multiple CPU system configuration, the PLC number of the host CPU is stored. PLC No. 1: 1, PLC No. 2: 2, PLC No. 3: 3, PLC No. 4: 4	S (Initial)	New	○

(3) System clocks/counters

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding ACPU D9□□□	Corresponding CPU
SD412	1 second counter	Number of counts in 1-second units	• Following programmable controller CPU module RUN, 1 is added each second • Count repeats from 0 to 32767 to -32768 to 0	S (Status change)	D9022	○
SD414	2n second clock setting	2n second clock units	• Stores value n of 2n second clock (Default is 30) • Setting can be made between 1 and 32767	U	New	
SD415	2nms clock setting	2nms clock units	• Stores value n of 2nms clock (Default is 30) • Setting can be made between 1 and 32767	U	New	
SD420	Scan counter	Number of counts in each scan	• This counter increases by 1 for each scan of the scan execution type program after RUN of the CPU module. ∗ • Count repeats from 0 to 32767 to -32768 to 0	S(Every END processing)	New	
SD430	Low speed scan counter	Number of counts in each scan	• This counter increases by 1 for each scan of the low speed execution type program after RUN of the CPU module. • Count repeats from 0 to 32767 to -32768 to 0 • Used only for low speed execution type programs	S(Every END processing)	New	

∗: Not counted by the scan in an initial execution type program.

Special Register List

(4) Scan information

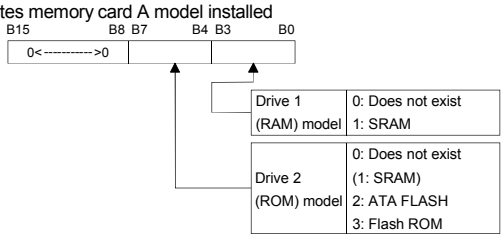
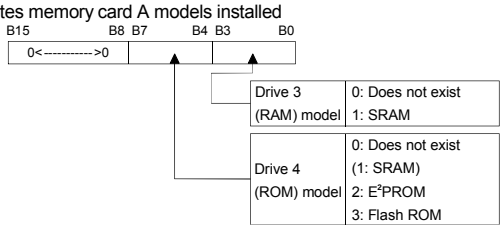
Number	Name	Meaning	Explanation	Set by (When set)	Corresponding ACPU D9□□□	Corresponding CPU
SD500	Execution program No.	Execution type of program being executed	• Program number of program currently being executed is stored as BIN value.	S (Status change)	New	○
SD510	Low speed program No.	File name of low speed execution in progress	• Program number of low speed program currently being executed is stored as BIN value. • Enabled only when SM510 is ON.	S (Every END processing)	New	
SD520	Current scan time	Current scan time (ms unit)	• Current scan time is stored into SD520, SD521. (Measurement is made in 100μs increments.) SD520: Place of ms is stored (storage range: 0 to 65535) SD521: Place of μs is stored (storage range: 0 to 900) Example: Current scan time 23.6ms is stored as indicated below. SD520 = 23 SD521 = 600	S (Every END processing)	D9017 format change	
SD521		Current scan time (μs unit)		S (Every END processing)	New	
SD522	Initial scan time	Initial scan time (ms unit)	• Scan time of initial execution program is stored into SD522, SD523. (Measurement is made in 100μs increments.) SD522: Place of ms is stored (storage range: 0 to 65535) SD523: Place of μs is stored (storage range: 0 to 900)	S (First END processing)	New	
SD523		Initial scan time (μs unit)				
SD524	Minimum scan time	Minimum scan time (ms unit)	• Minimum value of scan time with the exception of initial execution program scan time is stored into SD524, SD525. (Measurement is made in 100μs increments.) SD524: Place of ms is stored (storage range: 0 to 65535) SD525: Place of μs is stored (storage range: 0 to 900)	S (Every END processing)	D9018 format change	
SD525		Minimum scan time (μs unit)		S (Every END processing)	New	
SD526	Maximum scan time	Maximum scan time (ms unit)	• Maximum value of scan time with the exception of initial execution program scan time is stored into SD526, SD527. (Measurement is made in 100μs increments.) SD526: Place of ms is stored (storage range: 0 to 65535) SD527: Place of μs is stored (storage range: 0 to 900)	S (Every END processing)	D9019 format change	
SD527		Maximum scan time (μs unit)			New	
SD528	Current scan time for low speed execution type programs	Current scan time (ms unit)	• Current scan time of low speed program is stored into SD528, SD529. (Measurement is made in 100μs increments.) SD528: Place of ms is stored (storage range: 0 to 65535) SD529: Place of μs is stored (storage range: 0 to 900)	S (Every END processing)	New	
SD529		Current scan time (μs unit)				
SD532	Minimum scan time for low speed execution type programs	Minimum scan time (ms unit)	• Minimum value of low speed program scan time is stored into SD532, SD533. (Measurement is made in 100μs increments.) SD532: Place of ms is stored (storage range: 0 to 65535) SD533: Place of μs is stored (storage range: 0 to 900)	S (Every END processing)	New	
SD533		Minimum scan time (μs unit)				
SD534	Maximum scan time for low speed execution type programs	Maximum scan time (ms unit)	• Maximum value of low speed program scan time with the exception of the first scan is stored into SD534, SD535. (Measurement is made in 100μs increments.) SD534: Place of ms is stored (storage range: 0 to 65535) SD535: Place of μs is stored (storage range: 0 to 900)	S (Every END processing)	New	
SD535		Maximum scan time (μs unit)				
SD540	END processing time	END processing time (ms unit)	• Time from scan program end until next scan start is stored into SD540, SD541. (Measurement is made in 100μs increments.) SD540: Place of ms is stored (storage range: 0 to 65535) SD541: Place of μs is stored (storage range: 0 to 900)	S (Every END processing)	New	
SD541		END processing time (μs unit)				

Special Register List (Continued)

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding ACPU D9□□□	Corresponding CPU
SD542	Constant scan wait time	Constant scan wait time (ms unit)	• Waiting time at the time of constant scan setting is stored into SD542, SD543. (Measurement is made in 100μs increments.) SD542: Place of ms is stored (storage range: 0 to 65535) SD543: Place of μs is stored (storage range: 0 to 900)	S (First END processing)	New	○
SD543		Constant scan wait time (μs unit)				
SD544	Cumulative execution time for low speed execution type programs	Cumulative execution time for low speed execution type programs (ms unit)	• Cumulative execution time of low speed program is stored into SD544, SD545. (Measurement is made in 100μs increments.) SD544: Place of ms is stored (storage range: 0 to 65535) SD545: Place of μs is stored (storage range: 0 to 900) • Cleared to 0 after end of low speed one scan.	S (Every END processing)	New	
SD545		Cumulative execution time for low speed execution type programs (μs unit)				
SD546	Execution time for low speed execution type programs	Execution time for low speed execution type programs (ms unit)	• Execution time of low speed program during one scan is stored into SD546, SD547. (Measurement is made in 100μs increments.) SD546: Place of ms is stored (storage range: 0 to 65535) SD547: Place of μs is stored (storage range: 0 to 900) • Stored every scan.	S (Every END processing)	New	
SD547		Execution time for low speed execution type programs (μs unit)				
SD548	Scan program execution time	Scan program execution time (ms unit)	• Execution time of scan program during one scan is stored into SD548, SD549. (Measurement is made in 100μs increments.) SD548: Place of ms is stored (storage range: 0 to 65535) SD549: Place of μs is stored (storage range: 0 to 900) • Stored every scan.	S (Every END processing)	New	
SD549		Scan program execution time (μs unit)				
SD550	Service interval measurement module	Module No.	• Sets I/O number for module that measures service interval	U	New	○+Rem
SD551	Service interval time	Module service interval (ms unit)	• Service intervals for the module specified in SD550 are stored into SD551, SD552 when SM551 is turned ON. (Measurement is made in 100μs increments.) SD551: Place of ms is stored (storage range: 0 to 65535) SD552: Place of μs is stored (storage range: 0 to 900)	S (Request)	New	
SD552		Module service interval (μs unit)				

Special Register List

(5) Memory card

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding ACPU D9□□□	Corresponding CPU
SD600	Memory card A models	Memory card A models	• Indicates memory card A model installed 	S (Initial and card removal)	New	QCPU
SD602	Drive 1 (RAM) capacity	Drive 1 capacity	• Drive 1 capacity is stored in 1 kbyte units	S (Initial and card removal)	New	QCPU
SD603	Drive 2 (ROM) capacity	Drive 2 capacity	• Drive 2 capacity is stored in 1 kbyte units	S (Initial and card removal)	New	QCPU
SD604	Memory card A use conditions	Memory card A use conditions	• The use conditions for memory card A are stored as bit patterns (In use when ON) • The significance of these bit patterns is indicated below: B0: Boot operation (QBT) B8: — B1: Parameters (QPA) B9: CPU fault history (QFD) B2: Device comments (QCD) BA: SFC trace (QTS) B3: Device initial value (QDI) BB: Local device (QDL) B4: File register R (QDR) BC: B5: Trace (QTS) BD: B6: BE: B7: BF:	S (Status change)	New	QCPU
SD620	Memory card B models	Memory card B models	• Indicates memory card A models installed  Drive 4 is fixed to "3" because it has built-in Flash ROM.	S (Initial)	New	QCPU
SD622	Drive 3 (RAM) capacity	Drive 3 capacity	• Drive 3 capacity is stored in 1 kbyte units.	S (Initial)	New	QCPU
SD623	Drive 4 (ROM) capacity	Drive 4 capacity	• Drive 4 capacity is stored in 1 kbyte units.	S (Initial)	New	QCPU
SD624	Drive 3/4 use conditions	Drive 3/4 use conditions	• The conditions for usage for drive 3/4 are stored as bit patterns. (In use when ON) • The significance of these bit patterns is indicated below. B0: Boot operation (QBT) B8: Not used B1: Parameters (QPA) B9: CPU fault history (QFD) B2: Device comments (QCD) B10: SFC trace (QTS) B3: Device initial value (QDI) B11: Local device (QDL) B4: File R (QDR) B12: Not used B5: Trace (QTS) B13: Not used B6: Not used B14: Not used B7: Not used B15: Not used	S (Status change)	New	QCPU

Special Register List (Continued)

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD640</td><td>File register drive</td><td>Drive number</td><td>• Stores drive number being used by file register.</td><td>S (Status change)</td><td>New</td><td rowspan="8">○</td></tr>
<tr><td>SD641
SD642
SD643
SD644
SD645
SD646</td><td>File register file name</td><td>File register file name</td><td>• Stores file register file name (with extension) selected at parameters or by use of QDRSET instruction as ASCII code.
<table><tr><th></th><th>B15 to B8</th><th>B7 to B0</th></tr><tr><td>SD641</td><td>Second character</td><td>First character</td></tr><tr><td>SD642</td><td>Fourth character</td><td>Third character</td></tr><tr><td>SD643</td><td>Sixth character</td><td>Fifth character</td></tr><tr><td>SD644</td><td>Eighth character</td><td>Seventh character</td></tr><tr><td>SD645</td><td>First character of extension</td><td>2E_H(.)</td></tr><tr><td>SD646</td><td>Third character of extension</td><td>Second character of extension</td></tr></table></td><td>S (Status change)</td><td>New</td></tr>
<tr><td>SD647</td><td>File register capacity</td><td>File register capacity</td><td>• Stores the data capacity of the currently selected file register in 1 k word units.</td><td>S (Status change)</td><td>New</td></tr>
<tr><td>SD648</td><td>File register block number</td><td>File register block number</td><td>• Stores the currently selected file register block number.</td><td>S (Status change)</td><td>D9035</td></tr>
<tr><td>SD650</td><td>Comment drive</td><td>Comment drive number</td><td>• Stores the comment drive number selected at the parameters or by the QCDSET instruction.</td><td>S (Status change)</td><td>New</td></tr>
<tr><td>SD651
SD652
SD653
SD654
SD655
SD656</td><td>Comment file name</td><td>Comment file name</td><td>• Stores the comment file name selected at the parameters or by the QCDSET instruction in ASCII code (with extension).
<table><tr><th></th><th>B15 to B8</th><th>B7 to B0</th></tr><tr><td>SD651</td><td>Second character</td><td>First character</td></tr><tr><td>SD652</td><td>Fourth character</td><td>Third character</td></tr><tr><td>SD653</td><td>Sixth character</td><td>Fifth character</td></tr><tr><td>SD654</td><td>Eighth character</td><td>Seventh character</td></tr><tr><td>SD655</td><td>First character of extension</td><td>2E_H(.)</td></tr><tr><td>SD656</td><td>Third character of extension</td><td>Second character of extension</td></tr></table></td><td>S (Status change)</td><td>New</td><td rowspan="8">○</td></tr>
<tr><td>SD660</td><td rowspan="7">Boot operation designation file</td><td>Boot designation file drive number</td><td>• Stores the drive number where the boot designation file (＊ .QBT) is being stored.</td><td>S (Initial)</td><td>New</td></tr>
<tr><td>SD661
SD662
SD663
SD664
SD665
SD666</td><td>File name of boot designation file</td><td>• Stores the file name of the boot designation file (＊ .QBT).
<table><tr><th></th><th>B15 to B8</th><th>B7 to B0</th></tr><tr><td>SD661</td><td>Second character</td><td>First character</td></tr><tr><td>SD662</td><td>Fourth character</td><td>Third character</td></tr><tr><td>SD663</td><td>Sixth character</td><td>Fifth character</td></tr><tr><td>SD664</td><td>Eighth character</td><td>Seventh character</td></tr><tr><td>SD665</td><td>First character of extension</td><td>2E_H(.)</td></tr><tr><td>SD666</td><td>Third character of extension</td><td>Second character of extension</td></tr></table></td><td>S (Initial)</td><td>New</td></tr>
</table>

(6) Instruction-Related Registers

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD705
SD706</td><td>Mask pattern</td><td>Mask pattern</td><td>• During block operations, turning SM705 ON makes it possible to use the mask pattern being stored at SD705 (or at SD705 and SD706 if double words are being used) to operate on all data in the block with the masked values.</td><td>U</td><td>New</td><td>○</td></tr>
<tr><td>SD715
SD716
SD717</td><td>IMASK instruction mask pattern</td><td>Mask pattern</td><td>• Patterns masked by use of the IMASK instruction are stored in the following manner.
B15 B1 B0
SD715 I15 to I1 I0
SD716 I31 to I17 I16
SD717 I47 to I33 I32</td><td>S (During execution)</td><td>New</td><td rowspan="2">○</td></tr>
<tr><td>SD718
SD719</td><td>Accumulator</td><td>Accumulator</td><td>• For use as replacement for accumulators used in A-series programs.</td><td>S/U</td><td>New</td></tr>
<tr><td>SD736</td><td>PKEY input</td><td>PKEY input</td><td>• Special register that temporarily stores keyboard data input by means of the PKEY instruction.</td><td>S (During execution)</td><td>New</td><td>○</td></tr>
<tr><td>SD738
SD739
SD740
SD741
SD742
SD743
SD744
SD745
SD746
SD747
SD748
SD749
SD750
SD751
SD752
SD753
SD754
SD755
SD756
SD757
SD758
SD759
SD760
SD761
SD762
SD763
SD764
SD765
SD766
SD767
SD768
SD769</td><td>Message storage</td><td>Message storage</td><td>• Stores the message designated by the MSG instruction.
B15 to B8 B7 to B0
SD738 2nd character 1st character
SD739 4th character 3rd character
SD740 6th character 5th character
SD741 8th character 7th character
SD742 10th character 9th character
SD743 12th character 11th character
SD744 14th character 13th character
SD745 16th character 15th character
SD746 18th character 17th character
SD747 20th character 19th character
SD748 22nd character 21st character
SD749 24th character 23rd character
SD750 26th character 25th character
SD751 28th character 27th character
SD752 30th character 29th character
SD753 32nd character 31st character
SD754 34th character 33rd character
SD755 36th character 35th character
SD756 38th character 37th character
SD757 40th character 39th character
SD758 42nd character 41st character
SD759 44th character 43rd character
SD760 46th character 45th character
SD761 48th character 47th character
SD762 50th character 49th character
SD763 52nd character 51st character
SD764 54th character 53rd character
SD765 56th character 55th character
SD766 58th character 57th character
SD767 60th character 59th character
SD768 62nd character 61st character
SD769 64th character 63rd character</td><td>S (During execution)</td><td>New</td><td>○</td></tr>
</table>

Special Register List (Continued)

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding ACPU D9□□□	Corresponding CPU
SD781 TO SD793	Mask pattern of IMASK instruction	Mask pattern	• Stores the mask patterns masked by the IMASK instruction as follows. B15 B1 B0 SD781 I63 to I49 I48 SD782 I79 to I65 I64 to SD793 I255 to I241 I240	S (During execution)	New	○

(7) A to Q/QnA conversion correspondences

ACPU special registers D9000 to D9255 correspond to the special registers SD1000 to SD1255 after A-series to the Q/QnA-series conversion.

Since data are all set to these special registers on the system side, the user cannot turn them ON/OFF in a program.

When it is desired to set data on the user side, correct the program to use the special registers for Q/QnA.

For SD1200 - SD1255, however, the user can set data to only the special registers, among SD1200 - SD1255 after conversion, that correspond to those where the user could set data among D9200 - D9255 before conversion.

For more detailed information concerning the contents of the ACPU special registers, see the individual CPU User's Manual, and the MELSECNET and MELSECNET/B data link system reference manual.

REMARK

Supplemental explanation on "Special Register for Modification" column

① For the device numbers for which a special register for modification is specified, modify it to the special register for Process CPU.

② For the device numbers for which — is specified, special register after conversion can be used.

③ Device numbers for which ⊠ is specified do not function for QCPU/QnACPU.

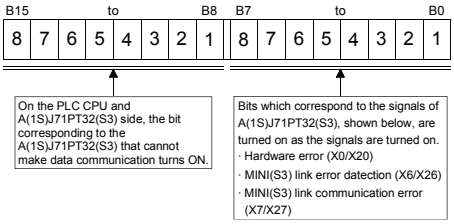
Special Register List

ACPU Special Conversion	Special Register after Conversion	Special Register for Modification	Name	Meaning	Details	Corresponding CPU
D9000	SD1000	—	Fuse blown	Number of module with blown fuse	• When fuse blown modules are detected, the lowest number of detected units is stored in hexadecimal. (Example: When fuses of Y50 to 6F output modules have blown, "50" is stored in hexadecimal) To monitor the number by peripheral devices, perform monitor operation given in hexadecimal. (Cleared when all contents of SD1100 to SD1107 are reset to 0.) • Fuse blow check is executed also to the output modules of remote I/O stations.	○
D9001	SD1001	—	Fuse blown	Number of module with blown fuse	• Stores the module numbers corresponding to setting switch numbers or base unit slot numbers when fuse blow occurred.	

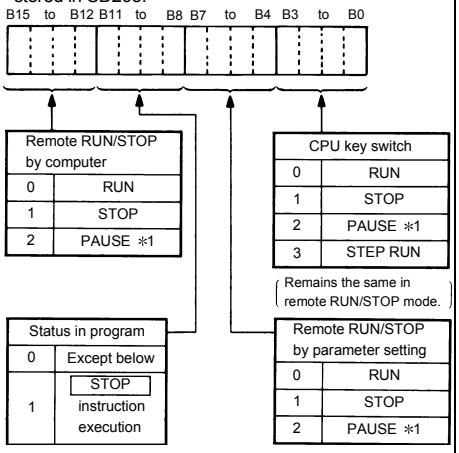
I/O module for A0J2		Extension base unit	
Setting switch	Stored data	Base unit slot No.	Stored data
0	1	0	5
1	2	1	6
2	3	2	7
3	4	3	8
4	5		
5	6		
6	7		
7	8		

• For remote I/O station, value of (module I/O number/10H) + 1 is stored.

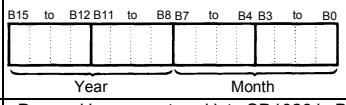
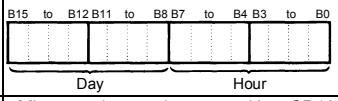
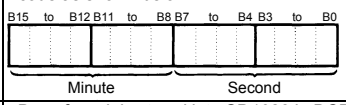
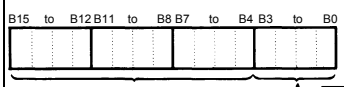
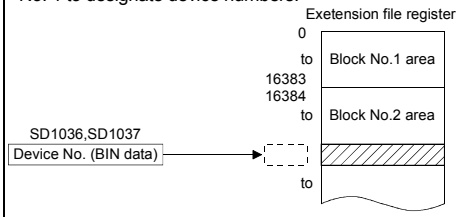
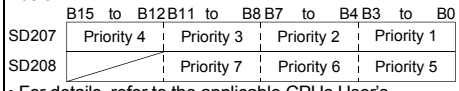
Special Register List (Continued)

ACPU Special Conversion	Special Register after Conversion	Special Register for Modification	Name	Meaning	Details	Corresponding CPU
D9002	SD1002	—	I/O module verification error	I/O module verification error module number	• If I/O modules, of which data are different from data entered, are detected when the power is turned on, the first I/O number of the lowest number unit among the detected units is stored in hexadecimal. (Storing method is the same as that of SD1000.) To monitor the number by peripheral devices, perform monitor operation given in hexadecimal. (Cleared when all contents of SD1116 to SD1123 are reset to 0.) • I/O module verify check is executed also to the modules of remote I/O terminals.	○
D9004	SD1004	—	MINI link master module errors	Error detection state	• Stores the MINI(S3) link error detection status in the mounted MELSECNET/MINI-S3 master module. 	QnA
D9005	SD1005	—	AC DOWN counter	Number of times for AC DOWN	• Turned ON if instantaneous power failure of within 20ms occurs when AC power supply module is used, and reset when power is switched OFF, then ON.	○
					• Turned ON if instantaneous power failure of within 10ms occurs when DC power supply module is used, and reset when power is switched OFF, then ON.	
					• Turned ON if instantaneous power failure of within 1ms occurs when DC power supply module is used, and reset when power is switched OFF, then ON.	QnA
D9008	SD1008	SD0	Self-diagnosis error	Self-diagnosis error code	• When error is found as a result of self-diagnosis, error code is stored in BIN code.	○
D9009	SD1009	SD62	Annunciator detection	F number at which external failure has occurred	• When one of F0 to 2047 is turned on by OUT F or SET F, the F number, which has been detected earliest among the F numbers which have turned on, is stored in BIN code. • SD62 can be cleared by RST F or LEDR instruction. If another F number has been detected, the clearing of SD62 causes the next number to be stored in SD62.	
					• When one of F0 to 2047 is turned on by OUT F or SET F, the F number, which has been detected earliest among the F numbers which have turned on, is stored in BIN code. • SD62 can be cleared by executing RST F or LEDR instruction or moving INDICATOR RESET switch on CPU module front to ON position. If another F number has been detected, the clearing of SD62 causes the nest number to be stored in SD62.	
D9010	SD1010		Error step	Step number at which operation error has occurred.	• When operation error has occurred during execution of application instruction, the step number, at which the error has occurred, is stored in BIN code. Thereafter, each time operation error occurs, the contents of SD1010 are renewed.	

Special Register List (Continued)

ACPU Special Conversion	Special Register after Conversion	Special Register for Modification	Name	Meaning	Details	Corresponding CPU
D9011	SD1011		Error step	Step number at which operation error has occurred.	• When operation error has occurred during execution of application instruction, the step number, at which the error has occurred, is stored in BIN code. Since storage into SD1011 is made when SM1011 changes from off to on, the contents of SD1011 cannot be renewed unless SM1011 is cleared by user program.	
D9014	SD1014		I/O control mode	I/O control mode number	• The I/O control mode set is returned in any of the following numbers: 0. Both input and output in direct mode 1. Input in refresh mode, output in direct mode 3. Both input and output in refresh mode	
D9015	SD1015	SD203	Operating status of CPU	Operating status of CPU	• The operation status of CPU as shown below are stored in SD203.  ∗1 When the CPU module is in RUN mode and SM1040 is off, the CPU module remains in RUN mode if changed to PAUSE mode.	○
D9016	SD1016		Program number	0: Main program (ROM) 1: Main program (RAM) 2: Subprogram 1 (RAM) 3: Subprogram 2 (RAM) 4: Subprogram 3 (RAM) 5: Subprogram 1 (ROM) 6: Subprogram 2 (ROM) 7: Subprogram 3 (ROM) 8: Main program (E^2PROM) 9: Subprogram 1 (E^2PROM) A: Subprogram 2 (E^2PROM) B: Subprogram 3 (E^2PROM)	• Indicates which sequence program is run presently. One value of 0 to B is stored in BIN code.	
D9017	SD1017	SD520	Scan time	Minimum scan time (10 ms units)	• If scan time is smaller than the content of SD520, the value is newly stored at each END. Namely, the minimum value of scan time is stored into SD520 in BIN code.	
D9018	SD1018	SD524	Scan time	Scan time (10 ms units)	• Scan time is stored in BIN code at each END and always rewritten.	

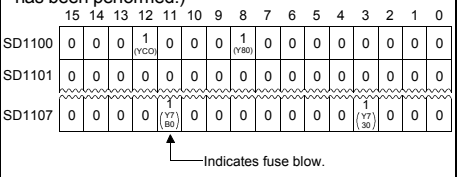
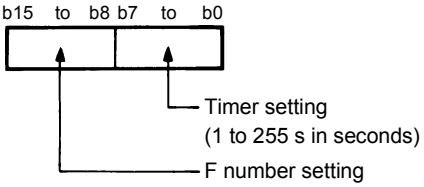
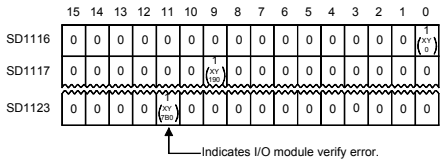
Special Register List (Continued)

ACPU Special Conversion	Special Register after Conversion	Special Register for Modification	Name	Meaning	Details	Corresponding CPU
D9019	SD1019	SD526	Scan time	Maximum scan time (10 ms units)	• If scan time is larger than the content of SD526, the value is newly stored at each END. Namely, the maximum value of scan time is stored into SD526 in BIN code.	○
D9020	SD1020		Constant scan	Constant scan time (User sets in 10 ms units)	• Sets the interval between consecutive program starts in multiples of 10 ms. 0: No setting 1 to 200: Set. Program is executed at intervals of (set value) × 10 ms.	
D9021	SD1021	—	Scan time	Scan time (1 ms units)	• Scan time is stored and updated in BIN code after every END.	
D9022	SD1022	SD412	1 second counter	Count in units of 1ms.	• When the PC CPU starts running, it starts counting 1 every second. • Count repeats changing from 0 to 32767 to -32768 to 0.	
D9025	SD1025	—	Clock data	Clock data (year, month)	• Year (lower 2 digits) and month are stored into SD1025 in BCD code as shown below.  Example: 1987, July H8707	
D9026	SD1026	—	Clock data	Clock data (day, hour)	• Day and hour are stored into SD1026 in BCD code as shown below.  Example 31th, 10 o'clock H3110	
D9027	SD1027	—	Clock data	Clock data (minute, second)	• Minute and second are stored into SD1027 in BCD code as shown below.  Example: 35 minutes, 48 seconds H3548	
D9028	SD1028	—	Clock data	Clock data (day of week)	• Day of week is stored into SD1028 in BCD code as shown below.  Example: Friday H0005 Day of the week: 0 Sunday; 1 Monday; 2 Tuesday; 3 Wednesday; 4 Thursday; 5 Friday; 6 Saturday	
D9035	SD1035	SD648	Extension file register	Use block No.	• Stores the block No. of the extension file register being used in BCD code.	
D9036	SD1036		Extension file registerfor designation of device number	Device number when individual devices from extension file register are directly accessed	• Designate the device number for the extension file register for direct read and write in 2 words at SD1036 and SD1037 in BIN data. Use consecutive numbers beginning with R0 of block No. 1 to designate device numbers. 	
D9037	SD1037					
D9038	SD1038	SD207	LED display priority ranking	Priorities 1 to 4	• Sets priority of ERROR LEDs which illuminate (or flicker) to indicate errors with error code numbers. • Configuration of the priority setting areas is as shown below.  • For details, refer to the applicable CPUs User's Manual and the ACPU Programming manual (Fundamentals).	
D9039	SD1039	SD208		Priorities 5 to 7		

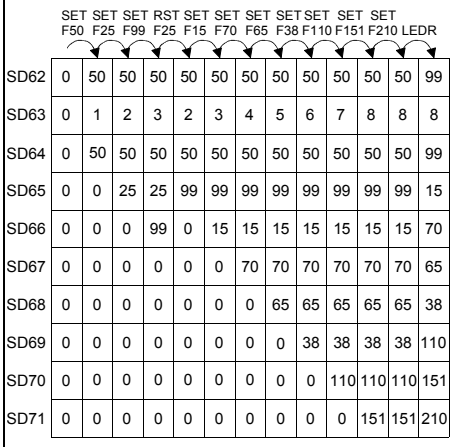
Special Register List (Continued)

ACPU Special Conversion	Special Register after Conversion	Special Register for Modification	Name	Meaning	Details	Corresponding CPU
D9044	SD1044		For sampling trace	Step or time during sampling trace	• When SM803 is turned ON/OFF by peripheral device to activate sampling trace STRA, STRAR, value stored in SD1044 is used as sampling trace condition. For scan ..... 0 For time ..... Time (10ms increments) Value is stored into SD1044 in BIN code.	○
D9049	SD1049		SFC program execution work area	Extension file register block No. used as SFC program execution work area	• Stores the block number of the expansion file register which is used as the work area for the execution of a SFC program in a binary value. • Stores "0" if an empty area of 16K bytes or smaller, which cannot be expansion file register No. 1, is used or if SM320 is OFF.	
D9050	SD1050		SFC program error number	Error code generated by SFC program	• Stores code numbers of errors occurred in the SFC program in BIN code. 0: No error 80: SFC program parameter error 81: SFC code error 82: Number of steps of simultaneous execution exceeded 83: Block start error 84: SFC program operation error	
D9051	SD1051		Error block	Block number where error occurred	• Stores the block number in which an error occurred in the SFC program in BIN code. In the case of error 83 the starting block number is stored.	
D9052	SD1052		Error step	Step number where error occurred	• Stores the step number in which error 84 occurred in the SFC program in BIN code. Stores "0" when errors 80, 81 and 82 occurred. Stored the block starting step number when error 83 occurred.	
D9053	SD1053		Error transition	Transition condition number where error occurred	• Stores the transfer condition number in which error 84 occurred in the SFC program in BIN code. Stored "0" when errors 80, 81, 82 and 83 occurred.	
D9054	SD1054		Error sequence step	Sequence step number where error occurred	• Stores the sequence step number of transfer condition and operation output in which error 84 occurred in the SFC program in BIN code.	
D9055	SD1055	SD812	Status latch execution step No.	Status latch execution step No.	• Stores the step number when status latch is executed. • Stores the step number in a binary value if status latch is executed in a main sequence program. • Stores the block number and the step number if status latch is executed in a SFC program. Block No. (BIN) | Step No. (BIN) ← Higher 8 bits → ← Lower 8 bits →	
D9060	SD1060	SD392	Software version	Software version of internal software	• Stores the software version of the internal system in ASCII code. Higher byte | Lower byte The data in the lower byte position is indefinite. The software version is stored in the higher byte position. For version "A", for example, "41H" is stored. Note: The software version of the initial system may differ from the version indicated by the version information printed on the rear of the case.	QnA
D9072	SD1072		PLC communications check	Data check of serial communication module	• In the self-loopback test of the serial communication module, the serial communication module writes/reads data automatically to make communication checks.	○
D9081	SD1081	SD714	Number of empty blocks in communications request registrtion area	0 to 32	• Stores the number of empty blocks in the communication request registration area to the remote terminal module connected to the MELSECNET/MINI-S3 master unit, A2C or A52G.	QnA

Special Register List (Continued)

ACPU Special Conversion	Special Register after Conversion	Special Register for Modification	Name	Meaning	Details	Corresponding CPU
D9085	SD1085		Register for setting time check value	1s to 65535s	• Sets the time check time of the data link instructions (ZNRD, ZNWR) for the MELSECNET/10. • Setting range: 1 s to 65535 s (1 to 65535) • Setting unit: s • Default value: 10 s (If 0 has been set, default 10 s is applied)	
D9090	SD1090		Microcomputer subroutine input data area head device No.	According to corresponding microcomputer package	• For details, refer to the manual of each microcomputer program package.	
D9091	SD1091		Detailed error code	Self-diagnosis detailed error code	• Stores the detail code of cause of an instruction error.	
D9094	SD1094	SD251	Head I/O number for replacement	Head I/O number for replacement	• Stores upper 2 digits of the head I/O address of I/O modules to be loaded or unloaded during online mode in BIN code. Example) Input module X2F0 → H2F	
D9100	SD1100	—	Fuse blown module	Bit pattern in units of 16 points, indicating the modules whose fuses have blown	• Output module numbers (in units of 16 points), of which fuses have blown, are entered in bit pattern. (Preset output unit numbers when parameter setting has been performed.)  • Fuse blow check is executed also to the output module of remote I/O station. (If normal status is restored, clear is not performed. Therefore, it is required to perform clear by user program.)	
D9101	SD1101					
D9102	SD1102					
D9103	SD1103					
D9104	SD1104					
D9105	SD1105					
D9106	SD1106					
D9107	SD1107					
D9108	SD1108	—	Step transfer monitoring timer setting	Timer setting valve and the F number at time out	• Sets value for the step transfer monitoring timer and the number of F which turns on when the monitoring timer timed out.  (By turning on any of SM1108 to SM1114, the monitoring timer starts. If the transfer condition following a step which corresponds to the timer is not established within set time, set annunciator (F) is tuned on.)	○
D9109	SD1109					
D9110	SD1110					
D9111	SD1111					
D9112	SD1112					
D9113	SD1113					
D9114	SD1114					
D9116	SD1116	—	I/O module verification error	Bit pattern, in units of 16 points, indicating the modules with verification errors.	• When I/O modules, of which data are different from those entered at power-on, have been detected, the I/O unit numbers (in units of 16 points) are entered in bit pattern. (Preset I/O unit numbers when parameter setting has been performed.)  • I/O module verify check is executed also to remote I/O station modules. (If normal status is restored, clear is not performed. Therefore, it is required to perform clear by user program.)	
D9117	SD1117					
D9118	SD1118					
D9119	SD1119					
D9120	SD1120					
D9121	SD1121					
D9122	SD1122					
D9123	SD1123					

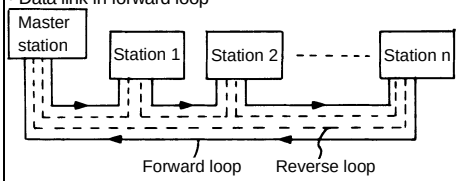
Special Register List (Continued)

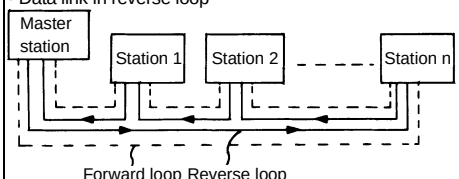
<table>
<tr><th>ACPU Special Conversion</th><th>Special Register after Conversion</th><th>Special Register for Modification</th><th>Name</th><th>Meaning</th><th>Details</th><th>Corresponding CPU</th></tr>
<tr><td>D9124</td><td>SD1124</td><td>SD63</td><td>Annunciator detection quantity</td><td>Annunciator detection quantity</td><td>• When one of F0 to 2047 is turned on by [SET F] 1 is added to the contents of SD63. When [RST F] or [LEDR] instruction is executed, 1 is subtracted from the contents of SD63. (When CPU module has INDICATOR RESET switch, pressing that switch performs the same processing.)
• Quantity, which has been turned on by [SET F] is stored into SD63 in BIN code. The value of SD63 is maximum 8.</td><td rowspan="10">○</td></tr>
<tr><td>D9125</td><td>SD1125</td><td>SD64</td><td rowspan="9">Annunciator detection number</td><td rowspan="9">Annunciator detection number</td><td rowspan="9">• When any of F0 to 2047 is turned ON by [SET F], F numbers turned ON sequentially are registered into D9125 - D9132.
F numbers turned OFF by [RST F] are deleted from D9125 - D9132, and move to data registers subsequent to the ones that stored deleted F numbers. Execution of [LEDR] instruction shifts up SD64 - SD71 contents one place. (When CPU module has INDICATOR RESET switch, pressing that switch performs the same processing.) When there are eight annunciator numbers detected, the ninth number is not stored into SD64 - SD71 if detected.
 
</td></tr>
<tr><td>D9126</td><td>SD1126</td><td>SD65</td></tr>
<tr><td>D9127</td><td>SD1127</td><td>SD66</td></tr>
<tr><td>D9128</td><td>SD1128</td><td>SD67</td></tr>
<tr><td>D9129</td><td>SD1129</td><td>SD68</td></tr>
<tr><td>D9130</td><td>SD1130</td><td>SD69</td></tr>
<tr><td>D9131</td><td>SD1131</td><td>SD70</td></tr>
<tr><td>D9132</td><td>SD1132</td><td>SD71</td></tr>
</table>

SD62	0	50	50	50	50	50	50	50	50	50	50	50	99
SD63	0	1	2	3	2	3	4	5	6	7	8	8	8
SD64	0	50	50	50	50	50	50	50	50	50	50	50	99
SD65	0	0	25	25	99	99	99	99	99	99	99	99	15
SD66	0	0	0	99	0	15	15	15	15	15	15	15	70
SD67	0	0	0	0	0	0	70	70	70	70	70	70	65
SD68	0	0	0	0	0	0	0	65	65	65	65	65	38
SD69	0	0	0	0	0	0	0	0	38	38	38	38	110
SD70	0	0	0	0	0	0	0	0	0	110	110	110	151
SD71	0	0	0	0	0	0	0	0	0	0	151	151	210

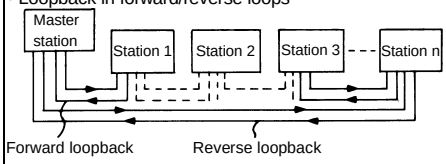
Special Register List

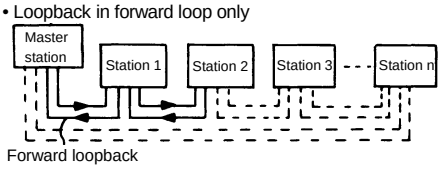
(10) Special register list dedicated for QnA

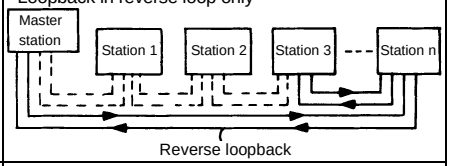
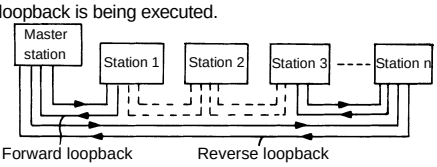
<table>
<tr><th>ACPU Special Conversion</th><th>Special Register after Conversion</th><th>Special Register for Modification</th><th>Name</th><th>Meaning</th><th>Details</th><th>Corresponding CPU</th></tr>
<tr><td>D9200</td><td>SD1200</td><td>—</td><td>ZNRD (LRDP for ACPU) processing results</td><td>0: Normal end
2: ZNRD instruction setting fault
3: Error at relevant station
4: Relevant station ZNRD execution disabled</td><td>Stores the execution result of the ZNRD (word device read) instruction
• ZNRD instruction setting fault: Faulty setting of the ZNRD instruction constant, source, and/or destination
• Corresponding station error: One of the stations is not communicating.
• ZNRD cannot be executed in the corresponding station: The specified station is a remote I/O station.</td><td rowspan="4">QnA</td></tr>
<tr><td>D9201</td><td>SD1201</td><td>—</td><td>ZNWR (LWTP for ACPU) processing results</td><td>0: Normal end
2: ZNWR instruction setting fault
3: Error at relevant station
4: Relevant station ZNWR execution disabled</td><td>Stores the execution result of the ZNWR (word device write) instruction.
• LWTP instruction setting fault: Faulty setting of the ZNWR instruction constant, source, and/or destination.
• Corresponding station error: One of the stations is not communicating.
• ZNWR cannot be executed in the corresponding station: The specified station is a remote I/O station.</td></tr>
<tr><td>D9202</td><td>SD1202</td><td>—</td><td rowspan="2">Local station link type</td><td>Stores conditions for up to numbers 1 to 16</td><td rowspan="2">Stores whether the slave station corresponds to MELSECNET or MELSECNET II.
• Bits corresponding to the MELSECNET II stations become "1."
• Bits corresponding to the MELSECNET stations or unconnected become "0."
<table><tr><th>Device number</th><th colspan="16">Bit</th></tr><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SD1202</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr><tr><td>SD1203</td><td>L32</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr><tr><td>SD1241</td><td>L48</td><td>L47</td><td>L46</td><td>L45</td><td>L44</td><td>L43</td><td>L42</td><td>L41</td><td>L40</td><td>L39</td><td>L38</td><td>L37</td><td>L36</td><td>L35</td><td>L34</td><td>L33</td></tr><tr><td>SD1242</td><td>L64</td><td>L63</td><td>L62</td><td>L61</td><td>L60</td><td>L59</td><td>L58</td><td>L57</td><td>L56</td><td>L55</td><td>L54</td><td>L53</td><td>L52</td><td>L51</td><td>L50</td><td>L49</td></tr></table>• If a local station goes down during the operation, the contents before going down are retained. Contents of SD1224 to SD1227 and SD1228 to SD1231 are ORed. If the corresponding bit is "0", the corresponding bit of the special register above becomes valid.
• If the own (master) station goes down, the contents before going down are also retained.</td></tr>
<tr><td>D9203</td><td>SD1203</td><td>—</td><td>Stores conditions for up to numbers 17 to 32</td></tr>
<tr><td>D9204</td><td>SD1204</td><td>—</td><td>Link status</td><td>0: Forward loop, during data link
1: Reverse loop, during data link
2: Loopback implemented in forward/reverse directions
3: Loopback implemented only in forward direction
4: Loopback implemented only inreverse direction
5: Data link disabled</td><td>Stores the present path status of the data link.
• Data link in forward loop
 

• Data link in reverse loop
 
</td><td>QnA</td></tr>
</table>

Special Register List (Continue)

<table>
<tr><th>ACPU Special Conversion</th><th>Special Register after Conversion</th><th>Special Register for Modification</th><th>Name</th><th>Meaning</th><th>Details</th><th>Corresponding CPU</th></tr>
<tr><td>D9204</td><td>SD1204</td><td>—</td><td>Link status</td><td>0: Forward loop, during data link
1: Reverse loop, during data link
2: Loopback implemented in forward/reverse directions
3: Loopback implemented only in forward direction
4: Loopback implemented only inreverse direction
5: Data link disabled</td><td>• Loopback in forward/reverse loops
 

• Loopback in forward loop only
 

• Loopback in reverse loop only
 
</td><td rowspan="5">QnA</td></tr>
<tr><td>D9205</td><td>SD1205</td><td>—</td><td>Station implementing loopback</td><td>Stores the local or remote I/O station number at which loopback is being executed.
 
</td></tr>
<tr><td>D9206</td><td>SD1206</td><td>—</td><td>Station implementing loopback</td><td>Station that implemented reverse loopback</td><td>In the example of above figure, "1" is stored into SD1205 and "3" into SD1206. If data link returns to normal status (data link in forward loop), values stored into SD1205, SD1206 do not return to "0". To return them to "0", therefore, sequence program must be used or reset operation performed.</td></tr>
<tr><td>D9210</td><td>SD1210</td><td>—</td><td>Number of retries</td><td>Stored as cumulative value</td><td>Stores the number of retry times due to transmission error.
Count stops at maximum of "FFFF$_H$" .
RESET to return the count to 0.</td></tr>
<tr><td>D9211</td><td>SD1211</td><td>—</td><td>Number of times loop selected</td><td>Stored as cumulative value</td><td>Stores the number of times the loop line has been switched to reverse loop or loopback.
Count stops at maximum of "FFFF$_H$".
RESET to return the count to 0.</td></tr>
<tr><td>D9212</td><td>SD1212</td><td>—</td><td>Local station operation status</td><td>Stores conditions for up to numbers 1 to 16</td><td rowspan="4">Stores the local station numbers which are in STOP or PAUSE mode.
<table>
<tr><th rowspan="2">Device number</th><th colspan="16">Bit</th></tr>
<tr><th>b15</th><th>b14</th><th>b13</th><th>b12</th><th>b11</th><th>b10</th><th>b9</th><th>b8</th><th>b7</th><th>b6</th><th>b5</th><th>b4</th><th>b3</th><th>b2</th><th>b1</th><th>b0</th></tr>
<tr><td>SD1212</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr>
<tr><td>SD1213</td><td>L32</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr>
<tr><td>SD1214</td><td>L48</td><td>L47</td><td>L46</td><td>L45</td><td>L44</td><td>L43</td><td>L42</td><td>L41</td><td>L40</td><td>L39</td><td>L38</td><td>L37</td><td>L36</td><td>L35</td><td>L34</td><td>L33</td></tr>
<tr><td>SD1215</td><td>L64</td><td>L63</td><td>L62</td><td>L61</td><td>L60</td><td>L59</td><td>L58</td><td>L57</td><td>L56</td><td>L55</td><td>L54</td><td>L53</td><td>L52</td><td>L51</td><td>L50</td><td>L49</td></tr>
</table>
When a local station is switched to STOP or PAUSE mode, the bit corresponding to the station number in the register becomes "1".
Example: When station 7 switches to STOP mode, bit 6 in SD1212 becomes "1" , and when SD1212 is monitored, its value is "64 (40$_H$)".</td><td rowspan="4">QnA</td></tr>
<tr><td>D9213</td><td>SD1213</td><td>—</td><td>Local station operation status</td><td>Stores conditions for up to numbers 17 to 32</td></tr>
<tr><td>D9214</td><td>SD1214</td><td>—</td><td>Local station operation status</td><td>Stores conditions for up to numbers 33 to 48</td></tr>
<tr><td>D9215</td><td>SD1215</td><td>—</td><td>Local station operation status</td><td>Stores conditions for up to numbers 49 to 64</td></tr>
</table>

Special Register List (Continue)

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<tr><td>D9216</td><td>SD1216</td><td>—</td><td rowspan="4">Local station error detect status</td><td>Stores conditions for up to numbers 1 to 16</td><td rowspan="4">Station numbers of local stations that have detected errors are stored into corresponding data register bits as indicated below.
<table><tr><th>Device number</th><th colspan="16">Bit</th></tr><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SD1216</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr><tr><td>SD1217</td><td>L32</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr><tr><td>SD1218</td><td>L48</td><td>L47</td><td>L46</td><td>L45</td><td>L44</td><td>L43</td><td>L42</td><td>L41</td><td>L40</td><td>L39</td><td>L38</td><td>L37</td><td>L36</td><td>L35</td><td>L34</td><td>L33</td></tr><tr><td>SD1219</td><td>L64</td><td>L63</td><td>L62</td><td>L61</td><td>L60</td><td>L59</td><td>L58</td><td>L57</td><td>L56</td><td>L55</td><td>L54</td><td>L53</td><td>L52</td><td>L51</td><td>L50</td><td>L49</td></tr></table>If a local station detects an error, the bit corresponding to the station number becomes "1".
Example: When station 6 and 12 detect an error, bits 5 and 11 in SD1216 become "1", and when SD1216 is monitored, its value is "2080 (820H)".</td><td rowspan="4">QnA</td></tr>
<tr><td>D9217</td><td>SD1217</td><td>—</td><td>Stores conditions for up to numbers 17 to 32</td></tr>
<tr><td>D9218</td><td>SD1218</td><td>—</td><td>Stores conditions for up to numbers 33 to 48</td></tr>
<tr><td>D9219</td><td>SD1219</td><td>—</td><td>Stores conditions for up to numbers 49 to 64</td></tr>
<tr><td>D9220</td><td>SD1220</td><td>—</td><td rowspan="4">Local station parameters non-conforming; remote I/O station I/O allocation error</td><td>Stores conditions for up to numbers 1 to 16</td><td rowspan="4">Stores the local station numbers that have mismatches between the parameters of the master station of tier three and those of the master station in tier two in the three tier system or the remote I/O station numbers that have incorrect I/O assignment, as shown below in correspondence with the data register bits.
<table><tr><th>Device number</th><th colspan="16">Bit</th></tr><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SD1220</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr><tr><td>SD1221</td><td>L32</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr><tr><td>SD1222</td><td>L48</td><td>L47</td><td>L46</td><td>L45</td><td>L44</td><td>L43</td><td>L42</td><td>L41</td><td>L40</td><td>L39</td><td>L38</td><td>L37</td><td>L36</td><td>L35</td><td>L34</td><td>L33</td></tr><tr><td>SD1223</td><td>L64</td><td>L63</td><td>L62</td><td>L61</td><td>L60</td><td>L59</td><td>L58</td><td>L57</td><td>L56</td><td>L55</td><td>L54</td><td>L53</td><td>L52</td><td>L51</td><td>L50</td><td>L49</td></tr></table>If a local station acting as the master station of tier three detects a parameter error or a remote station contains an invalid I/O assignment, the bit corresponding to the station number becomes "1".
Example: When local station 5 and remote I/O station 14 detect an error, bits 4 and 13 in SD1220 become "1" , and when SD1220 is monitored, its value is "8208 (2010H) " .</td></tr>
<tr><td>D9221</td><td>SD1221</td><td>—</td><td>Stores conditions for up to numbers 17 to 32</td></tr>
<tr><td>D9222</td><td>SD1222</td><td>—</td><td>Stores conditions for up to numbers 33 to 48</td></tr>
<tr><td>D9223</td><td>SD1223</td><td>—</td><td>Stores conditions for up to numbers 49 to 64</td></tr>
<tr><td>D9224</td><td>SD1224</td><td>—</td><td rowspan="4">Local station and remote I/O station initial communications underway</td><td>Stores conditions for up to numbers 1 to 16</td><td rowspan="4">Stores the local or remote station numbers while they are communicating the initial data with their relevant master station.
<table><tr><th>Device number</th><th colspan="16">Bit</th></tr><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SD1224</td><td>L/R 16</td><td>L/R 15</td><td>L/R 14</td><td>L/R 13</td><td>L/R 12</td><td>L/R 11</td><td>L/R 10</td><td>L/R 9</td><td>L/R 8</td><td>L/R 7</td><td>L/R 6</td><td>L/R 5</td><td>L/R 4</td><td>L/R 3</td><td>L/R 2</td><td>L/R 1</td></tr><tr><td>SD1225</td><td>L/R 32</td><td>L/R 31</td><td>L/R 30</td><td>L/R 29</td><td>L/R 28</td><td>L/R 27</td><td>L/R 26</td><td>L/R 25</td><td>L/R 24</td><td>L/R 23</td><td>L/R 22</td><td>L/R 21</td><td>L/R 20</td><td>L/R 19</td><td>L/R 18</td><td>L/R 17</td></tr><tr><td>SD1226</td><td>L/R 48</td><td>L/R 47</td><td>L/R 46</td><td>L/R 45</td><td>L/R 44</td><td>L/R 43</td><td>L/R 42</td><td>L/R 41</td><td>L/R 40</td><td>L/R 39</td><td>L/R 38</td><td>L/R 37</td><td>L/R 36</td><td>L/R 35</td><td>L/R 34</td><td>L/R 33</td></tr><tr><td>SD1227</td><td>L/R 64</td><td>L/R 63</td><td>L/R 62</td><td>L/R 61</td><td>L/R 60</td><td>L/R 59</td><td>L/R 58</td><td>L/R 57</td><td>L/R 56</td><td>L/R 55</td><td>L/R 54</td><td>L/R 53</td><td>L/R 52</td><td>L/R 51</td><td>L/R 50</td><td>L/R 49</td></tr></table>The bit corresponding to the station number which is currently communicating the initial settings becomes "1" .
Example: When stations 23 and 45 are communicating, bit 6 of SD1225 and bit 12 of SD1226 become "1", and when SD1225 is monitored, its value is "64 (40H)", and when SD1226 is monitored, its value is "4096 (1000H)"</td></tr>
<tr><td>D9225</td><td>SD1225</td><td>—</td><td>Stores conditions for up to numbers 17 to 32</td></tr>
<tr><td>D9226</td><td>SD1226</td><td>—</td><td>Stores conditions for up to numbers 33 to 48</td></tr>
<tr><td>D9227</td><td>SD1227</td><td>—</td><td>Stores conditions for up to numbers 49 to 64</td></tr>
<tr><td>D9228</td><td>SD1228</td><td>—</td><td rowspan="4">Local station and remote I/O station error</td><td>Stores conditions for up to numbers 1 to 16</td><td rowspan="4">Stores the local or remote station numbers which are in error.
<table><tr><th>Device number</th><th colspan="16">Bit</th></tr><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SD1228</td><td>L/R 16</td><td>L/R 15</td><td>L/R 14</td><td>L/R 13</td><td>L/R 12</td><td>L/R 11</td><td>L/R 10</td><td>L/R 9</td><td>L/R 8</td><td>L/R 7</td><td>L/R 6</td><td>L/R 5</td><td>L/R 4</td><td>L/R 3</td><td>L/R 2</td><td>L/R 1</td></tr><tr><td>SD1229</td><td>L/R 32</td><td>L/R 31</td><td>L/R 30</td><td>L/R 29</td><td>L/R 28</td><td>L/R 27</td><td>L/R 26</td><td>L/R 25</td><td>L/R 24</td><td>L/R 23</td><td>L/R 22</td><td>L/R 21</td><td>L/R 20</td><td>L/R 19</td><td>L/R 18</td><td>L/R 17</td></tr><tr><td>SD1230</td><td>L/R 48</td><td>L/R 47</td><td>L/R 46</td><td>L/R 45</td><td>L/R 44</td><td>L/R 43</td><td>L/R 42</td><td>L/R 41</td><td>L/R 40</td><td>L/R 39</td><td>L/R 38</td><td>L/R 37</td><td>L/R 36</td><td>L/R 35</td><td>L/R 34</td><td>L/R 33</td></tr><tr><td>SD1231</td><td>L/R 64</td><td>L/R 63</td><td>L/R 62</td><td>L/R 61</td><td>L/R 60</td><td>L/R 59</td><td>L/R 58</td><td>L/R 57</td><td>L/R 56</td><td>L/R 55</td><td>L/R 54</td><td>L/R 53</td><td>L/R 52</td><td>L/R 51</td><td>L/R 50</td><td>L/R 49</td></tr></table>The bit corresponding to the station number with the error becomes "1" .
Example: When local station 3 and remote I/O station 14 have an error, bits 2 and 13 of SD1228 become "1", and when SD1228 is monitored, its value is "8196 (2004H)".</td></tr>
<tr><td>D9229</td><td>SD1229</td><td>—</td><td>Stores conditions for up to numbers 17 to 32</td></tr>
<tr><td>D9230</td><td>SD1230</td><td>—</td><td>Stores conditions for up to numbers 33 to 48</td></tr>
<tr><td>D9231</td><td>SD1231</td><td>—</td><td>Stores conditions for up to numbers 49 to 64</td></tr>
</table>

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<tr><th>ACPU Special Conversion</th><th>Special Register after Conversion</th><th>Special Register for Modification</th><th>Name</th><th>Meaning</th><th>Details</th><th>Corresponding CPU</th></tr>
<tr><td>D9232</td><td>SD1232</td><td>—</td><td rowspan="8">Local station and remote I/O station loop error</td><td>Stores conditions for up to numbers 1 to 8</td><td rowspan="8">Stores the local or remote station number at which a forward or reverse loop error has occurred
<table><tr><th>Device number</th><th colspan="16">Bit</th></tr><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SD1232</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr><tr><td></td><td colspan="2">L/R8</td><td colspan="2">L/R7</td><td colspan="2">L/R6</td><td colspan="2">L/R5</td><td colspan="2">L/R4</td><td colspan="2">L/R3</td><td colspan="2">L/R2</td><td colspan="2">L/R1</td></tr><tr><td>SD1233</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr><tr><td></td><td colspan="2">L/R16</td><td colspan="2">L/R15</td><td colspan="2">L/R14</td><td colspan="2">L/R13</td><td colspan="2">L/R12</td><td colspan="2">L/R11</td><td colspan="2">L/R10</td><td colspan="2">L/R9</td></tr><tr><td>SD1234</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr><tr><td></td><td colspan="2">L/R24</td><td colspan="2">L/R23</td><td colspan="2">L/R22</td><td colspan="2">L/R21</td><td colspan="2">L/R20</td><td colspan="2">L/R19</td><td colspan="2">L/R18</td><td colspan="2">L/R17</td></tr><tr><td>SD1235</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr><tr><td></td><td colspan="2">L/R32</td><td colspan="2">L/R31</td><td colspan="2">L/R30</td><td colspan="2">L/R29</td><td colspan="2">L/R28</td><td colspan="2">L/R27</td><td colspan="2">L/R26</td><td colspan="2">L/R25</td></tr><tr><td>SD1236</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr><tr><td></td><td colspan="2">L/R40</td><td colspan="2">L/R39</td><td colspan="2">L/R38</td><td colspan="2">L/R37</td><td colspan="2">L/R36</td><td colspan="2">L/R35</td><td colspan="2">L/R34</td><td colspan="2">L/R33</td></tr><tr><td>SD1237</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr><tr><td></td><td colspan="2">L/R48</td><td colspan="2">L/R47</td><td colspan="2">L/R46</td><td colspan="2">L/R45</td><td colspan="2">L/R44</td><td colspan="2">L/R43</td><td colspan="2">L/R42</td><td colspan="2">L/R41</td></tr><tr><td>SD1238</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr><tr><td></td><td colspan="2">L/R56</td><td colspan="2">L/R55</td><td colspan="2">L/R54</td><td colspan="2">L/R53</td><td colspan="2">L/R52</td><td colspan="2">L/R51</td><td colspan="2">L/R50</td><td colspan="2">L/R49</td></tr><tr><td>SD1239</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td><td>R</td><td>F</td></tr><tr><td></td><td colspan="2">L/R64</td><td colspan="2">L/R63</td><td colspan="2">L/R62</td><td colspan="2">L/R61</td><td colspan="2">L/R60</td><td colspan="2">L/R59</td><td colspan="2">L/R58</td><td colspan="2">L/R57</td></tr></table>In the above table, "F" indicates a forward loop line and "R" a reverse loop line .The bit corresponding to the station number at which the forward or reverse loop error has occurred, becomes "1".
Example: When the forward loop line of station 5 has an error, bit 8 of SD1232 become "1", and when SD1232 is monitored, its value is "256 (100_H)".</td><td rowspan="10">QnA</td></tr>
<tr><td>D9233</td><td>SD1233</td><td>—</td><td>Stores conditions for up to numbers 9 to 16</td></tr>
<tr><td>D9234</td><td>SD1234</td><td>—</td><td>Stores conditions for up to numbers 17 to 24</td></tr>
<tr><td>D9235</td><td>SD1235</td><td>—</td><td>Stores conditions for up to numbers 25 to 32</td></tr>
<tr><td>D9236</td><td>SD1236</td><td>—</td><td>Stores conditions for up to numbers 33 to 40</td></tr>
<tr><td>D9237</td><td>SD1237</td><td>—</td><td>Stores conditions for up to numbers 41 to 48</td></tr>
<tr><td>D9238</td><td>SD1238</td><td>—</td><td>Stores conditions for up to numbers 49 to 56</td></tr>
<tr><td>D9239</td><td>SD1239</td><td>—</td><td>Stores conditions for up to numbers 57 to 64</td></tr>
<tr><td>D9240</td><td>SD1240</td><td>—</td><td>Number of times communications errors detected</td><td>Stores cumulative total of receive errors</td><td>Stores the number of times the following transmission errors have been detected:
CRC, OVER, AB. IF
Count is made to a maximum of $FFFF_H$. RESET to return the count to 0.</td></tr>
<tr><td>D9241</td><td>SD1241</td><td>—</td><td rowspan="2">Local station link type</td><td>Stores conditions for up to numbers 33 to 48</td><td rowspan="2">Stores whether the slave station corresponds to MELSECNET or MELSECNET II.
• Bits corresponding to the MELSECNET II stations become "1."
• Bits corresponding to the MELSECNET stations or unconnected become "0."
<table><tr><th>Device number</th><th colspan="16">Bit</th></tr><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SD1202</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr><tr><td>SD1203</td><td>L32</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr><tr><td>SD1241</td><td>L48</td><td>L47</td><td>L46</td><td>L45</td><td>L44</td><td>L43</td><td>L42</td><td>L41</td><td>L40</td><td>L39</td><td>L38</td><td>L37</td><td>L36</td><td>L35</td><td>L34</td><td>L33</td></tr><tr><td>SD1242</td><td>L64</td><td>L63</td><td>L62</td><td>L61</td><td>L60</td><td>L59</td><td>L58</td><td>L57</td><td>L56</td><td>L55</td><td>L54</td><td>L53</td><td>L52</td><td>L51</td><td>L50</td><td>L49</td></tr></table>• If a local station goes down during the operation, the contents before going down are retained.
Contents of SD1224 to SD1227 and SD1228 to SD1231 are ORed. If the corresponding bit is "0", the corresponding bit of the special register above becomes valid.
• If the own (master) station goes down, the contents before going down are also retained.</td></tr>
<tr><td>D9242</td><td>SD1242</td><td>—</td><td>Stores conditions for up to numbers 49 to 64</td></tr>
<tr><td>D9243</td><td>SD1243</td><td>—</td><td>Station number information for host station</td><td>Stores station number (0 to 64)</td><td>Allows a local station to confirm its own station number</td></tr>
<tr><td>D9244</td><td>SD1244</td><td>—</td><td>Number of link device stations</td><td>Stores number of slave stations</td><td>Indicates the number of slave stations in one loop.</td></tr>
<tr><td>D9245</td><td>SD1245</td><td>—</td><td>Number of times communications errors detected</td><td>Stores cumulative total of receive errors</td><td>Stores the number of times the following transmission errors have been detected: CRC, OVER, AB. IF
Count is made to a maximum of $FFFF_H$. RESET to return the count to 0.</td></tr>
</table>

Special Register List (Continue)

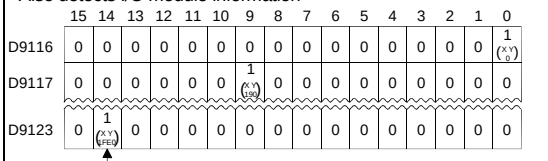
<table>
<tr><th>ACPU Special Conversion</th><th>Special Register after Conversion</th><th>Special Register for Modification</th><th>Name</th><th>Meaning</th><th>Details</th><th>Corresponding CPU</th></tr>
<tr><td>D9248</td><td>SD1248</td><td>—</td><td rowspan="4">Local station operation status</td><td>Stores conditions for up to numbers 1 to 16</td><td rowspan="4">Stores the local station number which is in STOP or PAUSE mode.
<table><tr><th>Device number</th><th colspan="16">Bit</th></tr><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SD1248</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr><tr><td>SD1249</td><td>L32</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr><tr><td>SD1250</td><td>L48</td><td>L47</td><td>L46</td><td>L45</td><td>L44</td><td>L43</td><td>L42</td><td>L41</td><td>L40</td><td>L39</td><td>L38</td><td>L37</td><td>L36</td><td>L35</td><td>L34</td><td>L33</td></tr><tr><td>SD1251</td><td>L64</td><td>L63</td><td>L62</td><td>L61</td><td>L60</td><td>L59</td><td>L58</td><td>L57</td><td>L56</td><td>L55</td><td>L54</td><td>L53</td><td>L52</td><td>L51</td><td>L50</td><td>L49</td></tr></table>The bit corresponding to the station number which is in STOP or PAUSE mode, becomes "1".
Example: When local stations 7 and 15 are in STOP mode, bits 6 and 14 of SD1248 become "1", and when SD1248 is monitored, its value is "16448 (4040_H)".</td><td rowspan="8">QnA</td></tr>
<tr><td>D9249</td><td>SD1249</td><td>—</td><td>Stores conditions for up to numbers 17 to 32</td></tr>
<tr><td>D9250</td><td>SD1250</td><td>—</td><td>Stores conditions for up to numbers 33 to 48</td></tr>
<tr><td>D9251</td><td>SD1251</td><td>—</td><td>Stores conditions for up to numbers 49 to 64</td></tr>
<tr><td>D9252</td><td>SD1252</td><td>—</td><td rowspan="4">Local station error conditions</td><td>Stores conditions for up to numbers 1 to 16</td><td rowspan="4">Stores the local station number other than the host, which is in error.
<table><tr><th>Device number</th><th colspan="16">Bit</th></tr><tr><td></td><td>b15</td><td>b14</td><td>b13</td><td>b12</td><td>b11</td><td>b10</td><td>b9</td><td>b8</td><td>b7</td><td>b6</td><td>b5</td><td>b4</td><td>b3</td><td>b2</td><td>b1</td><td>b0</td></tr><tr><td>SD1252</td><td>L16</td><td>L15</td><td>L14</td><td>L13</td><td>L12</td><td>L11</td><td>L10</td><td>L9</td><td>L8</td><td>L7</td><td>L6</td><td>L5</td><td>L4</td><td>L3</td><td>L2</td><td>L1</td></tr><tr><td>SD1253</td><td>L32</td><td>L31</td><td>L30</td><td>L29</td><td>L28</td><td>L27</td><td>L26</td><td>L25</td><td>L24</td><td>L23</td><td>L22</td><td>L21</td><td>L20</td><td>L19</td><td>L18</td><td>L17</td></tr><tr><td>SD1254</td><td>L48</td><td>L47</td><td>L46</td><td>L45</td><td>L44</td><td>L43</td><td>L42</td><td>L41</td><td>L40</td><td>L39</td><td>L38</td><td>L37</td><td>L36</td><td>L35</td><td>L34</td><td>L33</td></tr><tr><td>SD1255</td><td>L64</td><td>L63</td><td>L62</td><td>L61</td><td>L60</td><td>L59</td><td>L58</td><td>L57</td><td>L56</td><td>L55</td><td>L54</td><td>L53</td><td>L52</td><td>L51</td><td>L50</td><td>L49</td></tr></table>The bit corresponding to the station number which is in error, becomes "1".
Example: When local station 12 is in error, bit 11 of SD1252 becomes "1", and when SD1252 is monitored, its value is "2048 (800_H) ".</td></tr>
<tr><td>D9253</td><td>SD1253</td><td>—</td><td>Stores conditions for up to numbers 17 to 32</td></tr>
<tr><td>D9254</td><td>SD1254</td><td>—</td><td>Stores conditions for up to numbers 33 to 48</td></tr>
<tr><td>D9255</td><td>SD1255</td><td>—</td><td>Stores conditions for up to numbers 49 to 64</td></tr>
</table>

(11) Fuse blown module

<table>
<tr><th>Number</th><th>Name</th><th>Meaning</th><th>Explanation</th><th>Set by (When set)</th><th>Corresponding ACPU D9□□□</th><th>Corresponding CPU</th></tr>
<tr><td>SD1300</td><td rowspan="10">Fuse blown module</td><td rowspan="10">Bit pattern in units of 16 points, indicating the modules whose fuses have blown
0: No blown fuse
1: Blown fuse present</td><td rowspan="10">• 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.)
• Also detects blown fuse condition at remote station output modules
<table><tr><th></th><th>15</th><th>14</th><th>13</th><th>12</th><th>11</th><th>10</th><th>9</th><th>8</th><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0</th></tr><tr><td>SD1300</td><td>0</td><td>0</td><td>0</td><td>1 (YC0)</td><td>0</td><td>0</td><td>0</td><td>1 (Y80)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>SD1301</td><td>1 (Y1F0)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1 (Y1A)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>SD1331</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1 (Y1FB0)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1 (Y1F30)</td><td>0</td><td>0</td><td>0</td></tr></table>Indicates a blown fuse
• Not cleared even if the blown fuse is replaced with a new one. This flag is cleared by error resetting operation.</td><td rowspan="10">S (Error)</td><td>D9100</td><td rowspan="10">○+Rem</td></tr>
<tr><td>SD1301</td><td>D9101</td></tr>
<tr><td>SD1302</td><td>D9102</td></tr>
<tr><td>SD1303</td><td>D9103</td></tr>
<tr><td>SD1304</td><td>D9104</td></tr>
<tr><td>SD1305</td><td>D9105</td></tr>
<tr><td>SD1306</td><td>D9106</td></tr>
<tr><td>SD1307</td><td>D9107</td></tr>
<tr><td>SD1308</td><td>New</td></tr>
<tr><td>SD1309 to SD1330</td><td>New</td></tr>
<tr><td>SD1331</td><td>New</td></tr>
<tr><td>SD1350 to SD1381</td><td>External power supply disconnected module (For future expansion)</td><td>Bit pattern in units of 16 points, indicating the modules whose external power supply has been disconnected
0: External power supply disconnected
1: External power supply is not disconnected</td><td>The module number (in units of 16 points) whose external power supply has been disconnected is input as a bit pattern.
(If the module numbers are set by parameter, the parameter-set numbers are used.)
<table><tr><th></th><th>15</th><th>14</th><th>13</th><th>12</th><th>11</th><th>10</th><th>9</th><th>8</th><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0</th></tr><tr><td>SD1350</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>SD1351</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>SD1381</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td></tr></table>Indicates a blown fuse</td><td>S (Error)</td><td>New</td><td>QCPU Remote</td></tr>
</table>

Special Register List (Continue)

(12) I/O module verification

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding ACPU D9□□□	Corresponding CPU
SD1400	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	• 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.) • Also detects I/O module information  • Not cleared even if the blown fuse is replaced with a new one. This flag is cleared by error resetting operation.	S (Error)	D9116	○+Rem
SD1401					D9117	
SD1402					D9118	
SD1403					D9119	
SD1404					D9120	
SD1405					D9121	
SD1406					D9122	
SD1407					D9123	
SD1408					New	
SD1409 to SD1430					New to New	
SD1431					New	

(13) Process control instructions

Number	Name	Meaning	Explanation	Set by (When set)	Corresponding ACPU D9□□□	Corresponding CPU
SD1500 SD1501	Basic period	Basic period tome	• Set the basic period (1 second units) use for the process control instruction using floating point data. Floating points data = SD1501 SD1500	U	New	○
SD1502	Process control instruction detail error code	Process control instruction detail error code	• Shows the detailed error contents for the error that occurred in the process control instruction	S (Error occurrence)	New	
SD1503	Process control instruction generated error location	Process control instruction generated error location	• Shows the error process block that occurred in the process control instruction.	S (Error occurrence)	New	
SD1506 SD1507	Dummy device	Dummy device	• Used to specify dummy devices by a process control instruction	U	New	

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 form the peripheral equipment, intelligent function module, or network system. If an error occurs when a general data processing is requested from the peripheral devices, intelligent function module, and 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 a 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 differs 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_H to $4FFF_H$	Refer to Appendix 1.2.
Intelligent function module	7000_H to $7FFF_H$	User's manuals of intelligent function module
Network system	$F000_H$ to $FFFF_H$	Q Corresponding MELSECNET/H Network System Reference Manual

App - 1

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

The error contents of the error codes (4000H to 4FFFH) detected by the CPU module and the messages displayed by the GX Developer are shown below.

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		Remote request that is not handled was executed.	Check the requested remote operation.
4002H		Command for which a global request cannot be performed was executed.	Check the requested command.
4003H			
4004H		CPU module cannot execute the request contents because it is in system protect	Turn off the CPU module system protect switch.
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		The CPU module is not BUSY (The buffer is not vacant).	After the free time has passed, reexecute the request.
4010H	CPU mode error	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		An attempt was made to change any parameter value during an online module change.	Change the parameter values after an online module change is over.

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Error code (hexadecimal)	Error item	Error description	Countermeasure
4021H	CPU file related error	The specified drive memory does not exist or there is an error.	Check the specified drive memory status.
4022H		The file with the specified file name or file No. does not exist.	Check the specified file name and file No.
4023H		The file name and file No. of the specified file do not match.	Delete the file and then recreate the file.
4024H		The specified file cannot be handled by a user.	Do not access the specified file.
4025H		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.
4026H		The keyword specification set in the corresponding drive memory is required.	Access by specifying the keyword set in the corresponding drive memory.
4027H		The specified range exceeds the file range.	Check the specified range and access within that range.
4028H		The same file already exists.	Forcefully execute the request forcibly. Or reexecute after changing the file name.
4029H		The specified file capacity cannot be obtained.	Revise the specified file contents. Or reexecute after cleaning up and reorganizing the specified drive memory.
402BH		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.
402CH		Currently the request contents cannot be executed.	Reexecute after the free wait time has passed.
4030H	CPU device specified error	The specified device name cannot be handled.	Check the specified device name.
4031H		The specified device No. is outside the range.	Check the specified device No.
4032H		There is a mistake in the specified device qualification.	Check the specified device qualification method.
4033H		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.
4040H	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.
4041H		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.
4042H		The specified intelligent function module cannot be accessed.	Check that the specified intelligent function module is operating normally.
4043H		The intelligent function module does not exist in the specified position.	Check the header I/O No. of the specified intelligent function module.
4044H		A control bus error has occurred.	Check that there is no error in the intelligent function module or in the hardware of another module.
4045H		The setting required to conduct simulation has not been made.	Conduct a simulation setting.
4046H		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.
4149H		Another GX Developer was used to execute online module change.	Select between stopping and continuing the online module change
414AH		An attempt was made to execute the online module change of a non-control module.	Stop the the online module change of a non-control module
414BH		An attempt was made to execute online module change before the PC CPU module starts.	Perform an online module change after the PC CPU module has started.
414FH		Online module change is inhibited by the parameter setting in the multiple CPU system.	Stop an online module change. Perform an online module change after changing the parameter setting.

Error code (hexadecimal)	Error item	Error description	Countermeasure
4050H	Protect error	The request contents cannot be executed because the memory card write protect switch is on.	Turn off the memory card write protect switch.
4051H		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?
4052H		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.
4053H		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.
4054H		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.
4060H	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.
4061H		Communication failed.	Execute a re-communication.
4062H		The monitor detail condition is already being used and monitored by another piece of equipment.	Do not conduct monitor detail condi-tions from the specified equipment. Or reexecute monitoring after deleting the monitor detail conditions of the other equipment.
4063H		The number of the file lock registrations exceeds 16.	Reduce the number of registrations to 16 or less.
4064H		There is a problem with the specified contents.	Check the specified contents.
4065H		The device allocation information differs from the parameter.	Check the parameter. Or check the data.
4066H		A keyword that differs from the keyword set in the specified driver memory has been specified.	Check the specified keyword.
4067H		The specified monitor file cannot be obtained.	Conduct monitor after obtaining the monitor file.
4068H		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.
4069H		The conditions have already been reached by the device match.	Check the monitor conditions. Or reconduct monitor registration and execute monitor.
406AH		A drive other than Nos. 1 to 3 has been specified.	Check the specified drive and specify the correct drive.
4070H	Circuit inquiry	Program before correction and the registration program differ.	Check the registration program and make the programs match.
4080H	Other errors	Data error	Check the requested data contents.
4081H		The sort subject cannot be detected.	Check the data to be searched.
4082H		The specified command is executing and therefore cannot be executed.	Reexecute the command after the request from the other equipment is completed.
4083H		Trying to execute a program that is not registered in the parameter.	Register the program to be executed in the parameter.

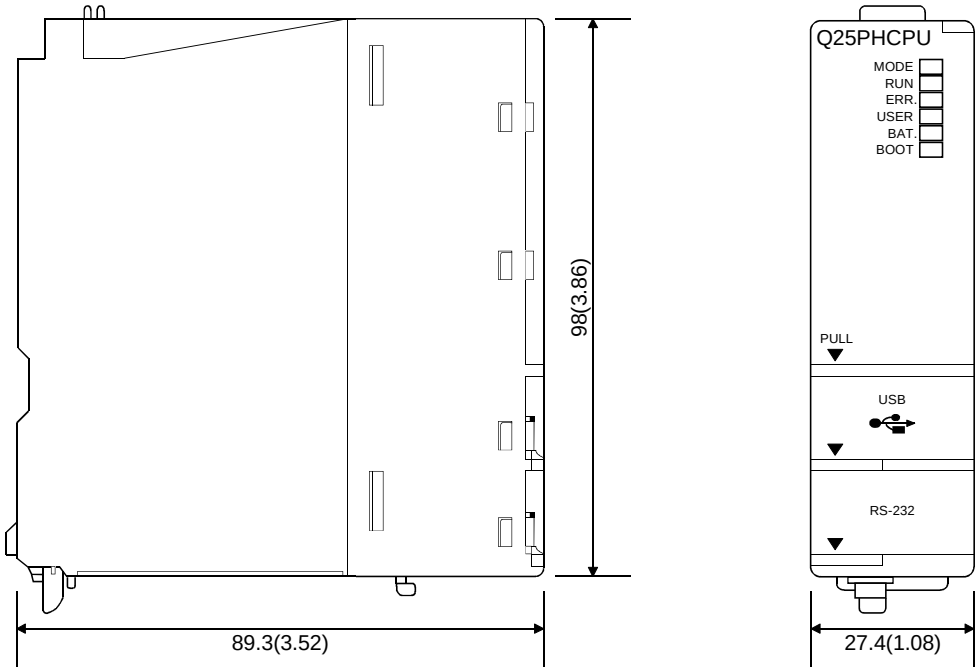
Error code (hexadecimal)	Error item	Error description	Countermeasure
4084H	Other errors	The specified pointer P, I cannot be detected.	Check the data to be searched.
4085H		Pointer P, I cannot be specified because the program is not specified in the parameter.	Specify pointer P, I after registering the program to be executed in the parameter.
4086H		Pointer P, I has already been added.	Check the pointer No. to be added and make correction.
4087H		Trying to specify too many pointers.	Check the specified pointer and make a correction.
4088H		The specified step No. was not in the instruction header.	Check the specified step No. and make a correction.
4089H		An END instruction was inserted/deleted while the CPU module was running.	Conduct Insert/removal after the CPU module has stopped.
408AH		The file capacity was exceeded by the write during Run.	Write the program after the CPU module has stopped.
408BH		The remote request cannot be executed.	Reexecute after the CPU module is in a status where the mode request can be executed.
4090H	Online registration errors during SFC STEP-RUN	The block breakpoint number was exceeded.	Check the number of settings and make a correction.
4091H		There is a mistake in the block breakpoint registration number.	Check the number of registrations and make a correction.
4092H		The step breakpoint number has been exceeded.	Check the number of registrations and make a correction.
4093H		There is a mistake in the step breakpoint registration number.	Check the number of registrations and make a correction.
4094H		Tried to execute a request during block continuous processing.	Reconduct the request after the processing has ended.
4095H		Tried to execute a request during block forced execution processing.	Reconduct the request after the processing has ended.
4096H		Tried to execute a request during step continuous processing.	Reconduct the request after the processing has ended.
4097H		Tried to execute a request during step forced execution processing.	Reconduct the request after the processing has ended.
4098H		Tried to execute a request during one step continuous processing.	Reconduct the request after the processing has ended.
4099H		Tried to execute a request during one step forced execution processing.	Reconduct the request after the processing has ended.
409AH		Tried to execute a request during block forced end processing.	Reconduct the request after the processing has ended.
409BH		Tried to execute a request during step forced end processing.	Reconduct the request after the processing has ended.
409CH		Tried to execute a request during hold step reset processing.	Reconduct the request after the processing has ended.
409DH		A block No. that has not been created or that exceeds the range has been specified.	Check the setting contents and make a correction.
409EH		A step No. that was not created was specified.	Check the setting contents and make a correction.
409FH		The specified number of cycles is outside the range.	Check the number of registrations and make a correction.

Error code (hexadecimal)	Error item	Error description	Countermeasure
40A0H	SFC device specification error	A block No. outside the range was specified.	Check the setting contents and make a correction.
40A1H		A number of blzocks that exceeds the range was specified.	Check the number of settings and make a correction.
40A2H		A step No. that is outside the range was specified.	Check the setting contents and make a correction.
40A3H		A number of steps that exceeds the range was specified.	Check the number of settings and make a correction.
40A4H		A sequence step No. outside the range was specified.	Check the setting contents and make a correction.
40A5H		The specified device was outside the range.	Check the number of settings and make a correction.
40A6H		There is a mistake in the block specification pattern or the step specification pattern.	Check the setting contents and make a correction.
40B0H	SFC file related error	The wrong drive was specified.	Check the setting contents and make a correction.
40B1H		The specified program does not exist.	Check the specified file name and make a correction.
40B2H		The specified program was not an SFC program.	Check the specified file name and make a correction.
40B3H		There was an SFC dedicated instruction in the write during run area.	Check the setting contents and make a correction.
4110H	CPU mode error	Since the CPU module is in a stop error status, it cannot execute the request.	Execute the request again after resetting the CPU module.
4111H		Since the other CPU modules have not started up, the CPU module cannot execute the request.	Execute the request again after the other CPU modules have started up.
41D0H	File-related errors	The route directory has no free space.	Increase the free space of the specified drive. Optimize the specified drive to increase continuous free areas.
41D1H		The file pointer is insufficient.	Specify the correct file pointer.
41D5H		The file of the same name exists.	Change the file name.
41DFH		The disk is write-protected.	Cancel the write protection of the disk and execute again.
41E0H		The drive does not respond.	Check for the specified drive. If it exists, check its status.
41E1H		The address or sector is not found.	Check if the target is a ROM drive or not.
41E4H		The file cannot be accessed properly.	Execute again after resetting the CPU.
41E8H		The drive format information is illegal.	Format the target drive.
41E9H		At the time of file access, time-out occurred during waiting for access.	Execute again after some time.
41EBH		The path name is too long.	Check the length of the path name.
41ECH		The disk is logically broken.	Change the specified drive.
41EDH		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.
41F2H		The specified drive is ROM.	Check the specified drive. (Format it for RAM.)
41FBH		The same starting source has already opened the specified file.	Check if it is being processed by another application.
41FCH		An attempt was made to erase the mounted drive.	Execute again after dismounting the drive.
41FDH		The Flash ROM is not formatted.	Erase the specified drive.
41FEH		The memory card is not inserted.	Insert or reinsert the memory card.
41FFH		The memory card type differs.	Check the memory card type.
4200H	Online module change-related error	The requested processing cannot be performed since online module change is not enabled in the setting of the multiple CPU setting parameter.	Do not make a request where an error occurred, or make a request again after enabling online module change in the setting of the multiple CPU setting parameter.
4201H		The requested processing cannot be performed since online module change is enabled in the setting of the multiple CPU setting parameter.	Do not make a request where an error occurred, or make a request again after disabling online module change in the setting of the multiple CPU setting parameter.
4202H		The requested processing cannot be performed since an online module change is being performed.	Make a request again after completion of the online module change.
4210H		The specified head I/O number is outside the range.	When making a request, specify the head I/O number of the module that will be changed online.
4211H		An online module change request is abnormal.	Check the command used to make a request.

Error code (hexadecimal)	Error item	Error description	Countermeasure
4212H	Online module change-related error	An online module change is already being made for other equipment.	Make a request again after completion of the online module change, or continue after changing the connection path.
4213H		The specified head I/O number differs from the head I/O number of the module being changed online.	When making a request, specify the head I/O number of the module being changed online.
4214H		The specified module differs from the one changed online.	Make a request again after mounting the module that is the same as the one changed online.
4215H		The specified module does not exist.	When making a request, specify the head I/O number of the module that will be changed online, or make a request again after mounting the module.
4216H		The specified module is faulty.	Make a request again after changing the module.
4217H		There is no response from the specified module.	Continue the online module changing operation.
4218H		The specified module is incompatible with online module change.	Do not make a request where an error occurred, or make a request again to the module compatible with online module change.
4219H		The specified module is mounted on the extension base that has no power supply.	Do not make a request to the module that is mounted on the extension base or main base that has no power supply.
421AH		The specified module is not in a control group.	Make a request to the CPU module that controls the specified module.
421BH		An error occurred in the setting of the initial setting parameter of the intelligent function module.	Resume processing after checking the contents of the intelligent function module buffer memory.
4A00H	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 multi-CPU system is attempted, the control CPU of the network module that relays the data is not active.	(1) Set the routing parameter for accessing the specified station in the related station. (2) Try after a while. Or confirm if the system relaying the data is active, then start communication.
4A01H		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.
4A02H		Cannot access the specified station.	Check if an error has occurred in the network module and if the module is offline.
4B00H	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



Unit: mm (inch)

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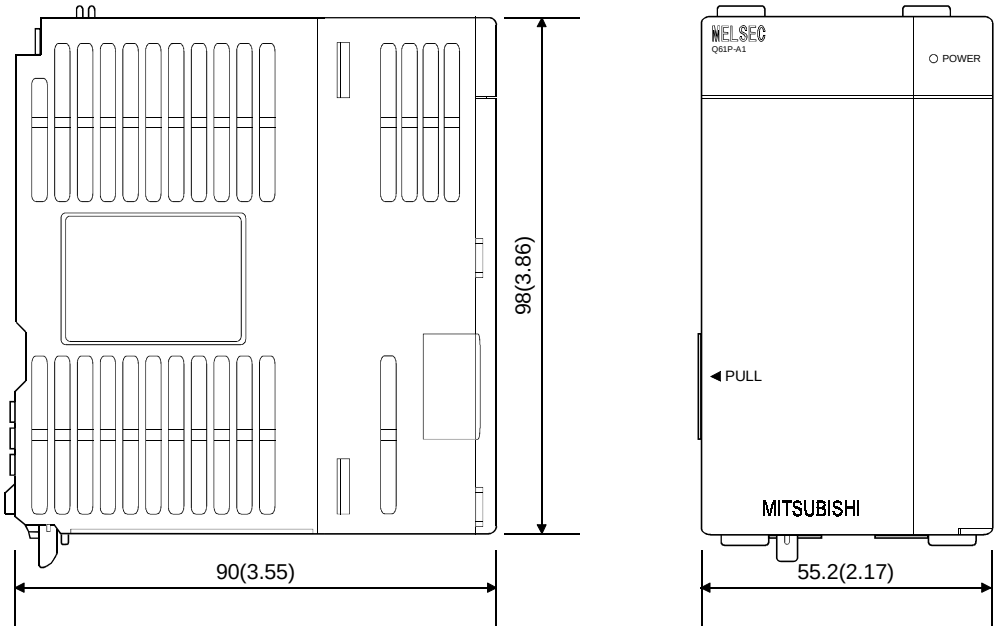
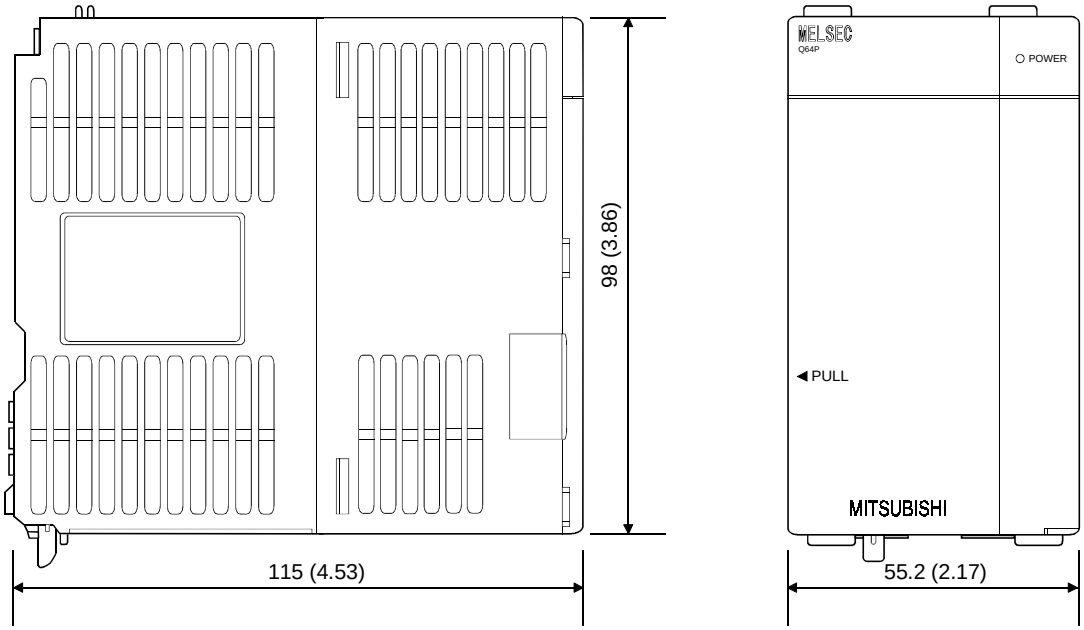
APPENDIX 2.2 Power supply module

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



Unit: mm (inch)

(2) Power Supply Module (Q64P)



Unit: mm (inch)

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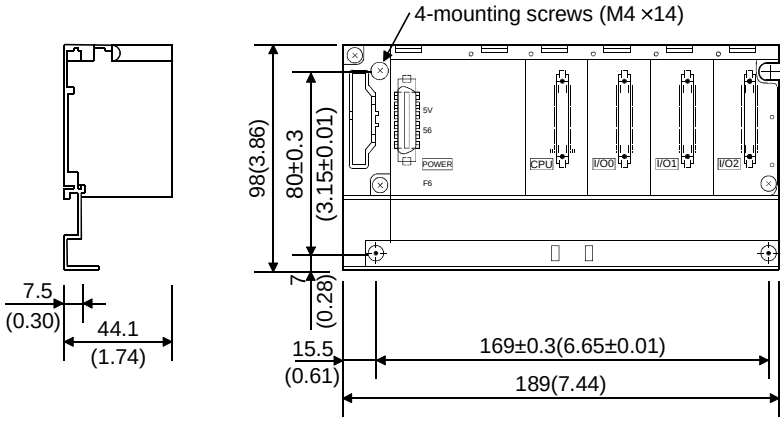
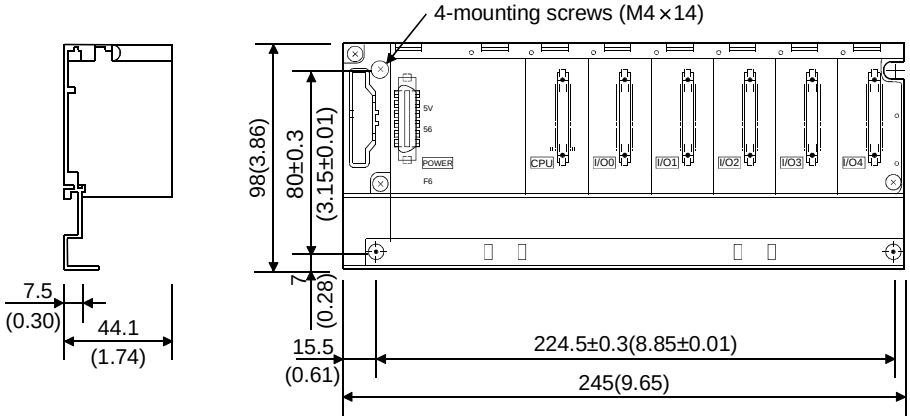
APPENDIX 2.3 Main base unit

(1) Main Base Unit (Q33B)



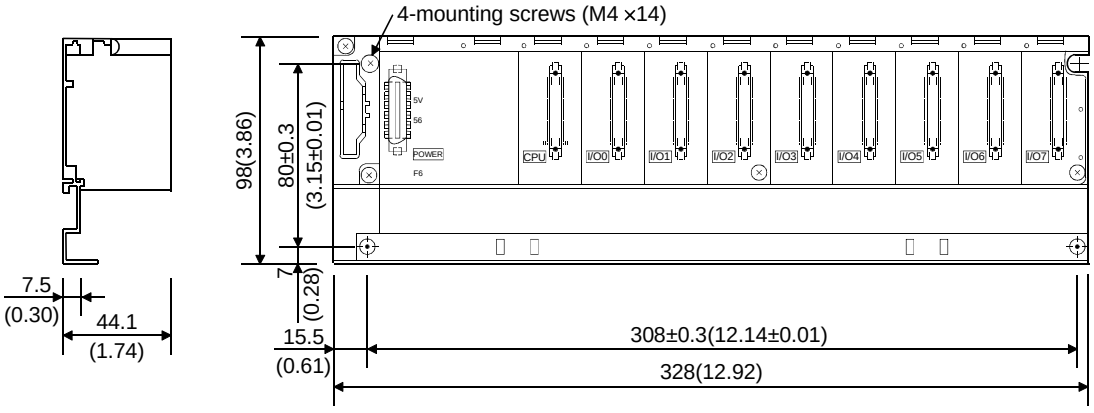
Unit: mm (inch)

(2) Main Base Unit (Q35B)



Unit: mm (inch)

(3) Main Base Unit (Q38B)



Unit: mm (inch)

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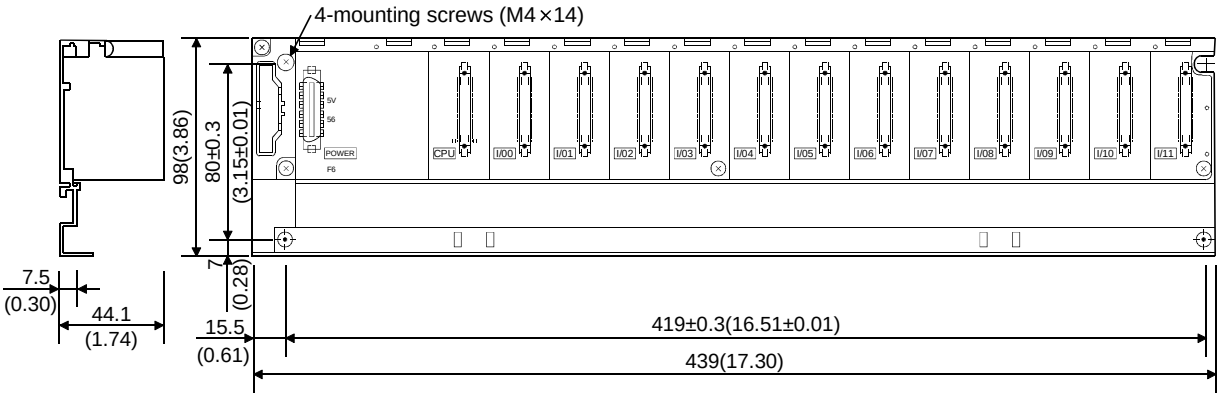
(4) Main Base Unit (Q312B)



Unit: mm (inch)

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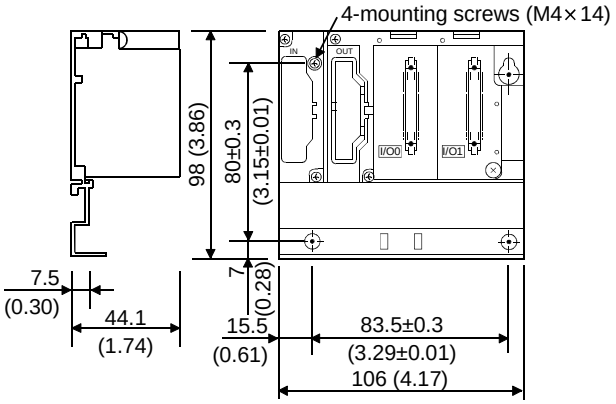
APPENDIX 2.4 Extension base unit

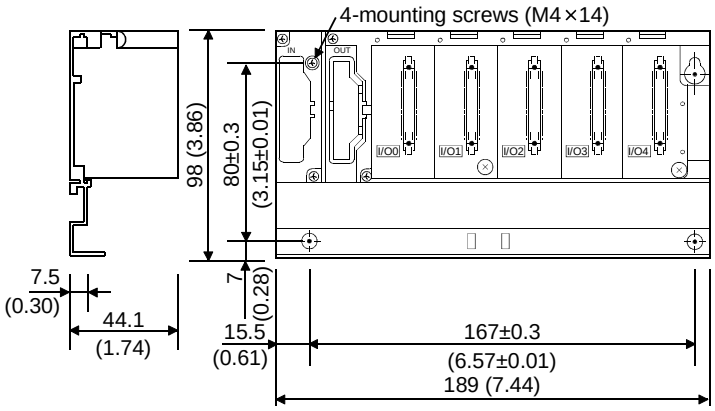
Unit: mm (inch)

(1) Extension Base Unit (Q52B)



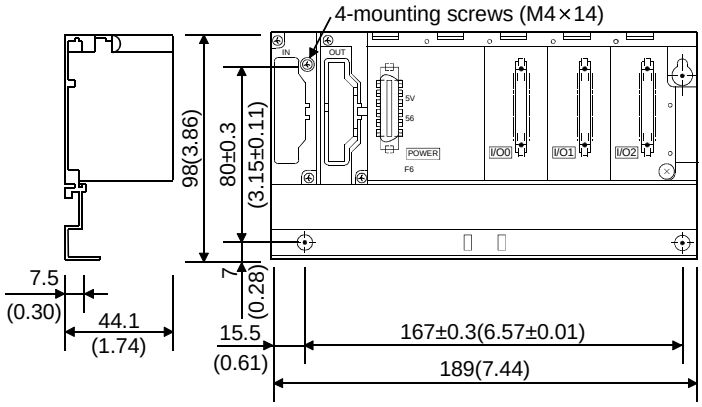
Unit: mm (inch)

(2) Extension Base Unit (Q55B)



Unit: mm (inch)

(3) Extension Base Unit (Q63B)



Unit: mm (inch)

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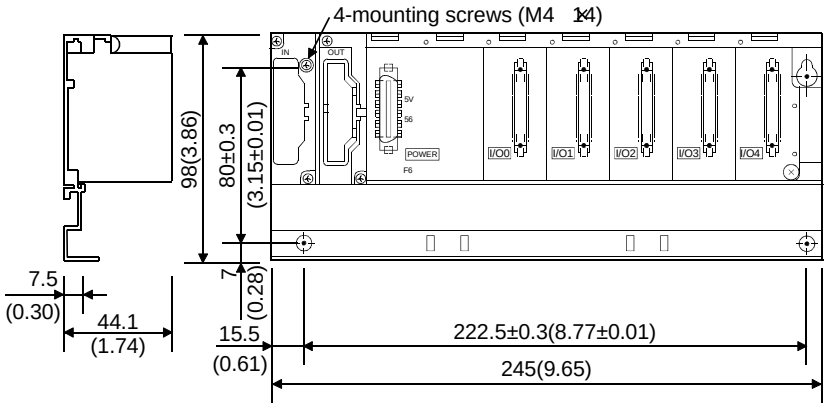
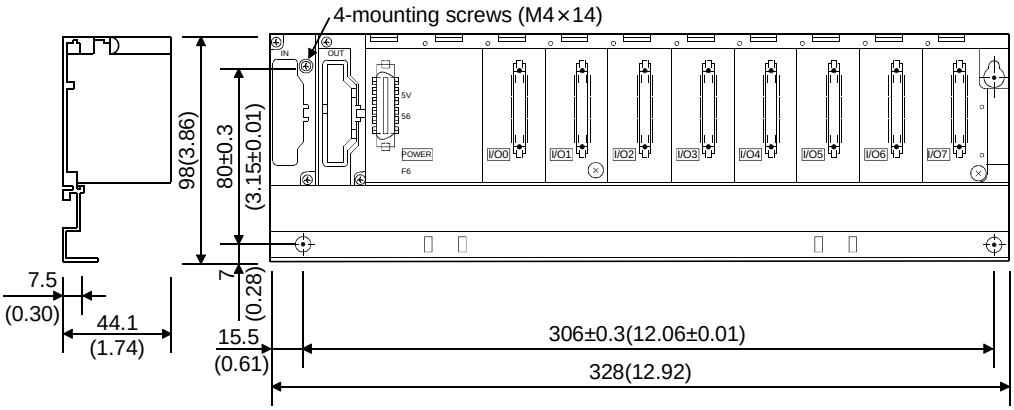
(4) Extension Base Unit (Q65B)



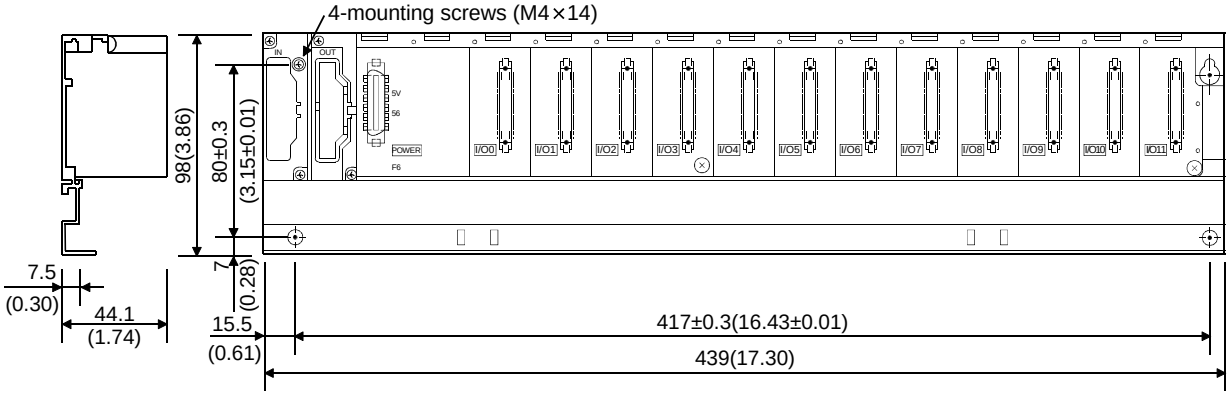
Unit: mm (inch)

(5) Extension Base Unit (Q68B)



Unit: mm (inch)

(6) Extension Base Unit (Q612B)



Unit: mm (inch)

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APPENDIX 3 Comparison Between Process CPU and High Performance model QCPU

The comparison between the Process CPU and High Performance model QCPU is given below.

APPENDIX 3.1 Function comparison

Added Function	Process CPU	Function Version and Serial Number of High Performance model QCPU				
		Function Version A		Function Version B		
		02091 or earlier	02092 or later	——	03051 or later	04012 or later
Automatic write to standard ROM	○	×	○	○	○	○
Enforced ON/OFF for external I/O	○	×	○	○	○	○
Remote password setting	○	×	○	○	○	○
Compatibility with MELSECNET/H remote I/O network	○	×	○	○	○	○
Interrupt module (QI60) compatibility	○	×	○	○	○	○
Compatibility with the multiple CPU system	○	×	×	○	○	○
Installation of PC CPU module into the multiple CPU system	○	×	×	×	○	○
High speed interrupt	×	×	×	×	×	○
Compatibility with index modification for module designation of dedicated instruction	×	×	×	×	×	○
Selection of refresh item for COM instruction	×	×	×	×	×	○
Process control instructions	○	×	×	×	×	×
Online module change	○	×	×	×	×	×
MELSECNET/H multiplex remote I/O system	○	×	×	×	×	×

○: Available, ×: N/A

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MEMO

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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.

Process CPU

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

MODEL	QNPHCPU-U-HH-E
MODEL CODE	13JR55
SH(NA)-080314E-B(0210)MEE	

MITSUBISHI ELECTRIC CORPORATION

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.