MELSEC System Q

Programmable Logic Controllers

User's Manual

Hardware Description

Art. No.
10 03 2011
Version F

About this manual

The texts, illustrations, diagrams and examples in this manual are provided for information purposes only. They are intended as aids to help explain the installation, operation, programming and use of the MELSEC System Q modules.

If you have any questions about the installation and operation of any of the products described in this manual please contact your local sales office or distributor (see back cover). You can find the latest information and answers to frequently asked questions on our website at www.mitsubishi-automation.com.

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User's Manual
MELSEC Q Series Modules
Art. No.:

Version			Changes / Additions / Corrections
A	06/2001		First edition
B	02/2002		Additions: CPU modules: Q00JCPU, Q00CPU, Q01CPU Power supply modules: Q62P and Q64P Base units: Q52B and Q55B Extension cable: QC05B Digital input modules: QX40, QX40-S1, QX41, QX42 Digital output modules: QY40P, QY41P, QY42P, QY50, QY68A
C	10/2003		Additions: CPU modules: Q12PHCPU and Q25PHCPU Digital input modules: QX41-S1, QX42-S1, QX82 and Q82-S1 Memory card: Q2MEM-2MBS Sections 4.3.6 and 4.4 Partial correction: Sections 6.2, 10.3.1 and 11.3
D	09/2004		Additions: Combined I/O modules: QH42P and QX48Y57 CPU module battery: Q7BAT (page 3-3, sections 5.2.1, 5.2.2, 10.3.1, 10.3.2) Notes on devices FX and FY (table 4-1) Footnote fig. 9-5 Partial corrections: Section 4.3.4 Notes on troubleshooting (pages 11-12 and 11-13) Error codes (section 11.2.1) added
E	02/2006		Additions: CPU modules: Q12PRHCPU, Q25PRHCPU, Q06CCPU Power supply modules: Q63RP and Q64RP Base units: Q38RB-E and Q68RB Partial corrections: MT-series modules deleted (Overview, section 3.2.1) ST-series modules addad (Overview, section3.2.1)
F	03/2011	akl	Additions: CPU modules: Universal model QCPU, Process CPUs Q02PHCPU and Q06PHCPU Power supply modules: Q61P, Q61P-D, Q61SP and Q64RN Base units: Q32SB, Q33SB, Q35SB, Q38DB, Q321DB, Q65WRB Digital input modules: QX10-TS, QX40-TS, QX80-TS Digital output modules: QY10-TS, QY40-TS, QY80-TS Memory cards: Q3MEM-4MBS and Q3MEM-8MBS Partial corrections: Error code list (section 11.3) Notes on troubleshooting (section 11.4.1); new section 11.4.2

Safety guidelines

For use by qualified staff only

This manual is only intended for use by properly trained and qualified electrical technicians who are fully acquainted with the relevant automation technology safety standards. All work with the hardware described, including system design, installation, configuration, maintenance, service and testing of the equipment, may only be performed by trained electrical technicians with approved qualifications who are fully acquainted with all the applicable automation technology safety standards and regulations. Any operations or modifications to the hardware and/or software of our products not specifically described in this manual may only be performed by authorised Mitsubishi Electric staff.

Proper use of the products

The MELSEC System Q modules are only intended for the specific applications explicitly described in this manual. All parameters and settings specified in this manual must be observed. The products described have all been designed, manufactured, tested and documented in strict compliance with the relevant safety standards. Unqualified modification of the hardware or software or failure to observe thewarnings on the products and in this manual may result in serious personal injury and/or damage to property. Only peripherals and expansion equipment specifically recommended and approved by MITSUBISHI ELECTRIC may be used with the programmable logic controllers of the MELSEC System Q.

All and any other uses or application of the products shall be deemed to be improper.

Relevant safety regulations

All safety and accident prevention regulations relevant to your specific application must be observed in the system design, installation, setup, maintenance, servicing and testing of these products. The regulations listed below are particularly important in this regard.

This list does not claim to be complete; however, you are responsible for knowing and applying the regulations applicable to you in your location:

- VDE Standards
  - VDE 0100
    Regulations for the erection of power installations with rated voltages below 1000 V
  - VDE 0105
    Operation of power installations
  - VDE 0113
    Electrical installations with electronic equipment
  - VDE 0160
    Electronic equipment for use in power installations
  - VDE 0550/0551
    Regulations for transformers
  - VDE 0700
    Safety of electrical appliances for household use and similar applications
  - VDE 0860
    Safety regulations for mains-powered electronic appliances and their accessories for household use and similar applications.
- Fire safety regulations
- Accident prevention regulation
  - VBG No. 4
    Electrical systems and equipment

Safety warnings in this manual

In this manual special warnings that are important for the proper and safe use of the products are clearly identified as follows:

DANGER:

Personnel health and injury warnings. Failure to observe the safety warnings identified with this symbol can result in health and injury hazards for the user.

CAUTION:

Equipment and property damage warnings. Failure to observe the safety warnings identified with this symbol can result in damage to the equipment or other property.

General safety information and precautions

The following safety precautions are intended as a general guideline for using PLC systems together with other equipment. These precautions must always be observed in the design, installation and operation of all control systems.

DANGER:

- ***Observe all safety and accident prevention regulations applicable to your specific application. Always disconnect all power supplies before performing installation andwiringwork or opening any of the assemblies,components and devices.***
- ***Assemblies, components and devicesmust always be installed in a shockproof housing fitted with a proper cover and fuses or circuit breakers.***
- ***Devices with a permanent connection to the mains power supply must be integrated in the building installations with an all-pole disconnection switch and a suitable fuse.***
- ***Check power cables and lines connected to the equipment regularly for breaks and insulation damage. If cable damage is found immediately disconnect the equipment and the cables from the power supply and replace the defective cabling.***
- ***Before using the equipment for the first time check that the power supply rating matches that of the local mains power.***
- ***You are responsible for taking the necessary precautions to ensure that programs interrupted by brownouts and power failures can be restarted properly and safely. In particular, you must ensure that dangerous conditions cannot occur under any circumstances, even for brief periods. EMERGENCY OFF must be switched forcibly, if necessary.***
- ***EMERGENCY OFF facilities conforming to EN 60204/IEC 204 and VDE 0113 must remain fully operative at all times and in all control system operating modes.The EMERGENCY OFF facility reset function must be designed so that it cannot ever cause an uncontrolled or undefined restart.***
- ***You must implement both hardware and software safety precautions to prevent the possibility of undefined control system states caused by signal line cable or core breaks.***

Symbols used in the manual

Use of instructions

Instructions concerning important information are marked separately and are displayed as follows:

NOTE | Text of instruction

Use of numbering in the figures

Numbering within the figures is displayed by white numbers within black circles and is explained in a table following it using the same number, e.g.:

❶ ❷ ❸ ❹

Use of handling instructions

Handling instructions are steps that must be carried out in their exact sequence during startup, operation, maintenance and similar operations.

They are numbered consecutively (black numbers in white circles):

① Text.

② Text.

③ Text.

Use of footnotes in tables

Instructions in tables are explained in footnotes underneath the tables (in superscript). There is a footnote character at the appropriate position in the table (in superscript).

If there are several footnotes for one table then these are numbered consecutively underneath the table (black numbers in white circle, in superscript):

① Text
② Text
③ Text

Contents

1 Introduction

This manual describes the following modules and units of the MELSEC System Q:

- CPU modules (→ Chapter 4),
- Memory cards (→ Chapter 5),
- Input and output modules (→ Chapter 6),
- Power supply modules (→ Chapter 7) and
- Base units (→ Chapter 8).

The manual comprises also detailed descriptions of:

- Installation (→ Chapter 9),
- Maintenance and Inspection (→ Chapter 10) and
- Troubleshooting (→ Chapter 11).

The MELSEC System Q is user-friendly and offers a wide range of communications facilities.

NOTES

For further information about programming of the programmable logic controllers refer to the programming manual of MELSEC System Q and MELSEC A/Q series (Art. No. 87432).

For further information about application and operating of intelligent function function modules of MELSEC System Q refer to the User's Manual of the modules.

Chapter 3 of this manual describes examples, when using the CPU in independant systems. The CPU can also be used in other system configurations (Data-Link systems or Computer-Link systems). These systems are described in different manuals.

2 Basics

2.1 Features of the MELSEC System Q

CPU modules

The MELSEC System Q offers a wide range of CPU modules:

- Basic model QCPU
  - Q00JCPU
  - Q00CPU
  - Q01CPU
- High performance model QCPU
  - Q02CPU
  - Q02HCPU
  - Q06HCPU
  - Q12HCPU
  - Q25HCPU
- Universal model QCPU
  - Q00UJCPU
  - Q00UCPU
  - Q01UCPU
  - Q02UCPU
  - Q03UDCPU
  - Q03UDECPU
  - Q04UDHCPU
  - Q04UDEHCPU
  - Q06UDHCPU
  - Q06UDEHCPU
  - Q10UDHCPU
  - Q10UDEHCPU
  - Q13UDHCPU
  - Q13UDEHCPU
  - Q20UDHCPU
  - Q20UDEHCPU
  - Q26UDHCPU
  - Q26UDEHCPU
- Process CPU
  - Q02PHCPU
  - Q06PHCPU
  - Q12PHCPU
  - Q25PHCPU
- Redundant CPU
  - Q12PRHCPU
  - Q25PRHCPU

NOTE Talking in this manual about Q-CPU means, that all mentioned CPUs are of MELSEC System Q.

Base units

The Q00JCPU and Q00UJCPU include power supply, CPU and main base unit with five slots. All other CPUs have to be mounted on a main base unit. Additionally one or two power supplies can be mounted and up to twelve modules.

Extension base units can be connected to the main base unit via bus cable. The extension base units are available with or without slots for a separate power supply and with slots for up to twelve modules.

The Q00JCPU and Q00UJCPU can adress max. 16 modules on one main base unit and two extension base units.

The CPU modules Q00CPU, Q01CPU, Q00UCPU, Q01UCPU and Q02UCPU are extendable with up to four extension base units and totally 24 modules (36 modules with Q02UCPU).

Except for Q12PRHCPU and Q25PRHCPU, all other CPU types can be extended with seven extension base units with maximum 64 slots total. The maximum distance between main base unit and last extension base unit is 13.2 m, so that the base units can be mounted inside the cabinet with some distance between each other.

- Connecting extension base units to a redundant PLC system

  It is not possible to connect an extension base unit to a main base unit with a redundant CPU up to serial no. 09012... The expansion can be done by remote I/O station via MELSECNET/H network.

  It is possible to connect a main base unit with a redundant Q12PRHCPU or Q25PRHCPU beginning at serial no. 09012… up to maximum seven extension base units with totally 63 modules.

  The first extension base unit must be the type Q65WRB, the second to seventh unit can be of type Q68RB.

Up to 8192 inputs and outputs

The CPU types Q02(H) to Q25H, the universal model CPUs from Q03UD(E)CPU on, all process CPUs and redundant CPUs can address up to 4096 in/outputs directly on the base unit. Together with remote I/Os these CPUs can address up to 8192 I/O points.

A Q02UCPU can address up to 2048 in/outputs directly and up to 8192 I/Os totally.

The Q00JCPU and Q00UJCPU address 256 I/O points directly. The Q00CPU, Q00UCPU, Q01CPU or Q01UCPU addresses 1024 I/O points. With these CPU types the number is extended to 2048 points and to 8192 points with the universal model PLC CPUs by remote I/Os.

High speed program processing

CPU types with an additional "H" (like Q12HCPU, Q25HCPU or Q12PHCPU) do a faster processing of the program. The operation time for the LD instruction (load) by the Q02CPU is 79 ns. The same instruction is done in 34 ns by the H type CPU.

An universal model PLC CPU increases the processing speed additionally. The operation time of the above mentioned LD instruction takes only 20 ns with the Q03UDCPU and only 9.5 ns with CPU modules from Q04UDCPU on.

With the new MELSEC System Q main base units with integrated memory and processor the data transfer to I/O modules, intelligent function modules and network modules is much faster compared to the previous base units. The access of the Q02HCPU to an intelligent function module is with 20 µs per word 7 times faster than with the Q2ASHCPU. The refresh cycle of the MELSECNET/10 network is around 4.3 times faster compared to the Q02HCPU and needs only 4.6 ms for 8 kwords.

Multi CPU operation

Except Q00JCPU all CPU modules of System Q are suitable für multi-CPU operation. Up to four CPU modules can be mounted on one main base unit to which the mounted I/O and intelligent function modules are assigned. The data transfer between the CPU modules can run automatical and cyclic. Also mixed configurations are possible with PLC CPU, Motion Controller CPU and Q PC. But Q00CPU and Q01CPU can’t be combined with H type CPUs.

By multi-CPU operation the cycle time is decreased, the performance is increased and the application is wider.

Redundant operation

The operation of a redundant system is continued, even if single components have a failure. This increases performance and outage and shutdown times are minimized.

The redundant PLC of MELSEC System Q consists of two controllers with identical configurations (power supply, Q12PRHCPU or Q25PRHCPU, network modules, etc.), which are connected by a so called tracking cable. One PLC controls the system, while the other one is in standby mode. In case of an error the system switches from the control system to the standby system and the process continues without any interruption.

Also a PLC with a standard CPU can be protected with two redundant power supplies against failures. Therefore a main base unit and an extension base unit with two types of power supply are available, one with 24 V DC input and one with 100–240 V AC input.

Range of instructions

Instructions for a Q-CPU are divided into two categories, basic instructions and comprehensive dedicated instructions. The process CPUs and redundant CPUs have additionally 52 process control instructions. Therefore these CPU types are particularly suitable for applications of process technology.

The capacity for the PLC programm is between 8 and 252 k steps depending on the CPU type.

Memory

In addition to the internal memory (RAM and FlashROM) all CPU types (except Q00(U)JCPU, Q00(U)CPU and Q01(U)CPU) have an extension slot for a RAM or a ROM memory card. The RAM card is protected against data loss with a battery. ROM memory cards are available with capacities up to 32 Mbyte for permanent storage of programs and other data.

Programming

The instructions in MELSEC System Q for programming of the CPU are according IEC1131 and there are additional MELSEC instructions depending on the programming tools.

Fast data transfer with programming devices

The connection of the programming device to the CPU module is done by USB interface except the basic model CPUs Q00JCPU, Q00CPU and Q01CPU. The datatransfer speed is then 12 Mbps.

For the Q-CPUs the datatransfer speed via RS232 interface is 115.2 kBaud.

Mounting

The base unit can be mounted directly by screws or on a DIN rail by adapter. The small dimensions of the modules of System Q allow, that the needed space for system mounting is reduced by 60 % compared with the MELSEC AnS series.

Direct connection to the ETHERNET

The universal model PLC CPUs (modules with an "E" in the model name like Q10UDEHCPU) are equipped with an ETHERNET interface allowing the direct connection of the PLC to the ETHERNET network.

Compatibiliy

Concerning the general programming all the modules of MELSEC System Q are compatible to the other Systems of the MELSEC PLC familiy. For information about programming of intelligent function modules refer to the User's Manual of the module.

2.2 Specification comparison of CPU

The following table gives an overview about the characteristics of each CPU. Chapter 4 describes the detailed performance.

2.2.1 Basic model QCPU Q00JCPU, Q00CPU, Q01CPU and Q02CPU

The Q00CPU, Q01CPU and Q02CPU can be used in a multi-CPU system from version B on. Combinations of Q00CPU and Q01CPU are only possible with Motion Controller CPUs and Q-PC. These CPUs can't be operated in one system together with other PLC CPU modules.

Refer to section 4.6 for checking the function version of the CPU module.

	Q00JCPU	Q00CPU	Q01CPU	Q02CPU
No. of I/O device points (usable on program)	2048	2048	2048	8192
No. of I/O device points (Hex)	X/Y000 to 7FF	X/Y000 to 7FF	X/Y000 to 7FF	X/Y000 to 1FFF
No. of I/O points (accessible to the actual I/O module)	256	1024	1024	4096
No. of I/O device points (Hex)	X/Y00 to FF	X/Y000 to 3FF	X/Y000 to 3FF	X/Y000 to FFF
SFC (MELSAP-3)	Possible	Possible	Possible	Possible
Processing speed (LD instruction)	200 ns	160 ns	100 ns	79 ns
Processing speed (MOV instruction)	700 ns	560 ns	350 ns	237 ns
Program memory (Drive 0)	8 k steps	8 k steps	14 k steps	28 k steps
Standard RAM (Drive 3)	—	64 kByte	64 kByte	64 kByte
Standard ROM (Drive 4)	56 kByte	94 kByte	240 kByte	112 kByte
Shared memory for multi-CPU operation	—	8 kByte	8 kByte	8 kByte
Shared memory for high speed data transfer in multi-CPU operation	—			
Memory cards	Not usable	Not usable	Not usable	RAM, Flash card and ATA cards ①
Power consumption (5 V DC)	0.22 A	0.25 A	0.27 A	0.60 A
Weight	0.66 kg	0.13 kg	0.13 kg	0.20 kg
Dimensions (HxWxD) [mm]	98x245x98	98x27.4x89.3		

Tab. 2-1: *Specification comparison of Q00J, Q00, Q01 and Q02*

① One of the following memory cards can be installed for a Q02CPU:
RAM: Q02MEM-1MBS (1 MB) or Q02MEM-2MBS (2 MB)
Flash card: Q02MEM-2MBF (2 MB) or Q02MEM-4MBF (4 MB)
ATA card: Q02MEM-8MBA (8 MB), Q02MEM-16MBA (16 MB) and Q02MEM-32MBA (32 MB)

2.2.2 High performance model QCPU (H types)

All of the following CPU modules can be used in a multi-CPU system.

	Q02HCPU	Q06HCPU	Q12HCPU	Q25HCPU
No. of I/O device points (usable on program)	8192			
No. of I/O device points (Hex)	X/Y000 to 1FFF			
No. of I/O points (accessible to the actual I/O module)	4096			
No. of I/O device points (Hex)	X/Y000 to FFF			
SFC (MELSAP-3)	Possible			
Processing speed (LD instruction)	34 ns			
Processing speed (MOV instruction)	102 ns			
Program memory (Drive 0)	28 k steps	60 k steps	124 k steps	252 k steps
Standard RAM (Drive 3)	64 kByte		256 kByte	256 kByte
Standard ROM (Drive 4)	112 kByte	240 kByte	496 kByte	1008 kByte
Shared memory for multi-CPU operation	8 kByte			
Shared memory for high speed data transfer in multi-CPU operation	—			
Memory cards	RAM: Q02MEM-1MBS (1 MB) Q02MEM-2MBS (2 MB) Flash card: Q02MEM-2MBF (2 MB) Q02MEM-4MBF (4 MB) ATA card: Q02MEM-8MBA (8 MB) Q02MEM-16MBA (16 MB) Q02MEM-32MBA (32 MB)			
Power consumption (5 V DC)	0.64 A			
Weight [kg]	0.20			
Dimensions (HxWxD) [mm]	98x27.4x89.3			

Tab. 2-2: *Specification comparison of Q02(H), Q06H, Q12H and Q25H*

2.2.3 Universal model QCPU

All of the following CPU modules can be used in a multi-CPU system.

Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU and Q03U(E)CPU

	Q00UJCPU	Q00UCPU	Q01UCPU	Q02UCPU	Q03UCPU Q03UECPU ②
No. of I/O device points (usable on program)	8192				
No. of I/O device points (Hex)	X/Y000 to 1FFF				
No. of I/O points (accessible to the actual I/O module)	256	1024	1024	2048	4096
No. of I/O device points (Hex)	X/Y00 to FF	X/Y000 to 3FF	X/Y000 to 3FF	X/Y000 to 7FF	X/Y000 to FFF
SFC (MELSAP-3)	Possible				
Processing speed (LD instruction)	120 ns	80 ns	60 ns	40 ns	20 ns
Processing speed (MOV instruction)	240 ns	160 ns	120 ns	80 ns	40 ns
Program memory (Drive 0)	10 k steps	10 k steps	15 k steps	20 k steps	30 k steps
Standard RAM (Drive 3)	—	128 kByte			192 kByte
Standard ROM (Drive 4)	256 kByte	512 kByte			1024 kByte
Shared memory for multi-CPU operation	—	8 kByte			8 kByte
Shared memory for high speed data transfer in multi-CPU operation	—				8 kByte
Memory cards	Not usable			RAM, Flash card, ATA card ①	
Power consumption (5 V DC)	0.37 A	0.33 A	0.33 A	0.23 A	Q03UCPU: 0.33 A Q03UECPU: 0.46 A
Weight	0.70 kg	0.15 kg	0.15 kg	0.20 kg	Q03UCPU: 0.20 kg Q03UECPU: 0.22 kg
Dimensions (HxWxD) [mm]	98x245x98	98x27.4x89.3			Q03UCPU: 98x27.4x89.3 Q03UECPU: 98x27.4x115

Tab. 2-3: *Specification comparison of Q00UJ, Q00U, Q01U, Q02U and Q03U(E)*

① One of the following memory cards can be installed for a Q02UCPU or Q03U(E)CPU:
RAM: Q02MEM-1MBS (1 MB), Q02MEM-2MBS (2 MB), Q03MEM-4MBS (4 MB), Q03MEM-8MBS (8 MB)
Flash card: Q02MEM-2MBF (2 MB) or Q02MEM-4MBF (4 MB)
ATA cards: Q02MEM-8MBA (8 MB), Q02MEM-16MBA (16 MB) or Q02MEM-32MBA (32 MB)

② The universal model PLC CPUs modules with an "E" in the model name are equipped with an Ethernet interface.

Q04UD(E)CPU to Q26UD(E)CPU*

	Q04UDHCPU Q04UDEHCPU	Q06UDHCPU Q06UDEHCPU	Q10UDHCPU Q10UDEHCPU	Q13UDHCPU Q13UDEHCPU	Q20UDHCPU Q20UDEHCPU	Q26UDHCPU Q26UDEHCPU
No. of I/O device points (usable on program)	8192					
No. of I/O device points (Hex)	X/Y000 to 1FFF					
No. of I/O points (accessible to the actual I/O module)	4096					
No. of I/O device points (Hex)	X/Y000 to FFF					
SFC (MELSAP-3)	Possible					
Processing speed (LD instruction)	9.5 ns					
Processing speed (MOV instruction)	19 ns					
Program memory (Drive 0)	40 k steps	60 k steps	100 k steps	130 k steps	200 k steps	260 k steps
Standard RAM (Drive 3)	256 kByte	768 kByte	1024 kByte		1280 kByte	
Standard ROM (Drive 4)	512 kByte	1024 kByte	2048 kByte		4096 kByte	
Shared memory for multi-CPU operation	8 kByte					
Shared memory for high speed data transfer in multi-CPU operation	32 kByte					
Memory cards	RAM: Q02MEM-1MBS (1 MB) Q02MEM-2MBS (2 MB) Q03MEM-4MBS (4 MB) Q03MEM-8MBS (8 MB) Flash card: Q02MEM-2MBF (2 MB) Q02MEM-4MBF (4 MB) ATA card: Q02MEM-8MBA (8 MB) Q02MEM-16MBA (16 MB) Q02MEM-32MBA (32 MB)					
Power consumption (5 V DC)	Q04UDH-, Q06UDH-, Q10UDH-, Q013UDH-, Q20UDH-, Q26UDHCPU: 0.39 A Q04UDEH-, Q06UDEH-, Q10UDEH-, Q013UDEH-, Q20UDEH-, Q26UDEHCPU: 0.49 A					
Weight	Q04UDH-, Q06UDH-, Q10UDH-, Q013UDH-, Q20UDH-, Q26UDHCPU: 0.20 kg Q04UDEH-, Q06UDEH-, Q10UDEH-, Q013UDEH-, Q20UDEH-, Q26UDEHCPU: 0.22 kg					
Dimensions (HxWxD) [mm]	Q04UDH-, Q06UDH-, Q10UDH-, Q013UDH-, Q20UDH-, Q26UDHCPU: 98x27.4x89.3 Q04UDEH-, Q06UDEH-, Q10UDEH-, Q013UDEH-, Q20UDEH-, Q26UDEHCPU: 98x27.4x115					

Tab. 2-4: *Specification comparison of Q04UD(E)CPU to Q26UD(E)CPU*

* The universal model PLC CPUs modules with an "E" in the model name are equipped with an Ethernet interface.

2.2.4 Process CPU

All of the following CPU modules can be used in a multi-CPU system.

	Q02PHCPU	Q06PHCPU	Q12PHCPU	Q25PHCPU
No. of I/O device points (usable on program)	8192			
No. of I/O device points (Hex)	X/Y000 to 1FFF			
No. of I/O points (accessible to the actual I/O module)	4096			
No. of I/O device points (Hex)	X/Y000 to FFF			
SFC (MELSAP-3)	Possible			
Processing speed (LD instruction)	34 ns			
Processing speed (MOV instruction)	102 ns			
Program memory (Drive 0)	28 k steps	60 k steps	124 k steps	252 k steps
Standard RAM (Drive 3)	128 kByte		256 kByte	
Standard ROM (Drive 4)	112 kByte	240 kByte	496 kByte	1008 kByte
Shared memory for multi-CPU operation	8 kByte			
Shared memory for high speed data transfer in multi-CPU operation	—			
Memory cards	RAM: Q02MEM-1MBS (1 MB) Q02MEM-2MBS (2 MB) Flash card: Q02MEM-2MBF (2 MB) Q02MEM-4MBF (4 MB) ATA card: Q02MEM-8MBA (8 MB) Q02MEM-16MBA (16 MB) Q02MEM-32MBA (32 MB)			
Power consumption (5 V DC)	0.64 A			
Weight	0.20 kg			
Dimensions (HxWxD) [mm]	98x27.4x89.3			

Tab. 2-5: *Specification comparison of Q02PH, Q06PH, Q12PH and Q25PH*

2.2.5 Redundant CPU

It is not possible to connect an extension base unit to a main base unit with redundant CPU. The expansion can be done by remote I/O station via MELSECNET/H network.

A standard main base unit of MELSEC System Q can be used, if you don't need redundant power supplies.

The redundant CPU modules Q12PRHCPU and Q25PRHCPU can't be used with a multi-CPU system.

	Q12PRHCPU	Q25HCPU
No. of I/O device points (usable on program)	8192	
No. of I/O device points (Hex)	X/Y000 to 1FFF	
No. of I/O points (accessible to the actual I/O module)	4096	
No. of I/O device points (Hex)	X/Y000 to FFF	
SFC (MELSAP-3)	Possible	
Processing speed (LD instruction)	34 ns	
Processing speed (MOV instruction)	102 ns	
Data transfer time to the Standby system	Device memory 48 k words: 10 ms Device memory 100 k words: 15 ms The cycle time increases by the data tranfer time to the Standby system.	
Program memory (Drive 0)	124 k steps	252 k steps
Standard RAM (Drive 3)	256 kByte	256 kByte
Standard ROM (Drive 4)	496 kByte	1008 kByte
Shared memory for multi-CPU operation	—	
Shared memory for high speed data transfer in multi-CPU operation	—	
Memory cards	RAM: Q02MEM-1MBS (1 MB) Q02MEM-2MBS (2 MB) Flash card: Q02MEM-2MBF (2 MB) Q02MEM-4MBF (4 MB) ATA card: Q02MEM-8MBA (8 MB) Q02MEM-16MBA (16 MB) Q02MEM-32MBA (32 MB)	
Power consumption (5 V DC)	0.64 A	0.64 A
Weight	0.3 kg	0.3 kg
Dimensions (HxWxD) [mm]	98x52.2x89.3	

Tab. 2-6: *Specification comparison of Q12PRH and Q25PRH*

NOTE

For more informations about redundant CPU modules refer to the technical catalogue MELSEC System Q and to the User's Manual of the module.

2.2.6 Motion CPU

The motion controller CPU of System Q controls extensive movements by the connected servo amplifiers and servo motors. They only work in a multi-CPU system together with minimum one PLC CPU. Therefore maximum three Motion CPU modules can be mounted on one main base unit.

Q172CPUN and Q173CPUN

		Q172CPUN	Q173CPUN
No. of I/O device points (usable on program)		8192	8192
Real I/O points (I/O in Main and Extension Base Units)		256	256
No. of control axes		8	32
Operation cycle	With software SV13	0.88 ms (1 to 8 axes)	0.88 ms (1 to 8 axes) 1.77 ms (9 to 16 axes) 3.55 ms (17 to 32 axes)
	With software SV22	0.88 ms (1 to 4 axes) 1.77 ms (5 to 8 axes)	0.88 ms (1 to 4 axes) 1.77 ms (5 to 12 axes) 3.55 ms (13 to 24 axes) 7.11 ms (25 to 32 axes)
Program memory		14 k steps	14 k steps
Shared memory for multi-CPU operation		8 kByte	8 kByte
Shared memory for high speed data transfer in multi-CPU operation		—	—
Memory cards		Not usable	Not usable
Power consumption (5 V DC)		1.14 A	1.25 A
Weight		0.22 kg	0.23 kg
Dimensions (HxWxD) [mm]		98x27.4x114.3	

Tab. 2-7: *Specification comparison of Q172CPUN and Q173CPUN*

Q172HCPU and Q173HCPU

		Q172HCPU	Q173HCPU
No. of I/O device points (usable on program)		8192	8192
Real I/O points (I/O in Main and Extension Base Units)		256	256
No. of control axes		8	32
Operation cycle	With software SV13	0.44 ms (1 to 3 axes) 0.88 ms (4 to 8 axes)	0.44 ms (1 to 3 axes) 0.88 ms (4 to 10 axes) 1.77 ms (11 to 20 axes) 3.55 ms (21 to 32 axes)
	With software SV22	0.88 ms (1 to 5 axes) 1.77 ms (6 to 8 axes)	0.88 ms (1 to 5 axes) 1.77 ms (6 to 14 axes) 3.55 ms (15 to 28 axes) 7.11 ms (29 to 32 axes)
Program memory		14 k steps	14 k steps
Shared memory for multi-CPU operation		8 kByte	8 kByte
Shared memory for high speed data transfer in multi-CPU operation		—	—
Memory cards		Not usable	Not usable
Power consumption (5 V DC)		1.14 A	1.25 A
Weight		0.22 kg	0.23 kg
Dimensions (HxWxD) [mm]		104.6x27.4x114.3	

Tab. 2-8: *Specification comparison of Q172HCPU and Q173HCPU*

Q172DCPU and Q173DCPU

It is only possible to mount a Q172DCPU or Q173DCPU on a Q38DB or Q312DB type main base unit. The PLC CPU must be an universal model CPU (QnUD(H)).

		Q172DCPU	Q173DCPU
No. of I/O device points (usable on program)		8192	8192
Real I/O points (I/O in Main and Extension Base Units)		256	256
No. of control axes		8	32
Operation cycle	With software SV13	0.44 ms (1 to 6 axes) 0.88 ms (7 and 8 axes)	0.44 ms (1 to 6 axes) 0.88 ms (7 to 18 axes) 1.77 ms (19 to 32 axes)
	With software SV22	0.44 ms (1 to 4 axes) 0.88 ms (5 to 8 axes)	0.44 ms (1 to 4 axes) 0.88 ms (5 to 12 axes) 1.77 ms (13 to 28 axes) 3.55 ms (29 to 32 axes)
Program memory		14 k steps	14 k steps
Shared memory for multi-CPU operation		8 kByte	8 kByte
Shared memory for high speed data transfer in multi-CPU operation		14 kByte	14 kByte
Memory cards		Not usable	Not usable
Power consumption (5 V DC)		1.14 A	1.25 A
Weight		0.33 kg	0.33 kg
Dimensions (HxWxD) [mm]		98x27.4x119.3	

Tab. 2-9: *Specification comparison of Q172DCPU and Q173DCPU*

NOTE

For more informations about motion controllers and operating system software refer to the technical catalogue MELSEC System Q and to the User's Manual of the module and the software.

2.2.7 PC CPU module

The PC CPU module is a compact personal computer of high value which can be installed on the main base unit. Combinations with other CPU modules in a multi-CPU system are possible. Besides typical functions of a PC, the PC CPU can also handle PLC functions.

		PC-CPU
CPU		Ultra low voltage Intel® Celereon® M processor
Processing frequency		600 MHz
Memory		512 MB (main)/2 x 32 kB L1 (cache), 1 x 512 kB L22 (cache)
Video		Integrated graphics board for a maximum resolution of 1280x1024 pixels, 16 mio. colours
Interfaces	Serial (RS232C)	2 (1 integrated 9-pin D-SUB connector and 1 optional interface at the extension box which is connnected to "EX I/F")
	Parallel	1
	USB	4 (3 integrated 9-pin D-SUB connector and 1 optional interface at the extension box which is connnected to "EX I/F")
	Keyboard/mouse	1 x PS/2 connector (keyboard and mouse can be used at the same time with the Y junction cable)
	LAN	1 x ETHERNET interface (100BASE-TX/10BASE-T)
	Monitor	1 x 15-pin H-DSUB
Connections for drives		1 x disk drive, 2 x hard disk (silicon hard disks are supported)
PC card slots		2 PCMCIA, CardBus
Dimensions (HxWxD) [mm]		98x55.2x115

Tab. 2-10: *PC CPU module of MELSEC System Q*

NOTE For more informations about PC CPU modules refer to the technical catalogue MELSEC System Q.

2.2.8 C-Controller CPU

The C-Controller CPUs Q06CCPU and Q12DCCPU with the powerful VxWorks operating system are programmed in C or C++. Therefore they are suitable especially for complex tasks in data processing.

The C-Controller CPUs have the same compact dimensions as the other CPU modules of MELSEC System Q and can be combined with them in a multi-CPU system or operate stand alone. Additionally the C-Controller CPUs are compatible with CoDeSys.

			Q06CCPU-V-H01	**Q12DCCPU-V**
CPU			SH-4	SH-4A
Operating system			VxWorks 5.4 (preinstalled))	VxWorks 6.4 (preinstalled))
Programming language			C or C++	C or C++
Development tool			Tornado 2.1*	Workbench 2.6.1
No. of I/Os			4096 (X/Y0 to X/YFFF)	4096 (X/Y0 to X/YFFF)
Memory	User area	RAM	—	3 MB
		ROM	6 MB	—
	Work RAM		64 MB	128 MB
	Battery-backed-up RAM		128 kB	128 kB
Interfaces		Serial (RS232C)	1	1
		USB	—	1
		LAN	1 x 100BASE-TX/10BASE-T	2 x 100BASE-TX/10BASE-T
PC card slots			1 slot for a TYPE I CF®-Card; Max. 1 GB CF® card is supported	1 slot for a TYPE I CF®-Card; Max. 8 GB CF® card is supported
Power consumption (5 V DC)			0.71 A	0.93 A
Weight			0.17 kg	0.24 kg
Dimensions (HxWxD) [mm]			98x27.4x89.3	98x27.4x115

Tab. 2-11: *Specifications of C-Controller CPUs*

* Licenses with special conditions for Mitsubishi users are available directly from Wind River

NOTE

For more informations about C-Controller CPUs refer to the technical catalogue MELSEC System Q.

3 System configuration

3.1 Overall configuration

Following figure shows the system configuration for a Q00JCPU or Q00UJCPU using a combination of main base unit, CPU and power supply module.

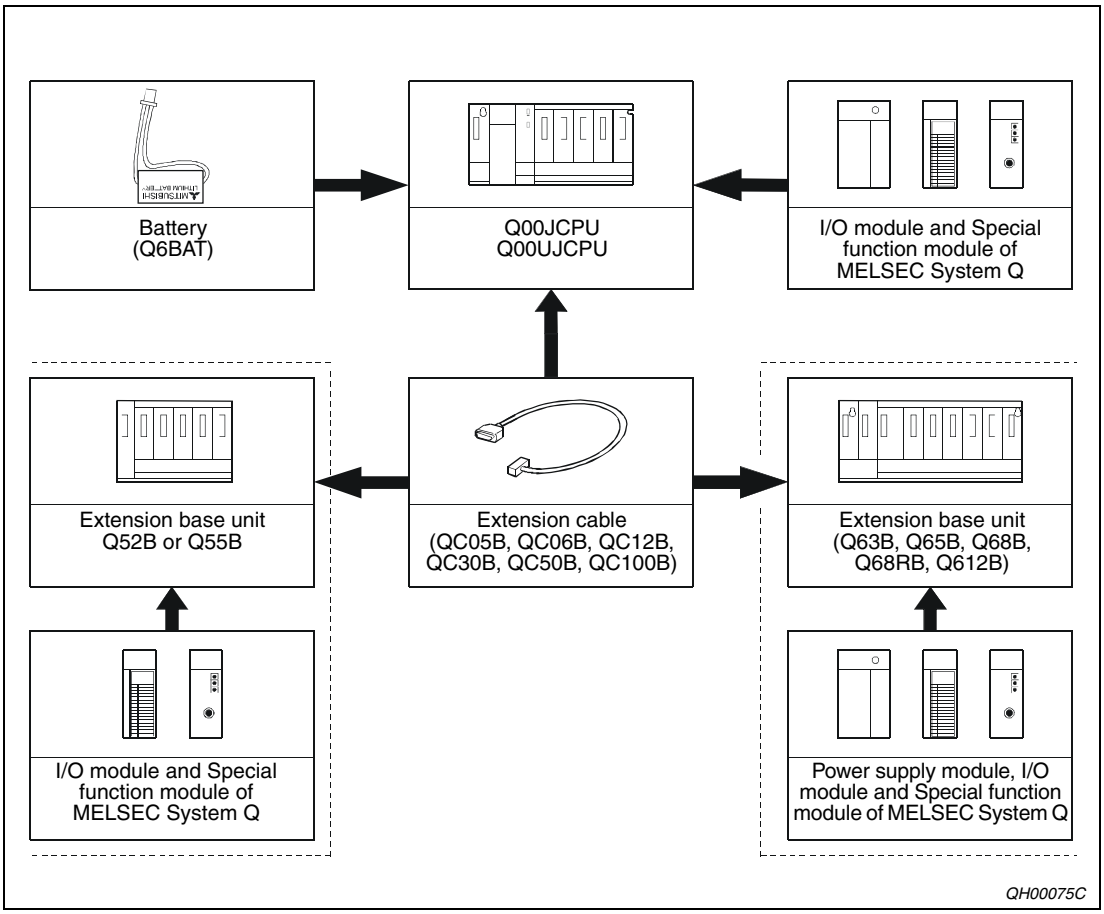


Fig. 3-1: *System configuration for Q00JCPU and Q00UJCPU*

Following figure shows the system configuration for a Q00CPU, Q01CPU, Q00UCPU or Q01UCPU (all without slots for a memory card).

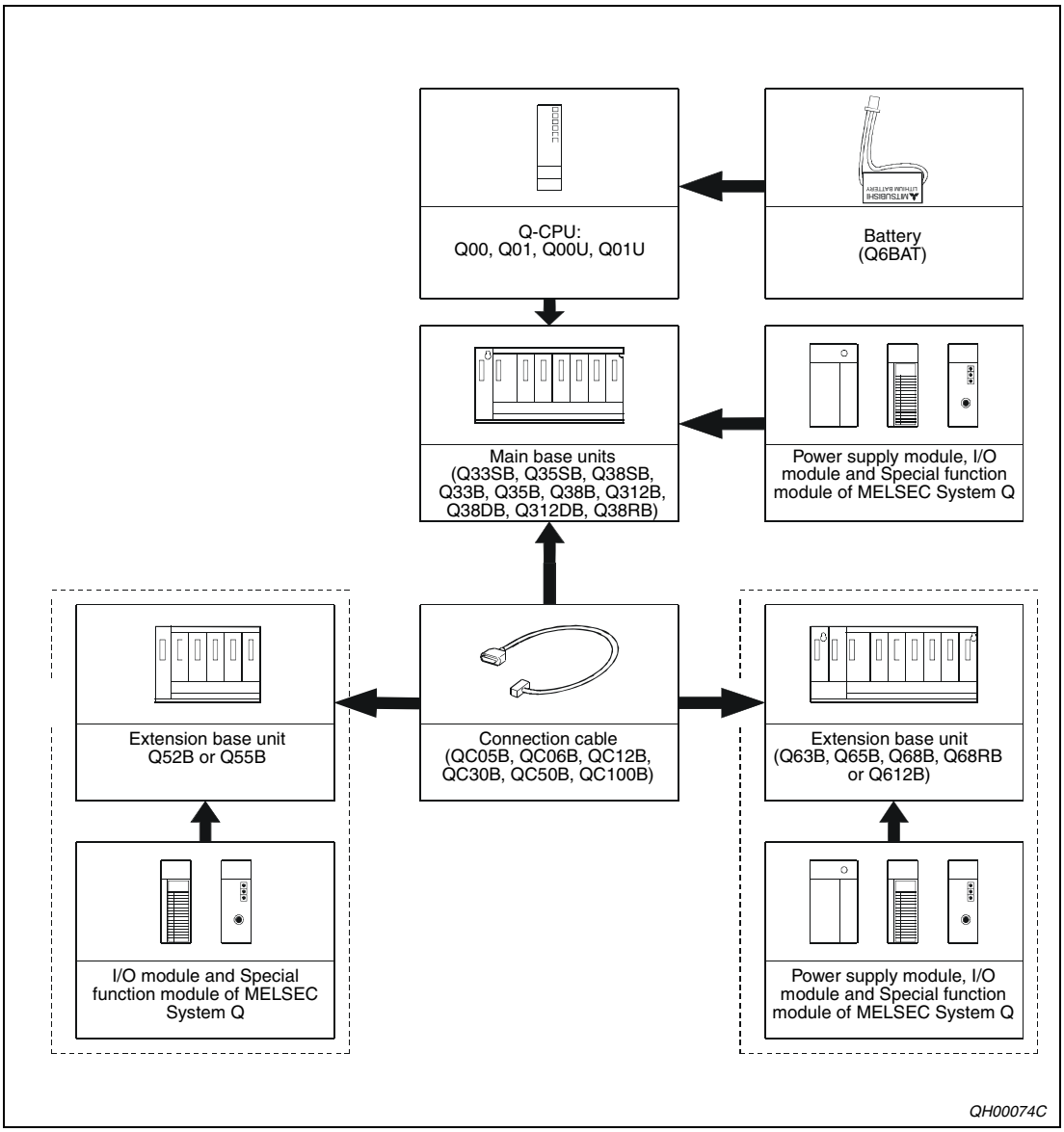


Fig. 3-2: *System configuration for Q00CPU, Q01CPU, Q00UCPU and Q01UCPU*

NOTES

It is only possible to mount the redundant power supplies Q63RP and Q64RP on a main base unit of type Q38RB and Q68RB. Each base unit has two slots for redundant power supplies.

The slim type main base units Q32SB, Q33SB and Q35SB can't be connected to extension base unit.

System configuration for CPU types Q02(P)(H) to Q25(P)H and Q02U to Q26UD(E)H:

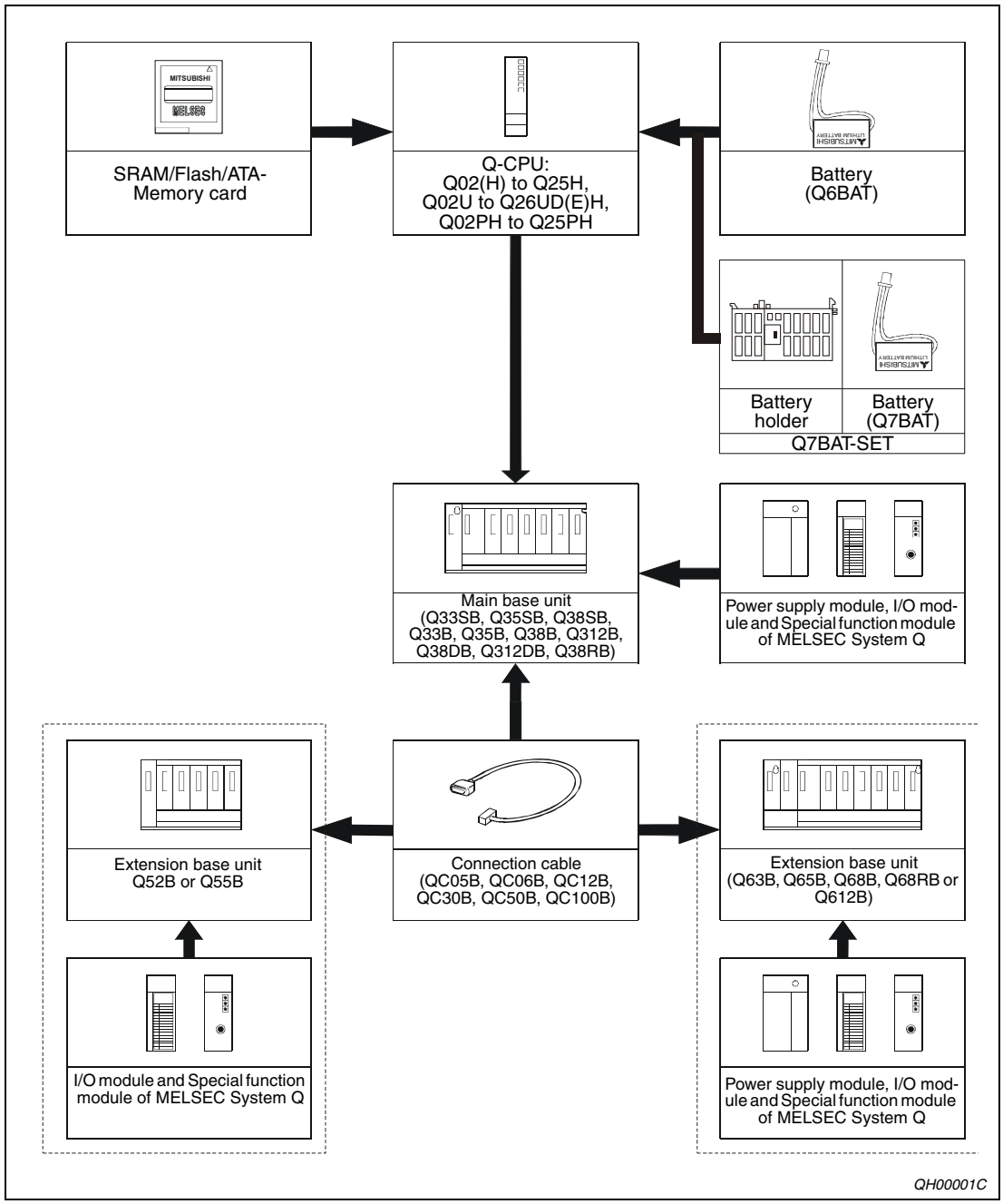


Fig. 3-3: *System configuration for CPUs Q02(H) to Q25H, Universal CPUs Q02U to Q26UD(E)H and Process CPUs Q02PH to Q25PH*

NOTES

Battery Q7BAT is not available in EU countries.

It is only possible to mount the redundant power supplies Q63RP and Q64RP on a main base unit of type Q38RB and Q68RB. Each base unit has two slots for redundant power supplies.

The process CPU modules Q02PHCPU to Q25PHCPU can't be mounted on the slim type main base units Q32SB, Q33SB and Q35SB.

The slim type main base units Q32SB, Q33SB and Q35SB can't be connected to extension base unit.

The following figure shows the system configuration of a redundant PLC with Q12PRH or Q25PRH CPU types.

The redundant PLC of MELSEC System Q consists of two systems with identical configurations (power supply, CPU module, network modules, etc.), which are connected by tracking cable. One PLC controls the system, while the other one is in standby for reserve.

For more informations about configuration and applicable modules refer to the technical catalogue MELSEC System Q and to the User's Manual of the redundant PLC module.

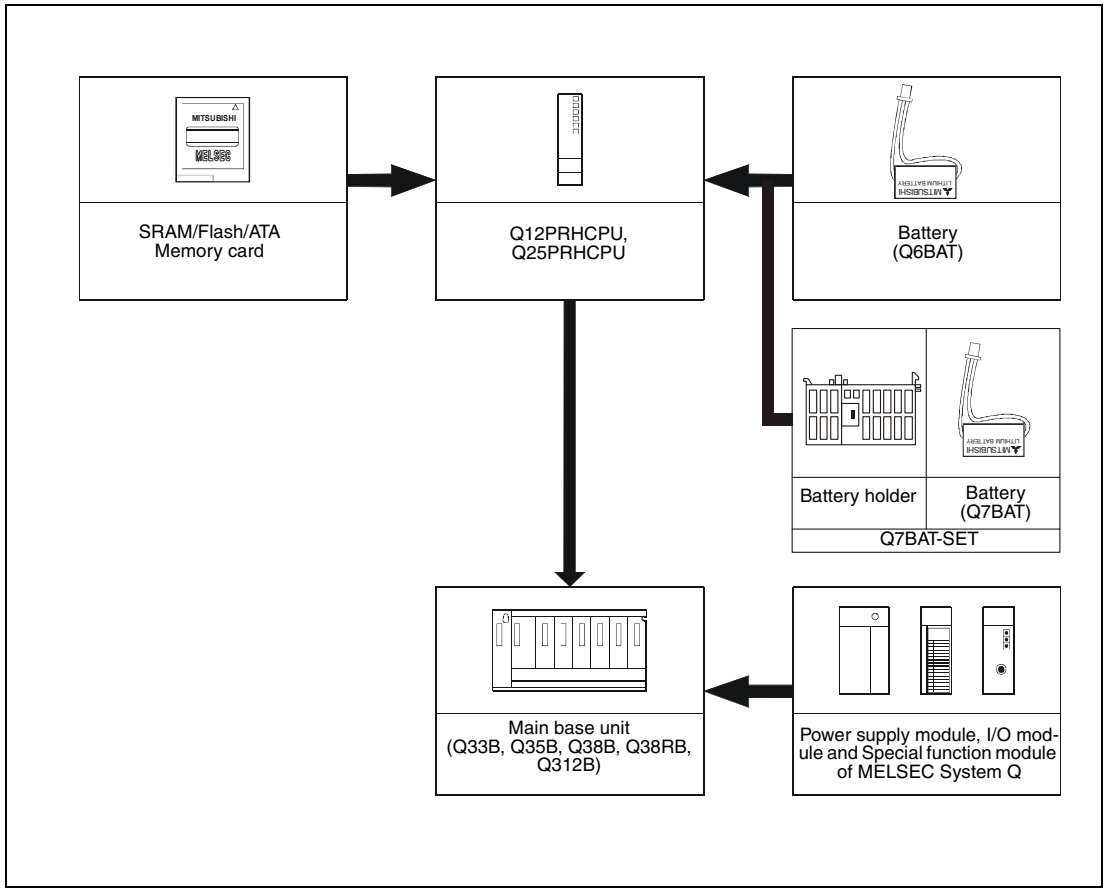


Fig. 3-4: *System configuration for Q12PRH- and Q25PRHCPU*

NOTES

Battery Q7BAT is not available in EU countries.

It is only possible to mount the redundant power supplies Q63RP and Q64RP on a main base unit of type Q38RB and Q68RB. Each base unit has two slots for redundant power supplies.

It is not possible to connect an extension base unit to a main base unit with a redundant CPU up to serial no. 09012... The expansion can be done by remote I/O station via MELSECNET/H network.
It is possible to connect up to maximum seven extension base units with totally 63 modules with a redundant Q12PRHCPU or Q25PRHCPU beginning at serial no. 09012… In the first stage the base unit Q65WRB should be connected directly to the main base unit. The base units Q68RB should be used for the second to seventh stage.

Following figure shows the configuration for programming of a Q-CPU:

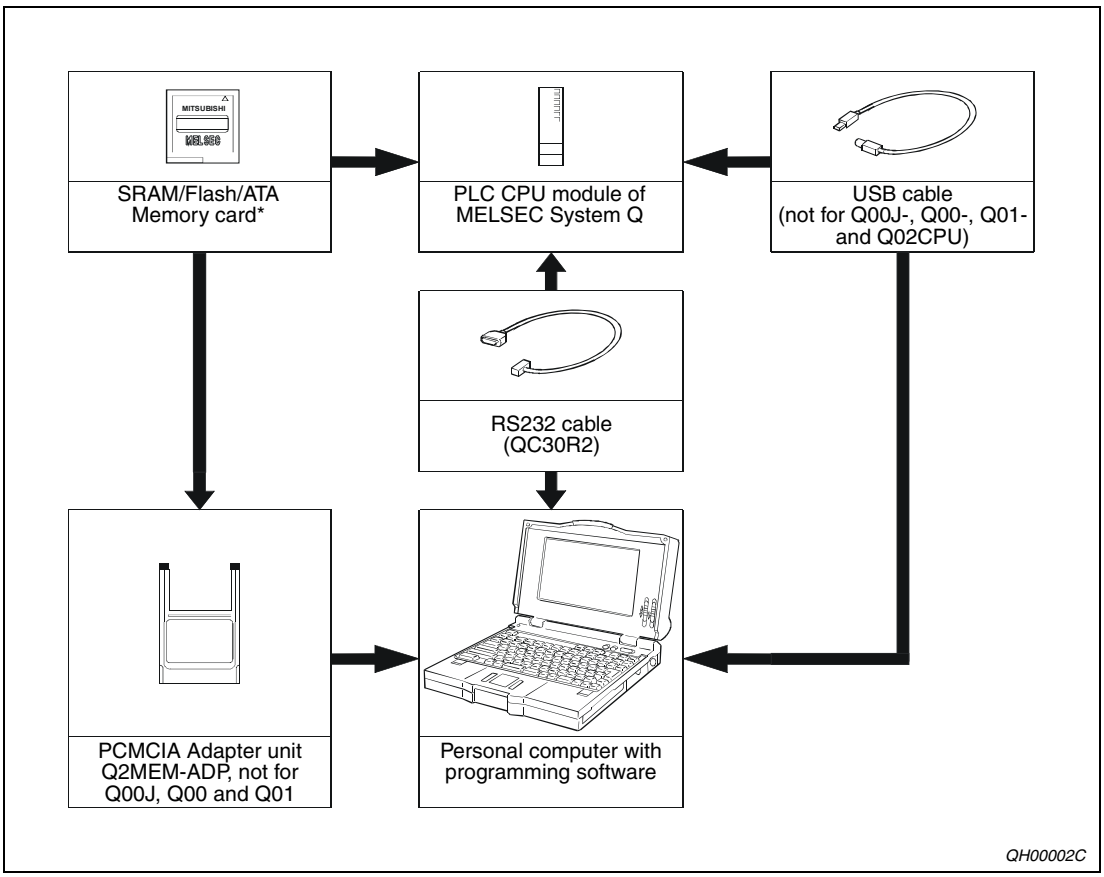


Fig. 3-5: *Programming the PLC CPU of MELSEC System Q*

* The basic model QCPU, Q00U(J)CPU, Q01UCPU do not support memory cards.

NOTES

Programming of the Q-CPUs is done with the following software:
- GX Developer
- GX IEC Developer

For special functions of the Q-CPUs and for transfer of programs to memory cards or over USB cable please refer to the User's Manuals of GX IEC Developer and GX Developer.

3.2 Overall system

3.2.1 Modules of MELSEC System Q

CPU modules

Type	Description		Power consumption (mA)		Note
			5 V DC	24 V DC	
Basic model QCPU					
Q00JCPU	Combination of base unit, power supply module and CPU	• 2048 total I/O points • 256 direct accessible I/O points • Memory capacity: 8 k steps	200	—	• 5 slots for I/O modules • Power supply specification: Input: 100-240 V AC Output: 5 V DC, 3 A
Q00CPU	CPU modules; suitable for multi-CPU operation; also refer to CPU performance specifications chapter 12	• 2048 total I/O points • 1024 direct accessible I/O points • Memory capacity: 8 k steps	250	—	
Q01CPU		• 2048 total I/O points • 1024 direct accessible I/O points • Memory capacity: 14 k steps	270	—	
High performance model QCPU					
Q02CPU	CPU modules; suitable for multi-CPU operation; also refer to CPU performance specifications chapter 12	• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 28 k steps	600	—	• Slot for memory card
Q02HCPU		• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 28 k steps	640	—	• Slot for memory card • USB interface
Q06HCPU		• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 60 k steps	640	—	
Q12HCPU		• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 124 k steps	640	—	
Q25HCPU		• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 252 k steps	640	—	

Tab. 3-1: *Overview of the CPU modules*

Type	Description		Power consumption (mA)		Note
			5 V DC	24 V DC	
Universal model QCPU					
Q00UJCPU	Combination of base unit, power supply module and CPU; suitable for multi-CPU operation	• 8192 total I/O points • 256 direct accessible I/O points • Memory capacity: 10 k steps	370	—	• 5 slots for I/O modules • USB interface • Power supply specification: Input: 100-240 V AC Output: 5 V DC, 3 A
Q00UCPU	Universal model QCPU; suitable for multi-CPU operation; also refer to CPU performance specifications chapter 12	• 8192 total I/O points • 1024 direct accessible I/O points • Memory capacity: 10 k steps	330	—	• USB interface
Q01UCPU		• 8162 total I/O points • 1024 direct accessible I/O points • Memory capacity: 15 k steps	330	—	
Q02UCPU		• 8192 total I/O points • 2048 direct accessible I/O points • Memory capacity: 20 k steps	230	—	• Slot for memory card • USB interface
Q03UDCPU		• 8192 total I/O points	330	—	
Q03UDECPU		• 4096 direct accessible I/O points • Memory capacity: 30 k steps	460	—	• Slot for memory card • USB interface • Built-in ETHERNET port
Q04UDHCPU		• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 40 k steps	390	—	• Slot for memory card • USB interface
Q04UDEHCPU			490	—	• Slot for memory card • USB interface • Built-in ETHERNET port
Q06UDHCPU		• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 60 k steps	390	—	• Slot for memory card • USB interface
Q06UDEHCPU			490	—	• Slot for memory card • USB interface • Built-in ETHERNET port

Tab. 3-1: *Overview of the CPU modules*

Type	Description		Power consumption (mA)		Note
			5 V DC	24 V DC	
Universal model QCPU (continued)					
Q10UDHCPU	Universal model QCPU; suitable for multi-CPU operation; also refer to CPU performance specifications chapter 12	• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 100 k steps	390	—	• Slot for memory card • USB interface
Q10UDEHCPU			490	—	• Slot for memory card • USB interface • Built-in ETHERNET port
Q13UDHCPU		• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 130 k steps	390	—	• Slot for memory card • USB interface
Q13UDEHCPU			490	—	• Slot for memory card • USB interface • Built-in ETHERNET port
Q20UDHCPU		• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 200 k steps	390	—	• Slot for memory card • USB interface
Q20UDEHCPU			490	—	• Slot for memory card • USB interface • Built-in ETHERNET port
Q26UDHCPU		• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 260 k steps	390	—	• Slot for memory card • USB interface
Q26UDEHCPU			490	—	• Slot for memory card • USB interface • Built-in ETHERNET port

Tab. 3-1: *Overview of the CPU modules*

Type	Description		Power consumption (mA)		Note
			5 V DC	24 V DC	
Process CPU					
Q02PHCPU	CPU modules; suitable for multi-CPU operation; also refer to CPU performance specifications chapter 12	• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 28 k steps	640	—	• Slot for memory card • USB interface • Additional process control instructions
Q06PHCPU		• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 60 k steps	640	—	
Q12PHCPU		• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 124k steps	640	—	
Q25PHCPU		• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 252k steps	640	—	
Redundant CPU					
Q12PRHCPU	Redundant CPU; Multi-CPU operation is not possible	• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 124k steps	640	—	• Slot for memory card • USB interface • Additional process control instructions • For setting up a redundant system
Q25PRHCPU	Redundant CPU; Multi-CPU operation is not possible	• 8192 total I/O points • 4096 direct accessible I/O points • Memory capacity: 252k steps	640	—	

Tab. 3-1: *Overview of the CPU modules*

Standard modules of System Q

Type	Description		No. of occupied I/O points	Power consumption (mA)		Note
				5 V DC	24 V DC	
Power supply modules						
Q61P	5 V DC; 6 A	Input: 100–240 V AC	—	—	—	
Q61P-A1		Input: 100–120 V AC				
Q61P-A2		Input: 200–240 V AC				
Q61P-D		Input: 100–240 V AC				With life detection function
Q61SP	5 V DC; 2 A	Input: 100–240 V AC				For slim type main base unit Q3□SB only
Q62P	5 V DC; 3 A 24 V DC; 0.6 A	Input: 100–240 V AC				
Q63P	5 V DC; 6 A	Input: 24 V DC				
Q63RP	5 V DC; 8.5 A	Input: 24 V DC				Redundant power supply module
Q64P	5 V DC; 8.5 A	Input: 100–120 V AC 200–240 V AC				
Q64PN		Input: 100–240 V AC				
Q64RP	5 V DC; 8.5 A	Input: 100–120 V AC 200–240 V AC				Redundant power supply module
Digital input modules						
QX10	16 Input points, 100–120 V AC; 50/60 Hz		16	50	—	AC voltage
QX10-TS						
QX28	8 Input points, 100–240 V AC; 50/60 Hz		16	50	—	
QX40	16 Input points, 24 V DC		16	50	—	Positive common type
QX40-TS						
QX40-S1	16 Input points, 24 V DC		16	60	—	
QX41	32 Input points, 24 V DC		32	75	—	
QX41-S1	32 Input points, 24 V DC		32	75	—	
QX42	64 Input points, 24 V DC		64	90	—	
QX42-S1	64 Input points, 24 V DC		64	90	—	
QX70	16 Input points, 5–12 V DC		16	55	—	Negative or positive common type
QX71	32 Input points, 5–12 V DC		32	70	—	
QX72	64 Input points, 5–12 V DC		64	85	—	
QX80	16 Input points, 24 V DC		16	50	—	Negative common type
QX80-TS						
QX81	32 Input points, 24 V DC		32	75	—	
QX82	64 Input points, 24 V DC		64	90	—	
QX82-S1	64 Input points, 24 V DC		64	90	—	

Tab. 3-2: *Standard modules of System Q*

Type	Description	No. of occupied I/O points	Power consumption (mA)		Note
			5 V DC	24 V DC	
Digital output modules					
QY10 QY10-TS	Relay output module, 16 Output points 24 V DC/240 V AC, 2 A	16	430	—	—
QY18A	Relay output module, 8 Output points 24 V DC/240 V AC, 2 A	16	430	—	
QY22	Triac output module, 16 Output points 100–240 V AC, 0.6 A	16	250	—	
QY40P QY40P-TS	Transistor output module, 16 Output points 12/24 V DC, 0.1 A	16	65	10	sink type
QY41P	Transistor output module, 32 Output points 12/24 V DC, 0.1 A	32	105	20	
QY42P	Transistor output module, 64 Output points 12/24 V DC, 0.1 A	64	150	20	
QY50	Transistor output module, 16 Output points 12/24 V DC, 0.5 A	16	80	20	
QY68A	Transistor output module, 8 Output points 5/12/24 V DC, 0.5 A	8	110	—	source/sink type
QY70	Transistor output module, 16 Output points 5/12 V DC, 0.016 A	16	95	90 (12 V DC)	sink type
QY71	Transistor output module, 32 Output points 5/12 V DC 0.016 A	32	150	170 (12 V DC)	
QY80 QY80-TS	Transistor output module, 16 Output points 12/24 V DC 0.5 A	16	80	20	source type
QY81P	Transistor output module, 32 Output points 12/24 V DC 0.1 A	32	95	40	
Combined I/O modules					
QH42P	32 Input points, 24 V DC 32 Transistor outputs 12/24 V DC, 0.1 A	32	130	15	Inputs: positive common type Outputs: sink type
QX48Y57	8 Input points, 24 V DC 7 Transistor outputs 12/24 V DC, 0.5 A	16	80	10	
Dummy module					
QG60	Dummy module for unused slots	16 (vacant)	—	—	—

Tab. 3-2: *Standard modules of System Q*

Special function modules

Type	Description	No. of occupied I/O points	Power consumption (mA)		Note
			5 V DC	24 V DC	
High-Speed counter modules					
QD62	2 Inputs (5/12/24 V DC); counting range 32 Bit and max. counting frequency 200 kHz	16	300	—	Outputs sink type
QD62E	2 Inputs (5/12/24 V DC); Counting range 32 Bit and max. counting frequency 200 kHz	16	330	—	Outputs source type
QD62D	2 differential inputs (5/12/24 V DC); Counting range 32 Bit and max. counting frequency 500 kHz	16	380	—	Outputs sink type
QD60P8-G	8 Inputs (5/12/24 V DC); Counting range 16/32 Bit and max. counting frequency 30 kHz	32	580	—	—
Q63P6	6 Inputs (5 V DC); Counting range 32 Bit and max. counting frequency 200 kHz	32	590	—	—
Positioning modules					
QD70P4	4 axis positioning module with pulse output	32	550	65	—
QD70P8	8 axis positioning module with pulse output	32	740	120	—
QD75D1	1 axis positioning module with pulse output	32	520	—	—
QD75P1	1 axis positioning module with pulse output	32	400	—	—
QD75D2	2 axis positioning module with differential driver output	32	560	—	—
QD75P2	2 axis positioning module with pulse output	32	460	—	—
QD75D4	4 axis positioning module with differential driver output	32	820	—	—
QD75P4	4 axis positioning module with pulse output	32	580	—	—
QD75M1	1 axis positioning module, SSCNET	32	400	—	SSCNET interface
QD75M2	2 axis positioning module, SSCNET	32	400	—	
QD75M4	4 axis positioning module, SSCNET	32	400	—	
Analog input/output modules					
Q62AD-DGH	Analog input module with 2 inputs (4 to 20 mA)	16	220	—	—
Q64AD	Analog input modules with 4 inputs (0 to 20 mA; –10 to +10 V DC)	16	630	—	—
Q64AD-GH		16	890	—	—
Q66AD-DG	Analog input module with 6 inputs (0 to 20 mA or 4 to 20 mA)	16	420	360	Isolated channels
Q68AD-G	Analog input modules with 8 inputs (0 to 20 mA; –10 to +10 V DC)	16	460	—	
Q68ADV	Analog input module with 8 inputs (–10 to +10 V DC)	16	640	—	—
Q68ADI	Analog input module with 8 inputs (0 to 20 mA)	16	640	—	—
ME1AD8HAI-Q	Analog input module with 8 inputs (0 to 20 mA or 4 to 20 mA) and function of a HART-Master station	32	320	300	—
Q62DA	Analog output modules with 2 outputs (0 to 20 mA; –10 to +10 V DC)	16	330	120	—
Q62DA-FG		16	370	300	Isolated channels
Q62DAN		16	330	150	—
Q64DA	Analog output module with 4 outputs (0 to 20 mA; –10 to +10 V DC)	16	340	180	—
Q64DAN		16	340	240	
Q66DA-G	Analog output module with 6 outputs (0 to 22 mA; –12 to +12 V DC)	16	620	220	Isolated channels
Q68DAV	Analog output module with 8 outputs (–10 to +10 V DC)	16	390	190	—
Q68DAVN		16	380	200	
Q68DAI	Analog output module with 8 outputs (0 to 20 mA)	16	380	280	—
Q68DAIN		16	380	270	

Tab. 3-3: *Special function modules*

Type	Description	No. of occupied I/O points	Power consumption (mA)		Note
			5 V DC	24 V DC	
Temperature control modules					
Q64TCRT	Temperature control module with 4 channels 1 transistor output and 1 Pt100 input per channel	16	550	—	—
Q64TCRTBW	Temperature control module with 4 channels 1 transistor output and 1 Pt100 input per channel Broken wire detection	32	640	—	occupies 2 slots
Q64TCTT	Temperature control module with 4 channels 1 transistor output and 1 thermocouple input per channel	16	550	—	—
Q64TCTTBW	Temperature control module with 4 channels 1 transistor output and 1 thermocouple input per channel Broken wire detection	32	640	—	occupies 2 slots
Temperature acquisition modules					
Q64TD	Temperature acquisition modules with 4 channels 1 thermocouple input per channel	16	500	—	—
Q64TDV-GH		16	500	—	Isolated channels
Q68TD-G-H01/H02	Temperature acquisition module with 8 channels 1 thermocouple input per channel	16	490	—	
Q64RD	Temperature acquisition module with 4 channels 1 Pt100- or JPt100 input per channel	16	600	—	—
Q64RD-G	Temperature acquisition module with 4 channels 1 Pt100-, JPt100 or Ni100 input per channel	16	620	—	Isolated channels
Q68RD3-G	Temperature acquisition module with 4 channels 1 Pt100-, JPt100 or Ni100 input per channel	16	540	—	
Loop control module					
Q62HLC	Loop control module with 2 channels, 1 thermocouple input, 1 voltage (–100 to +100 mV DC; –10 to +10 V DC) or current (0 to 20 mA DC) input per channel 1 current output (4 to 20 mA) per channel	16	270	70	—
Load cell input module					
Q61LD	Module for direct connection of load cells	16	480	—	—
High speed data logger module					
QD81DL96	Module for status logging of PLC devices	32	460	—	—
Interrupt module					
QI60	Interrupt module with 16 inputs	16	60	—	Positive common type

Tab. 3-3: *Special function modules*

Communication- , interface- and remote modules

Type	Description	No. of occupied I/O points	Power consumption (mA)		Note
			5 V DC	24 V DC	
Q series Ethernet interface module					
QJ71E71-B5	ETHERNET module (Client/Server) with 10BASE5 interface	32	500	—	Up to 4 modules per CPU
QJ71E71-B2	ETHERNET module (Client/Server) with 10BASE2 interface	32	700	—	
QJ71E71-100	ETHERNET module (Client/Server) with 10BASE-T- and 100BASE-TX interface	32	500		
Q series MELSECNET/10 and MELSECNET/H network module					
QJ71BR11	MELSECNET/H module (Master/local station), token bus, coaxial bus system	32	750	—	Up to 4 modules per CPU
QJ71LP21-25	MELSECNET/H module (Floating Master) Token ring, optical ring system	32	550	—	
QJ71LP21G					
QJ71LP21GE					
QJ72LP25-25	MELSECNET/H module (Slave module) Token-Ring, optical ring system	32	850	—	
QJ72LP25G					
QJ72LP25GE					
Q80BD71BR11	Interface board for personal computer Token bus, coaxial bus system	—	670	—	PC boards
Q80BD71LP21G	Interface boards for personal computer Token ring, optical ring system	—	450	—	
Q80BD71LP21-25		—	460	—	
Q80BD71LP21GE		—	450	—	
CC-Link communication modules					
QJ61BT11N	CC-Link Master/local station	32	460	—	Up to 4 modules per CPU
A80BDE-J61BT11	Interface board for personal computer CC-Link Master/local station	—	400	—	PC boards
A80BDE-J61BT13	Interface board for personal computer CC-Link local station	—	400	—	
AJ65SBTB1-8D	Remote module with 8 digital inputs (24 V DC)	8	—		—
AJ65BTB1-16D	Remote module with 16 digital inputs (24 V DC)	16	—	60	—
AJ65BTB2-16D	Remote module with 16 digital inputs (24 V DC)	16	—	60	—
AJ65SBTB1-16D1	Remote module with 16 digital inputs (24 V DC)	16	—		—
AJ65FBTA4-16DE	Remote module with 16 digital inputs	16	—		Protection IP67
AJ65BTC1-32D	Remote module with 32 digital inputs (24 V DC)	32	—	70	—
AJ65SBTB1-32D1	Remote module with 32 digital inputs (24 V DC)	32	—		—
AJ65BTB1-16DT	Remote module with 8 digital inputs (24 V DC) and 8 digital outputs (24 V DC; 0.5 A/channel, 4 A total)	16	—	70	—
AJ65FBTA42-16DTE	Remote module with 8 digital inputs and 8 digital outputs	16	—		Protection IP67
AJ65SBTB1-8TE	Remote module with 8 digital outputs (12/24 V DC; 0.1 A/channel)	8	—		—
AJ65SBTB2N-8R	Remote module with 8 relay outputs (24 V DC/240 V AC; 2A)	8	—		—
AJ65BTB1-16T	Remote module with 16 digital outputs (12/24 V DC; 0.5 A/channel, 4 A total)	16	—	80	—
AJ65SBTB2N-16R	Remote module with 16 relay outputs (24 V DC/240 V AC; 2 A)	16	—		—
AJ65BTC1-32T	Remote module with 32 digital outputs (12/24 V DC; 0.1 A/channel, 2 A total)	32	115	—	—

Tab. 3-4: *Communication- , interface- and remote modules*

Type	Description	No. of occupied I/O points	Power consumption (mA)		Note
			5 V DC	24 V DC	
CC-Link communication modules (continued)					
AJ65BTB2-16R	Remote module with 16 relay outputs (24 V DC/240 V AC; 2 A/channel, 8 A total)	16	85	—	—
AJ65BT-64AD	Remote analog input module with 4 inputs (–20 to 20 mA; –10 to 10 V DC)	2 Stat.	—	120	—
AJ65BT-64DAV	Remote analog output module with 4 outputs (–10 to +10 V DC)	2 Stat.	—	180	—
AJ65BT-64DAI	Remote analog output module with 4 outputs (4 to 20 mA)	2 Stat.	—	270	—
AJ65BT-64RD3	Remote module for temperature measurement with 4-channel input (3-wire-type Pt100)	4 Stat.	—	170	—
AJ65BT-64RD4	Remote module for temperature measurement with 4-channel input (4-wire-type Pt100)	4 Stat.	—	170	—
AJ65BT-68TD	Remote module for temperature measurement with 8-channel thermocouple input	4 Stat.	—	81	—
AJ65BT-D62	Remote High speed counter module 2 Inputs; Counting range 23 Bit and max. counting frequency 200 kHz	4 Stat.	—	70	—
AJ65BT-D62D	Remote High speed counter module 2 Inputs; Counting range 23 Bit and max. counting frequency 400 kHz	4 Stat.	—	100	—
AJ65BT-D62D-S1	Remote High speed counter module 2 differential inputs; Counting range 23 Bit and max. counting frequency 400 kHz	4 Stat.	—	120	—
AJ65BT-R2	Remote interface module with RS232C interface	1 Stat.	—	110	—
AJ65BT-D75P2-S3	Remote 2 axis positioning module with pulse output	4 Stat.	—	300	—
FR-A5NC FR-E5NC	CC-Link interface for frequency inverters FR-A500 and FR-E500	1 Stat.	—	—	—
DeviceNet communication module					
QJ71DN91	Master for DeviceNet	32	170	—	—
PROFIBUS communication modules					
QJ71PB92D	Master for PROFIBUS/DP	32	570	—	—
QJ71PB92V	Master for PROFIBUS/DP (V1/V2 protocol)	32	570	—	
QJ71PB93D	Slave for PROFIBUS/DP	32	360	—	—
AJ95FPBA2-16TE	PROFIBUS/DP slave with 16 outputs (24 V DC; 1 A/channel)	16	—		Protection IP67
AJ95TB32-16DT	PROFIBUS/DP slave with 8 inputs (24 V DC) and 8 outputs (24 V DC; 0.8 A/channel)	8 + 8	—	18	—
AJ95FPBA42-16DTE	PROFIBUS/DP slave with 8 inputs and 8 outputs	8 + 8	—		—
ST1PSD	ST series power supply module for supplying 5 V DC to the head station and to other modules and distribution of 24 V DC; input voltage: 24 V DC	2 + 2	—	—	—
ST1PDD	ST series power supply module for supplying the I/O modules with 24 V DC; input voltage: 24 V DC	2 + 2	—	—	—
ST1H-PB	PROFIBUS/DP slave, ST series base module (head station)	—	530	—	—
ST1X2-DE1	ST series input module with 2 digital inputs (24 V DC)	2 + 2	85	—	—
ST1X4-DE1	ST series input module with 4 digital inputs (24 V DC)	4 + 4	95	—	—
ST1X16-DE1	ST series input module with 16 digital inputs (24 V DC)	16 + 16	120	—	—
ST1Y2-TE2	ST series output module with 2 transistor outputs (24 V DC; 0.5 A/output; 1 A total)	2 + 2	90	—	—

Tab. 3-4: *Communication- , interface- and remote modules*

Type	Description		No. of occupied I/O points	Power consumption (mA)		Note
				5 V DC	24 V DC	
PROFIBUS communication modules (continued)						
ST1Y16-TE2	ST series output module with 16 transistor outputs (24 V DC; 0.5 A/output; 4 A total)		16 + 16	150	—	—
ST1Y2-TPE3	ST series output module with 2 transistor outputs (24 V DC; 1 A/output; 2 A total)		2 + 2	95	—	—
ST1Y16-TPE3	ST series output module with 16 transistor outputs (24 V DC; 1 A/output; 4 A total)		16 + 16	160	—	—
ST1Y2-R2	ST series output module with 2 relay outputs (24 V DC/240 V AC; 2 A/output; 4 A total)		2 + 2	90	—	—
ST1AD2-V	ST series analog input module with 2 voltage inputs (–10 to +10 V)		4 + 4	95	—	—
ST1AD2-I	ST series analog input module with 2 current inputs (0 to 20 mA, 4 to 20 mA)		4 + 4	95	—	—
ST1DA2-V	ST series output module with 2 voltage outputs (–10 to +10 V)		4 + 4	95	—	—
ST1DA2-I	Analog output module with 2 current outputs (0 to 20 mA, 4 to 20 mA)		4 + 4	95	—	—
ST1TD2	ST series analog temperature input module with 2-channel thermocouple input		4 + 4	95	—	—
AS-I communication modules						
QJ71AS92	Master for AS-I		32	570	—	—
MC-ASI-PS	AS-I bus power supply module (Input voltage: 230 V AC Output 30.5 V DC, 2.8 A)		—	—	—	—
MC-ASI X4M12	AS-I module with 4 digital inputs (12–24 V DC)		4	—	max. 250	The stated power consumption is valid with a supply voltage of 26.5 to 31.6 V.
MC-ASI X8M12	AS-I module with 8 digital inputs (12–24 V DC)		8	—	max. 250	
MC-ASI Y4M12-05	AS-I module with 4 digital outputs (Ub–0.8 V DC, 0.5 A/output; 2 A total)		4	—	max. 50	see below
MC-ASI Y4M12-2	AS-I module with 4 digital outputs (Ub–0.8 V DC, 2 A/output; 4 A total)		4	—	max. 50	
MC-ASI Y8M12	AS-I module with 8 digital outputs (Ub–0.8 V DC, 0.5 A/output; 4 A total)		8	—	max. 50	
MC-ASI X2Y2M12	AS-I module with 2 digital inputs (12–24 V DC) and 2 digital outputs (Ub–0.8 V DC, 2 A/output; 4 A total)		4	—	max. 250	
MC-ASI X4Y4M12	AS-I module with 4 digital inputs (12–24 V DC) and 4 digital outputs (Ub–0.8 V DC, 0.5 A/output; 2 A total)			—	max. 250	
The stated power consumption of the modules is valid with a supply voltage of 26.5 to 31.6 V. The output voltage of the output modules is maximum Ub–0.8 V.						
Interface modules						
QJ71C24N	Interface module with 1 RS232C and 1 RS422/485 interface		32	280	—	—
QJ71C24N-R2	Interface module with 2 RS232C interfaces		32	240	—	—
QJ71C24N-R4	Interface module with 2 RS422/485 interfaces		32	390	—	—
QD51-R24	High speed communication module (programmable)	Interfaces: 1 RS232C 1 RS422/485	32	310	—	—
QD51		Interfaces: 2 RS232C	32	260	—	—

Tab. 3-4: *Communication- , interface- and remote modules*

Base units and accessories

Type	Description	Note
Main base units		
Q32SB	For power supply module, CPU and up to 2 modules	• Slim type main base unit • It is not possible to connect an extension base unit.
Q33SB	For power supply module, CPU and up to 3 modules	
Q35SB	For power supply module, CPU and up to 5 modules	
Q33B-E	For power supply module, CPU and up to 3 modules	• Connection of extension base units possible
Q35B-E	For power supply module, CPU and up to 5 modules	
Q38B-E	For power supply module, CPU and up to 8 modules	
Q38DB	For power supply module, CPU and up to 8 modules	• Connection of extension base units possible • Multiple CPU high speed transmission base unit
Q38RB-E	For 2 redundant power supply modules, CPU and up to 8 modules	• Connection of extension base units possible
Q312B-E	For power supply module, CPU and up to 12 modules	
Q312DB	For power supply module, CPU and up to 8 modules	• Connection of extension base units possible • Multiple CPU high speed transmission base unit
Extension base units		
Q52B	For up to 2 modules	• Without power supply, connect only with cable QC05B
Q55B	For up to 5 modules	
Q63B	For up to 3 modules	• Depending on the CPU type are up to 7 extension base units connectible to the main base unit with maximum 64 slots totally.
Q65B	For up to 5 modules	
Q65WRB	For 2 redundant power supply modules and up to 5 modules (redundant local I/O of a redundant system)	
Q68B	For power supply module and up to 8 modules	
Q68RB-E	For 2 redundant power supply modules and up to 8 modules	
Q612B	For power supply module and up to 12 modules	
Connection cable		
QC05B	Cable length: 0.45 m	• For connecting Q52B and Q55B only
QC06B	Cable length: 0.6 m	• For connecting the base units
QC12B	Cable length: 1.2 m	
QC30B	Cable length: 3 m	
QC50B	Cable length: 5 m	
QC100B	Cable length: 10 m	
Tracking cable		
QC10TR	Cable length: 1 m	For connecting the 2 CPU modules of a redundant system.
QC30TR	Cable length: 3 m	

Tab. 3-5: *Base units and accessories*

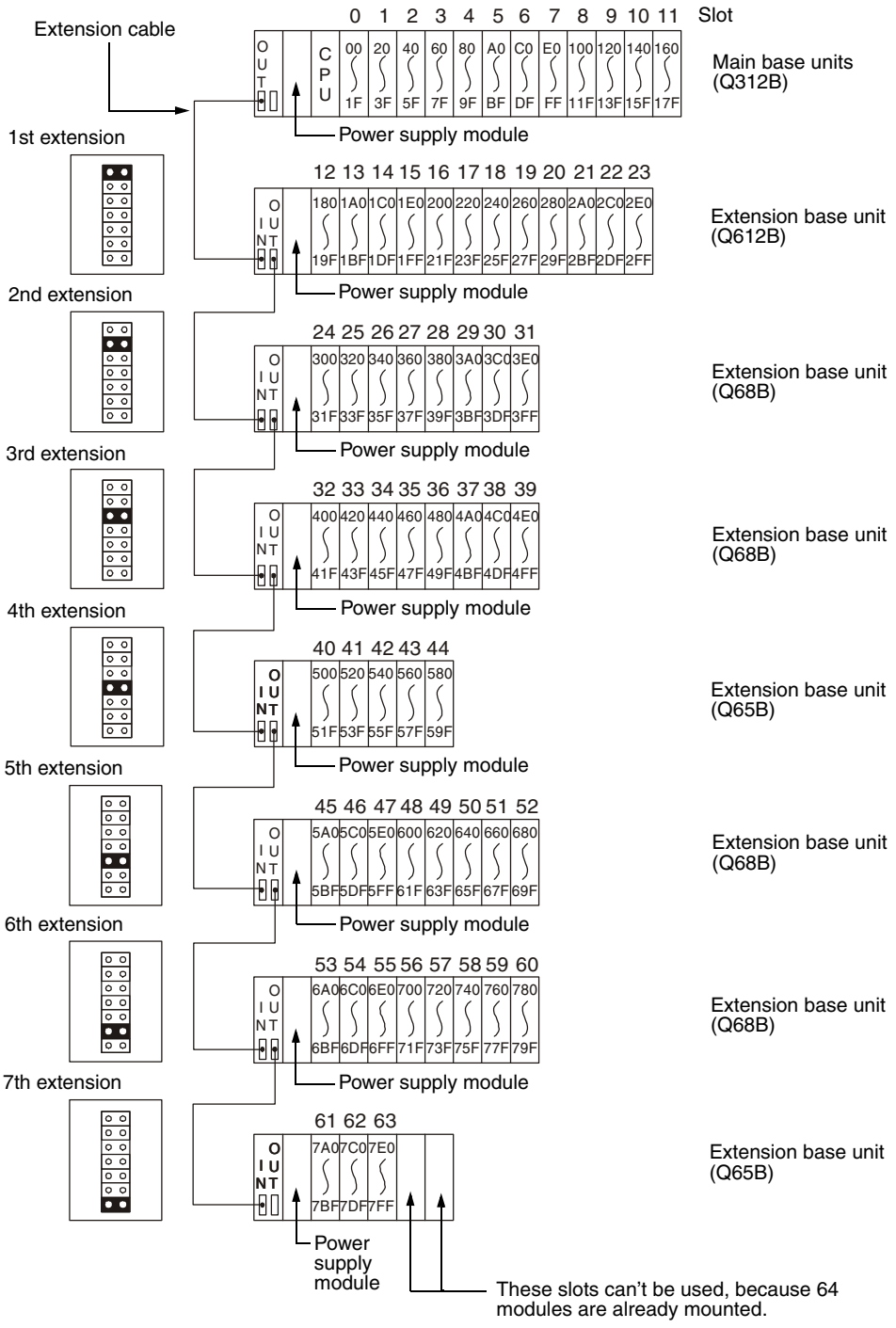
Type	Description	Note
Memory cards		
Q2MEM-1MBS	1 MByte SRAM	—
Q2MEM-2MBS	2 MByte SRAM	—
Q3MEM-4MBS	4 MByte SRAM	For Universal model QCPU only
Q3MEM-8MBS	8 MByte SRAM	
Q2MEM-2MBF	2 MByte Flash card	—
Q2MEM-4MBF	4 MByte Flash card	—
Q2MEM-8MBA	8 MByte ATA memory card	—
Q2MEM-16MBA	16 MByte ATA memory card	—
Q2MEM-32MBA	32 MByte ATA memory card	—
Memory card adapter		
Q2MEM-ADP		Memory card adapter for PCMCIA slot
Batteries		
Q6BAT	Buffer battery for CPU module	The battery is shipped together with the CPU.
Q2MEM-BAT	Memory card Q2MEM-1MBS buffer battery	—
Connector disconnection prevention holder for RS232 cable		
Q6HLD-R2	Mechanical fixing device for connector	This is recommended, when a cable is connected permanently to the RS232 interface, e. g. for connection to a GOT.

Tab. 3-5: *Base units and accessories*

3.2.2 Outline of system configuration

System configuration

The figure shows a configuration with one main base unit and extension base units of the MELSEC System Q. A High performance model CPU (Q02(H)- to Q25HCPU), a Universal model CPU (Q02U- to Q26UD(E)HCPU) or a Process CPU (Q02PH- to Q25PHCPU) is used.



Tab. 3-6: *System configuration*

System configuration	
Maximum number of extension stages	Q00JCPU, Q00UJCPU : 2 extension stages Q00CPU, Q01CPU, Q00UCPU, Q01UCPU, Q02UCPU: 4 extension stages Q02(H)CPU, Q06HCPU, Q12HCPU, Q25HCPU Q03UD(E)CPU, Q04UD(E)HCPU, Q06UD(E)HCPU Q10UD(E)HCPU, Q13UD(E)HCPU; Q20UD(E)HCPU Q26UD(E)HCPU, Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25HCPU : 7 extension stages
Maximum number of mountable I/O modules	Q00JCPU, Q00UJCPU : 16 Q00CPU, Q01CPU, Q00UCPU, Q01UCPU : 24 Q02UCPU : 36 Q02(H)CPU, Q06HCPU, Q12HCPU, Q25HCPU Q03UD(E)CPU, Q04UD(E)HCPU, Q06UD(E)HCPU Q10UD(E)HCPU, Q13UD(E)HCPU; Q20UD(E)HCPU Q26UD(E)HCPU, Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25HCPU : 64
Number of occupied I/O points	Q00JCPU, Q00UJCPU : 256 Q00CPU, Q01CPU, Q00UCPU, Q01UCPU : 1024 Q02UCPU : 2048 Q02(H)CPU, Q06CPU, Q12HCPU, Q25HCPU Q03UD(E)CPU, Q04UD(E)HCPU, Q06UD(E)HCPU Q10UD(E)HCPU, Q13UD(E)HCPU; Q20UD(E)HCPU Q26UD(E)HCPU, Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25HCPU : 4096
Main base units	• Q32SB, Q33SB, Q35SB • Q33B, Q35B, Q38B, Q312B • Q38DB, Q312DB • Q38RB
Extension base units	• Q52B, Q55B • Q63B, Q65B, Q68B, Q612B • Q68RB
Extension cable	QC05B (0.45 m), QC06B (0.6 m), QC12B (1.2 m), QC30B (3.0 m), QC50B (5.0 m), QC100B (10.0 m)
Notes	• Note the maximum number of extension base units, which are connectable to the main base unit. • Depending on the CPU type, 16, 24, 36 or 64 modules can be mounted on the main and on the extension base units. An error occurs, when the maximum number of modules is exceeded. • The overall length of extension cables must not be longer than 13.2 m. • Connect the OUT connector of an extension base unit and the IN connector of the adjacent extension base unit by an extension cable. • Do not lay tracking cables close together or close to main circuit power lines, high-voltage power lines, or load lines. • Set the extension stage numbers consecutively. Set an unique number for each extension base. • The extension base units Q38RB, Q68RB have slots for two redundant power supplies Q63RP or Q64RP. • The slim type main base units Q32SB, Q33SB and Q35SB can't be connected to extension base unit. • The process CPU modules Q02PH-, Q06PH-, Q12PH- and Q25PHCPU can't be mounted on the slim type main base units Q32SB, Q33SB and Q35SB.

Tab. 3-6: *System configuration*

4 CPU modules

4.1 Devices

The names and data ranges of devices which can be used in the CPU module are shown in the following tables.

4.1.1 Basic model QCPU

Device name		Range (total number)			Explanation
		Q00JCPU	Q00CPU	Q01CPU	
X	Input	X0–7FF (No. of I/O device points: 2048) X0–FF (direct accessible: 256)	X0–7FF (total number of I/O points: 2048) X0–3FF (I/O points accessible via base units: 1024)		Input of external signals to the PLC, e. g. by key switch, rotary switch, limit switch, binary switch
Y	Output	Y0–7FF (No. of I/O device points: 2048) Y0–FF (direct accessible: 256)	Y0–7FF (total number of I/O points: 2048) Y0–3FF (I/O points accessible via base units: 1024)		Output of signals for control of external devices by program like magnetic valves, magnetic contactors, lamps, digital displays etc.
M	Special relay	SM0–1023 (1024)			Predefined devices for special applications and additional functions of the PLC.
	Internal relay*	M0–8191 (8192)			Auxiliary devices of the PLC
L	Latch relay*	L0–2047 (2048)			Auxiliary devices of the PLC Latch relays are buffered at power shut down
S	Step relay	S0–2047 (2048)			Application like M device, e. g. for marking one step number in a program for step operation of a process.
B	Link relay*	B0–3FF (1024)			Bit devices in a network, which can't be output directly
F	Annunciator*	F0–1023 (1024)			Flag for marking of an error. If the error flag is set by an error recognition program during RUN operation, the corresponding error code will be stored in the special relay SD.
V	Edge relay*	V0–2047 (2048)			This relay is set by the negativ or positiv edge of the operation result, depending on the instruction.
T	Timer*	T0–511 (512) The low- and high-speed timers are specified by the instructions.			Incremental timer Measurement unit of the low-speed retentive timers: 1 to 1000 ms, 1 ms unit (100 ms by default) Measurement unit of the high-speed retentive timers: 0.1 to 100.0 ms, 0.1 ms unit (10.0 ms by default)
T (ST)	Retentive timer*	Max. 512 The retentive timers are specified by parameters (preset to 0) The low- and high-speed retentive timers are specified by the instructions.			
C	Counter*	C0–511 (512)			Incremental counter for normal or interrupt processing
	Interrupt Counter*	Max. 128 (0 point by default, setting by parameters)			
D	Data register*	D0–11135 (11136)			Register for data storage
SD	Special register	SD0–1023 (1024)			Predefined register for storage of special data

Tab. 4-1: *Device list for Q00JCPU, Q00CPU and Q01CPU*

Device name		Range (total number)			Explanation
		Q00JCPU	Q00CPU	Q01CPU	
W	Link register*	W0–7FF (2048)			Register for Link data in a network
R	File register	—	R0–32767 (32768)		Extension of the data register area
			ZR0–32767 (32768)		
SB	Link special relay	SB0–3FF (1024)			Bit devices in a network
SW	Link special register	SW0–3FF (1024)			Register for Link data
Z	Index register	Z0–9 (10)			Register for indexing of devices
N	Nesting	N0–14 (15 Steps)			Displays the nesting of Master control processes
P	Pointer	P0–299 (300) The common pointer address is set by parameters.			Target of a jump instruction (CJ, SCJ, CALL, JMP)
I	Interrupt Pointer	I0–127 (128) The cyclic interval of system interrupt pointers I28 to 31 can be set up by parameters (2 to 1000 ms, 1 ms unit). Default values: I28: 100 ms; I29: 40 ms; I30: 20 ms; I31: 10 ms			Pointer for branching of interrupt programs
K	Decimal constant	• K -32768–32767 (16 bit instructions) • K -2147483648–2147483647 (32 bit instructions)			For specification of command values for timer and counter, pointer, interrupt pointer, number of bit devices and instruction values
H	Hexadecimal constant	• H0–FFFF (16 bit instruction) • H0–FFFFFFFF (32 bit instruction)			For specification of instruction values
FX	Function input	FX0–F (16)			Devices for the status of input or output bits for subroutines. Only FX0 to FX4 and FY0 to FY4 can be used in a program.
FY	Function output	FY0–F (16)			
FD	Function register	FD0–4 (5)			Status register for the input and output bits for subroutines
Link direct device		Specified form: J□□\X□□, J□□\Y□□, J□□\W□□, J□□\B□□, J□□\SW□□, J□□\SB□□			Device for accessing the link device directly. Exclusively used for CC-Link IE controller network and MELSECNET/H.
Intelligent function module device		Specified form: U□□\G□□			Device for accessing the buffer memory of the intelligent function module directly.

Tab. 4-1: *Device list for Q00JCPU, Q00CPU and Q01CPU*

* The address areas for these devices can be set with a programming device by parameters. The table shows the preset values.

4.1.2 High performance model QCPU

Device name		Range (total number)					Explanation
		Q02CPU	Q02HCPU	Q06HCPU	Q12HCPU	Q25HCPU	
X	Input	X0–1FFF (total number of I/O points: 8192) X0–0FFF (I/O points accessible via base units: 4096)					Input of external signals to the PLC, e. g. by key switch, rotary switch, limit switch, binary switch
Y	Output	Y0–1FFF (total number of I/O points: 8192) Y0–0FFF (I/O points accessible via base units: 4096)					Output of signals for control of external devices by program like magnetic valves, magnetic contactors, lamps, digital displays etc.
M	Special relay	SM0–2047 (2048)					Predefined devices for special applications and additional functions of the PLC.
	Internal relay*	M0–8191 (8192)					Auxiliary devices of the PLC
L	Latch relay*	L0–8191 (8192)					Auxiliary devices of the PLC Latch relays are buffered at power shut down
S	Step relay	S0–8191 (8192)					Application like M device, e. g. for marking one step number in a program for step operation of a process.
B	Link relay*	B0–1FFF (8192)					Bit devices in a network, which can't be output directly
F	Annunciator*	F0–2047 (2048)					Flag for marking of an error. If the error flag is set by an error recognition program during RUN operation, the corresponding error code will be stored in the special relay SD.
V	Edge relay*	V0–2047 (2048)					This relay is set by the negativ or positiv edge of the operation result, depending on the instruction.
T	Timer*	T0–2047 (2048) The low- and high-speed timers are specified by the instructions.					Incremental timer Measurement unit of the low-speed retentive timers: 1 to 1000 ms, 1 ms unit (100 ms by default) Measurement unit of the high-speed retentive timers: 0.1 to 100.0 ms, 0.1 ms unit (10.0 ms by default)
T (ST)	Retentive timer*	Max. 2048, The retentive timers are specified by parameters (preset to 0) The low- and high-speed retentive timers are specified by the instructions.					
C	Counter*	C0–1023 (1024)					Incremental counter for normal or interrupt processing
	Interrupt Counter*	Max. 256 (0 point by default, setting by parameters)					
D	Data register*	D0–12287 (12288)					Register for data storage
SD	Special register	SD0–2047 (2048)					Predefined register for storage of special data
W	Link register*	W0–1FFF (8192)					Register for Link data in a network

Tab. 4-2: *Device list for Q02(H)-, Q06H-, Q12H- and Q25HCPU*

Device name		Range (total number)					Explanation
		Q02CPU	Q02HCPU	Q06HCPU	Q12HCPU	Q25HCPU	
R	File register	• When using the internal RAM: R0–32767 (32768) for Q02CPU, R0–65535 (65536) for Q02H- and Q06HCPU, R0–131071 (131072) for Q12H- and Q25HCPU with block conversion in steps of 32768 registers • When using a 1 MB SRAM memory card: With block conversion in steps of 32768 registers, 517120 file registers are accessible. • When using a 2 MB Flash or 2 MB SRAM memory card: With block conversion in steps of 32768 registers, 1041408 file registers are accessible. • When using a 4 MB Flash memory card: With block conversion in steps of 32768 registers, 1042432 file registers are accessible.					Extension of the data register area When using a Flash memory card only reading of the file registers is possible. It's not possible to use an ATA memory card.
		• When using the internal RAM: ZR0–32767 (32768) for Q02CPU, ZR0–65535 (65536) for Q02H- and Q06HCPU, ZR0–131071 (131072) for Q12H- and Q25HCPU (Block conversion is not necessary) • When using a 1 MB SRAM memory card: ZR0–517119 (517120), Block conversion is not necessary. • When using a 2 MB Flash- or 2 MB SRAM memory card: ZR0–1041407 (1041408), Block conversion is not necessary. • When using a 4 MB Flash memory card: ZR0–1042431 (1042432), Block conversion is not necessary.					
SB	Link special relay	SB0–7FF (2048)					Bit devices in a network
SW	Link special register	SW0–7FF (2048)					Register for Link data
Z	Index register	Z0–15 (16)					Register for indexing of devices
N	Nesting	N0–14 (15 Steps)					Displays the nesting of Master control processes
P	Pointer	P0–4095 (4096) The common pointer address is set by parameters.					Target of a jump instruction (CJ, SCJ, CALL, JMP)
I	Interrupt Pointer	I0–255 (256) The constant cyclic interval of system interrupt pointers I28 to 31 can be set up by parameters (0.5 to 1000 ms, 0.5 ms unit). Default values: I28: 100 ms; I29: 40 ms; I30: 20 ms; I31: 10 ms					Pointer for branching of interrupt programs
K	Decimal constant	• K -32768–32767 (16 bit instructions) • K -2147483648–2147483647 (32 bit instructions)					For specification of command values for timer and counter, pointer, interrupt pointer, number of bit devices and instruction values
H	Hexadecimal constant	• H0–FFFF (16 bit instruction) • H0–FFFFFFFF (32 bit instruction)					For specification of instruction values
FX	Function input	FX0–F (16)					Device for the status of input bits for subroutines.
FY	Function output	FY0–F (16)					Device for the status of output bits for subroutines.
FD	Function register	FD0–4 (5)					Status register for the input and output bits for subroutines
Link direct device		Specified form: J□□\X□□, J□□\Y□□, J□□\W□□, J□□\B□□, J□□\SW□□, J□□\SB□□					Device for accessing the link device directly. Exclusively used for CC-Link IE controller network and MELSECNET/H.
Intelligent function module device		Specified form: U□□\G□□					Device for accessing the buffer memory of the intelligent function module directly.

Tab. 4-2: *Device list for Q02(H)-, Q06H-, Q12H- and Q25HCPU*

* The address areas for these devices can be set with a programming device by parameters. The table shows the preset values.

4.1.3 Universal model QCPU

Q00UJCPU, Q00UCPU, Q01UCPU

Device name		Range (total number)			Explanation
		Q00UJCPU	Q00UCPU	Q01UCPU	
X	Input	X0–1FFF (No. of I/O device points: 8192) X0–FF (direct accessible: 256)	X0–1FFF (total number of I/O points: 8192) X0–3FF (I/O points accessible via base units: 1024)		Input of external signals to the PLC, e. g. by key switch, rotary switch, limit switch, binary switch
Y	Output	Y0–7FF (No. of I/O device points: 2048) Y0–FF (direct accessible: 256)	Y0–7FF (total number of I/O points: 2048) Y0–3FF (I/O points accessible via base units: 1024)		Output of signals for control of external devices by program like magnetic valves, magnetic contactors, lamps, digital displays etc.
M	Special relay	SM0–2047 (2048)			Predefined devices for special applications and additional functions of the PLC.
	Internal relay*	M0–8191 (8192)			Auxiliary devices of the PLC
L	Latch relay*	L0–8191 (8192)			Auxiliary devices of the PLC Latch relays are buffered at power shut down
S	Step relay	S0–8191 (8192)			Application like M device, e. g. for marking one step number in a program for step operation of a process.
B	Link relay*	B0–1FFF (8192)			Bit devices in a network, which can't be output directly
F	Annunciator*	F0–2047 (2048)			Flag for marking of an error. If the error flag is set by an error recognition program during RUN operation, the corresponding error code will be stored in the special relay SD.
V	Edge relay*	V0–2047 (2048)			This relay is set by the negativ or positiv edge of the operation result, depending on the instruction.
T	Timer*	T0–2047 (2048) The low- and high-speed timers are specified by the instructions.			Incremental timer Measurement unit of the low-speed retentive timers: 1 to 1000 ms, 1 ms unit (100 ms by default) Measurement unit of the high-speed retentive timers: 0.1 to 100.0 ms, 0.1 ms unit (10.0 ms by default)
T (ST)	Retentive timer*	The retentive timers are specified by parameters (preset to 0). The low- and high-speed retentive timers are specified by the instructions.			
C	Counter*	C0–1023 (1024)			Incremental counter for normal or interrupt processing
D	Data register*	D0–12287 (12288)			Register for data storage
	Extended data register*		Specified by parameters (preset to 0).		
SD	Special register	SD0–2047 (2048)			Predefined register for storage of special data
W	Link register*	W0–1FFF (8192)			Register for Link data in a network
	Extended link register*	—	Specified by parameters (preset to 0).		

Tab. 4-3: *Device list for Q00UJCPU, Q00UCPU and Q01UCPU*

Device name		Range (total number)			Explanation
		Q00UJCPU	Q00UCPU	Q01UCPU	
R	File register	—	R0–32767 (32768) With block conversion in steps of 32768 registers, 65536 file registers are accessible.		Extension of the data register area
			ZR0–65535 (65536); Block conversion is not necessary.		
SB	Link special relay	SB0–7FF (2048)			Bit devices in a network
SW	Link special register	SW0–1FF (2048)			Register for Link data
Z	Index register	Z0–19 (20)			Register for indexing of devices
	32 Bit-Index register	—	Z0–18 (10) (Two index registers are each combined in one word)		
N	Nesting	N0–14 (15 Steps)			Displays the nesting of Master control processes
P	Pointer	P0–511 (512) The common pointer address is set by parameters.			Target of a jump instruction (CJ, SCJ, CALL, JMP)
I	Interrupt Pointer	I0–127 (128) The constant cyclic interval of system interrupt pointers I28 to 31 can be set up by parameters (0.5 to 1000 ms, 0.5 ms unit). Default values: I28: 100 ms; I29: 40 ms; I30: 20 ms; I31: 10 ms			Pointer for branching of interrupt programs
K	Decimal constant	• K -32768–32767 (16 bit instructions) • K -2147483648–2147483647 (32 bit instructions)			For specification of command values for timer and counter, pointer, interrupt pointer, number of bit devices and instruction values
H	Hexadecimal constant	• H0–FFFF (16 bit instruction) • H0–FFFFFFFF (32 bit instruction)			For specification of instruction values
FX	Function input	FX0–F (16)			Devices for the status of input or output bits for subroutines. Only FX0 to FX4 and FY0 to FY4 can be used in a program.
FY	Function output	FY0–F (16)			
FD	Function register	FD0–4 (5)			Status register for the input and output bits for subroutines
Link direct device		Specified form: J□□\X□□, J□□\Y□□, J□□\W□□, J□□\B□□, J□□\SW□□, J□□\SB□□			Device for accessing the link device directly. Exclusively used for CC-Link IE controller network and MELSECNET/H.
Intelligent function module device		Specified form: U□□\G□□			Device for accessing the buffer memory of the intelligent function module directly.

Tab. 4-3: *Device list for Q00UJCPU, Q00UCPU and Q01UCPU*

* The address areas for these devices can be set with a programming device by parameters. The table shows the preset values.

Q02UCPU, Q03UDCPU and Q03UDECPU

Device name		Range (total number)		Explanation
		Q02UCPU	Q03UDCPU Q03UDECPU	
X	Input	X0–1FFF (total number of I/O points: 8192) X0–07FF (I/O points accessible via base units: 2048)	X0–1FFF (total number of I/O points: 8192) X0–0FFF (I/O points accessible via base units: 4096)	Input of external signals to the PLC, e. g. by key switch, rotary switch, limit switch, binary switch
Y	Output	Y0–1FFF (total number of I/O points: 8192) Y0–07FF (I/O points accessible via base units: 2048)	Y0–1FFF (total number of I/O points: 8192) Y0–0FFF (I/O points accessible via base units: 4096)	Output of signals for control of external devices by program like magnetic valves, magnetic contactors, lamps, digital displays etc.
M	Special relay	SM0–2047 (2048)		Predefined devices for special applications and additional functions of the PLC.
	Internal relay*	M0–8191 (8192)		Auxiliary devices of the PLC
L	Latch relay*	L0–8191 (8192)		Auxiliary devices of the PLC Latch relays are buffered at power shut down
S	Step relay	S0–8191 (8192)		Application like M device, e. g. for marking one step number in a program for step operation of a process.
B	Link relay*	B0–1FFF (8192)		Bit devices in a network, which can't be output directly
F	Annunciator*	F0–2047 (2048)		Flag for marking of an error. If the error flag is set by an error recognition program during RUN operation, the corresponding error code will be stored in the special relay SD.
V	Edge relay*	V0–2047 (2048)		This relay is set by the negativ or positiv edge of the operation result, depending on the instruction.
T	Timer*	T0–2047 (2048) The low- and high-speed timers are specified by the instructions.		Incremental timer Measurement unit of the low-speed retentive timers: 1 to 1000 ms, 1 ms unit (100 ms by default) Measurement unit of the high-speed retentive timers: 0.1 to 100.0 ms, 0.1 ms unit (10.0 ms by default)
T (ST)	Retentive timer*	The retentive timers are specified by parameters (preset to 0). The low- and high-speed retentive timers are specified by the instructions.		
C	Counter*	C0–1023 (1024)		Incremental counter for normal or interrupt processing
D	Data register*	D0–12287 (12288)		Register for data storage
	Extended data register*	Specified by parameters (preset to 0).		
SD	Special register	SD0–2047 (2048)		Predefined register for storage of special data
W	Link register*	W0–1FFF (8192)		Register for Link data in a network
	Extended link register*	Specified by parameters (preset to 0).		

Tab. 4-4: *Device list of Q02UCPU, Q03UDCPU and Q03UDECPU*

Device name		Range (total number)		Explanation
		Q02UCPU	Q03UDCPU Q03UDECPU	
R	File register	• When using the internal RAM: R0–32767 (32768) with block conversion in steps of 32768 registers, 65536 (for Q02UCPU) resp. 98304 (for Q03UD(E)CPU) file registers are accessible. • When using a 1 MB SRAM memory card: With block conversion in steps of 32768 registers, 517120 file registers are accessible. • When using a 2 MB Flash or 2 MB SRAM memory card: With block conversion in steps of 32768 registers, 1040384 file registers are accessible. • When using a 4 MB Flash or 4 MB SRAM memory card: With block conversion in steps of 32768 registers, 2087936 file registers are accessible. • When using a 8 MB SRAM memory card: With block conversion in steps of 32768 registers, 4184064 file registers are accessible.		Extension of the data register area When using a Flash memory card only reading of the file registers is possible. It's not possible, to use an ATA memory card.
		• When using the internal RAM: ZR0–65535 (65536) for Q02UCPU, ZR0–98303 (98304) for Q03UD(E)CPU (Block conversion is not necessary.) • When using a 1 MB SRAM memory card: ZR0–517119 (517120), Block conversion is not necessary. • When using a 2 MB Flash or 2 MB SRAM memory card: ZR0–1041407 (1041408), Block conversion is not necessary. • When using a 4 MB Flash or 4 MB SRAM memory card: ZR0–2087935 (2087936), Block conversion is not necessary. • When using a 8 MB SRAM memory card: ZR0–4184063 (4184064), Block conversion is not necessary.		
SB	Link special relay	SB0–7FF (2048)		Bit devices in a network
SW	Link special register	SW0–7FF (2048)		Register for Link data
Z	Index register	Z0–19 (20)		Register for indexing of devices
	32 Bit-Index register	Z0–18 (10) (Two index registers are each combined in one word)		
N	Nesting	N0–14 (15 Steps)		Displays the nesting of Master control processes
P	Pointer	P0–4095 (4096) The common pointer address is set by parameters.		Target of a jump instruction (CJ, SCJ, CALL, JMP)
I	Interrupt Pointer	I0 –255 (256) The constant cyclic interval of system interrupt pointers I28 to 31 can be set up by parameters (0.5 to 1000 ms, 0.5 ms unit). Default values: I28: 100 ms; I29: 40 ms; I30: 20 ms; I31: 10 ms		Pointer for branching of interrupt programs
K	Decimal constant	• K -32768–32767 (16 bit instructions) • K -2147483648–2147483647 (32 bit instructions)		For specification of command values for timer and counter, pointer, interrupt pointer, number of bit devices and instruction values
H	Hexadecimal constant	• H0–FFFF (16 bit instruction) • H0–FFFFFFFF (32 bit instruction)		For specification of instruction values
FX	Function input	FX0–F (16)		Device for the status of input bits for subroutines.
FY	Function output	FY0–F (16)		Device for the status of output bits for subroutines.
FD	Function register	FD0–4 (5)		Status register for the input and output bits for subroutines

Tab. 4-4: *Device list of Q02UCPU, Q03UDCPU and Q03UDECPU*

Device name	Range (total number)		Explanation
	Q02UCPU	Q03UDCPU Q03UDECPU	
Link direct device	Specified form: J□□\X□□, J□□\Y□□, J□□\W□□, J□□\B□□, J□□\SW□□, J□□\SB□□		Device for accessing the link device directly. Exclusively used for CC-Link IE controller network and MELSECNET/H.
Intelligent function module device	Specified form: U□□\G□□		Device for accessing the buffer memory of the intelligent function module directly.

Tab. 4-4: *Device list of Q02UCPU, Q03UDCPU and Q03UDECPU*

* The address areas for these devices can be set with a programming device by parameters. The table shows the preset values.

Q04UD(E)HCPU, Q06UD(E)HCPU, Q10UD(E)HCPU, Q13UD(E)HCPU, Q20UD(E)HCPU and Q26UD(E)CPU

Device name		Range (total number)						Explanation
		Q04UDH	Q06UDH	Q10UDH	Q13UDH	Q20UDH	Q26UDH	
		Q04UDEH	Q06UDEH	Q10UDEH	Q13UDEH	Q20UDEH	Q26UDEH	
X	Input	X0–1FFF (total number of I/O points: 8192) X0–0FFF (I/O points accessible via base units: 4096)						Input of external signals to the PLC, e. g. by key switch, rotary switch, limit switch, binary switch
Y	Output	Y0–1FFF (total number of I/O points: 8192) Y0–0FFF (I/O points accessible via base units: 4096)						Output of signals for control of external devices by program like magnetic valves, magnetic contactors, lamps, digital displays etc.
M	Special relay	SM0–2047 (2048)						Predefined devices for special applications and additional functions of the PLC.
	Internal relay*	M0–8191 (8192)						Auxiliary devices of the PLC
L	Latch relay*	L0–8191 (8192)						Auxiliary devices of the PLC Latch relays are buffered at power shut down
S	Step relay	S0–8191 (8192) No. of step relays can be changed in the parameters for CPUs beginning at serial no. 10042						Application like M device, e. g. for marking one step number in a program for step operation of a process.
B	Link relay*	B0–1FFF (8192)						Bit devices in a network, which can't be output directly
F	Annunciator*	F0–2047 (2048)						Flag for marking of an error. If the error flag is set by an error recognition program during RUN operation, the corresponding error code will be stored in the special relay SD.
V	Edge relay*	V0–2047 (2048)						This relay is set by the negativ or positiv edge of the operation result, depending on the instruction.
T	Timer*	T0–2047 (2048) The low- and high-speed timers are specified by the instructions.						Incremental timer Measurement unit of the low-speed retentive timers: 1 to 1000 ms, 1 ms unit (100 ms by default) Measurement unit of the high-speed retentive timers: 0.1 to 100.0 ms, 0.1 ms unit (10.0 ms by default)
T (ST)	Retentive timer*	The retentive timers are specified by parameters (preset to 0). The low- and high-speed retentive timers are specified by the instructions.						
C	Counter*	C0–1023 (1024)						Incremental counter for normal or interrupt processing
D	Data register*	D0–12287 (12288)						Register for data storage
	Extended data register*	Specified by parameters (preset to 0).						
SD	Special register	SD0–2047 (2048)						Predefined register for storage of special data
W	Link register*	W0–1FFF (8192)						Register for Link data in a network
	Extended link register*	Specified by parameters (preset to 0).						

Tab. 4-5: *Device list of CPU types Q04UD(E)H to Q26UD(E)H*

Device name		Range (total number) Q04UDH Q06UDH Q10UDH Q13UDH Q20UDH Q26UDH / Q04UDEH Q06UDEH Q10UDEH Q13UDEH Q20UDEH Q26UDEH	Explanation
R	File register	• When using the internal RAM: R0–32767 (32768) with block conversion in steps of 32768 registers, 131072 (for Q04UD(E)HCPU), 393216 (for Q06UD(E)CPU), 524288 (for Q10UD(E)CPU and Q13UD(E)CPU) or 655360 (for Q20UD(E)CPU and Q26UD(E)CPU) file registers are accessible. • When using a 1 MB SRAM memory card: with block conversion in steps of 32768 registers, 517120 file registers are accessible. • When using a 2 MB Flash or 2 MB SRAM memory card: with block conversion in steps of 32768 registers, 1041408 file registers are accessible. • When using a 4 MB Flash or 4 MB SRAM memory card: with block conversion in steps of 32768 registers, 2087936 file registers are accessible. • When using a 8 MB SRAM memory card: with block conversion in steps of 32768 registers, 4184064 file registers are accessible.	Extension of the data register area When using a Flash memory card only reading of the file registers is possible. It's not possible, to use an ATA memory card.
		• When using the internal RAM: ZR0–131071 (131072) for Q04UD(E)HCPU, ZR0–393215 (393216) for Q06UD(E)HCPU, ZR0–524287 (524288) for Q10UD(E)-/ Q13UD(E)CPU ZR0–655359 (655359) for Q20UD(E)-/ Q26UD(E)CPU Block conversion is not necessary. • When using a 1 MB SRAM memory card: ZR0–517119 (517120), Block conversion is not necessary. • When using a 2 MB Flash or 2 MB SRAM memory card: ZR0–1041408 (1041407), Block conversion is not necessary. • When using a 4 MB Flash or 4 MB SRAM memory card: ZR0–2087935 (2087936), Block conversion is not necessary. • When using a 8 MB SRAM memory card: ZR0–4184063 (4184064), Block conversion is not necessary.	
SB	Link special relay	SB0–7FF (2048)	Bit devices in a network
SW	Link special register	SW0–7FF (2048)	Register for Link data
Z	Index register	Z0–19 (20)	Register for indexing of devices
	32 Bit-Index register	Z0–18 (10) (Two index registers are each combined in one word)	
N	Nesting	N0–14 (15 Steps)	Displays the nesting of Master control processes
P	Pointer	P0–4095 (4096) The common pointer address is set by parameters.	Target of a jump instruction (CJ, SCJ, CALL, JMP)
I	Interrupt Pointer	I0 –255 (256) The constant cyclic interval of system interrupt pointers I28 to 31 can be set up by parameters (0.5 to 1000 ms, 0.5 ms unit). Default values: I28: 100 ms; I29: 40 ms; I30: 20 ms; I31: 10 ms	Pointer for branching of interrupt programs
K	Decimal constant	• K -32768–32767 (16 bit instructions) • K -2147483648–2147483647 (32 bit instructions)	For specification of command values for timer and counter, pointer, interrupt pointer, number of bit devices and instruction values
H	Hexadecimal constant	• H0–FFFF (16 bit instruction) • H0–FFFFFFFF (32 bit instruction)	For specification of instruction values
FX	Function input	FX0–F (16)	Device for the status of input bits for subroutines.
FY	Function output	FY0–F (16)	Device for the status of output bits for subroutines.
FD	Function register	FD0–4 (5)	Status register for the input and output bits for subroutines

Tab. 4-5: *Device list of CPU types Q04UD(E)H to Q26UD(E)H*

Device name	Range (total number)						Explanation
	Q04UDH	Q06UDH	Q10UDH	Q13UDH	Q20UDH	Q26UDH	
	Q04UDEH	Q06UDEH	Q10UDEH	Q13UDEH	Q20UDEH	Q26UDEH	
Link direct device	Specified form: J□□\X□□, J□□\Y□□, J□□\W□□, J□□\B□□, J□□\SW□□, J□□\SB□□						Device for accessing the link device directly. Exclusively used for CC-Link IE controller network and MELSECNET/H.
Intelligent function module device	Specified form: U□□\G□□						Device for accessing the buffer memory of the intelligent function module directly.

Tab. 4-5: *Device list of CPU types Q04UD(E)H to Q26UD(E)H*

The address areas for these devices can be set with a programming device by parameters. The table shows the preset values.

4.1.4 Process CPU

Device name		Range (total number)				Explanation
		Q02PHCPU	Q06PHCPU	Q12PHCPU	Q25PHCPU	
X	Input	X0–1FFF (total number of I/O points: 8192) X0–0FFF (I/O points accessible via base units: 4096)				Input of external signals to the PLC, e. g. by key switch, rotary switch, limit switch, binary switch
Y	Output	Y0–1FFF (total number of I/O points: 8192) Y0–0FFF (I/O points accessible via base units: 4096)				Output of signals for control of external devices by program like magnetic valves, magnetic contactors, lamps, digital displays etc.
M	Special relay	SM0–2047 (2048)				Predefined devices for special applications and additional functions of the PLC.
	Internal relay*	M0–8191 (8192)				Auxiliary devices of the PLC
L	Latch relay*	L0–8191 (8192)				Auxiliary devices of the PLC Latch relays are buffered at power shut down
S	Step relay	S0–8191 (8192)				Application like M device, e. g. for marking one step number in a program for step operation of a process.
B	Link relay*	B0–1FFF (8192)				Bit devices in a network, which can't be output directly
F	Annunciator*	F0–2047 (2048)				Flag for marking of an error. If the error flag is set by an error recognition program during RUN operation, the corresponding error code will be stored in the special relay SD.
V	Edge relay*	V0–2047 (2048)				This relay is set by the negativ or positiv edge of the operation result, depending on the instruction.
T	Timer*	T0–2047 (2048) The low- and high-speed timers are specified by the instructions.				Incremental timer Measurement unit of the low-speed retentive timers: 1 to 1000 ms, 1 ms unit (100 ms by default) Measurement unit of the high-speed retentive timers: 0.1 to 100.0 ms, 0.1 ms unit (10.0 ms by default)
T (ST)	Retentive timer*	Max. 2048, The retentive timers are specified by parameters (preset to 0) The low- and high-speed retentive timers are specified by the instructions.				
C	Counter*	C0–1023 (1024)				Incremental counter for normal or interrupt processing
	Interrupt Counter*	Max. 256 The interrupt counters are specified by parameters (preset to 0).				
D	Data register*	D0–12287 (12288)				Register for data storage
SD	Special register	SD0–2047 (2048)				Predefined register for storage of special data
W	Link register*	W0–1FFF (8192)				Register for Link data in a network

Tab. 4-6: *Device list of Q02PH-, Q06PH-, Q12PH- and Q25PHCPU*

Device name		Range (total number)				Explanation
		Q02PHCPU	Q06PHCPU	Q12PHCPU	Q25PHCPU	
R	File register	• When using the internal RAM: R0–65535 (65536) for Q02PH- and Q06PHCPU, R0–131071 (131072) for Q12PH- and Q25HCPU with block conversion in steps of 32768 registers • When using a 1 MB SRAM memory card: with block conversion in steps of 32768 registers, 517120 file registers are accessible. • When using a 2 MB Flash- or 2 MB SRAM memory card: with block conversion in steps of 32768 registers, 1041408 file registers are accessible. • When using a 4 MB Flash memory card: with block conversion in steps of 32768 registers, 1042432 file registers are accessible.				Extension of the data register area When using a Flash memory card only reading of the file registers is possible. It's not possible to use an ATA memory card
		• When using the internal RAM: ZR0–65535 (65536) for Q02PH- and Q06PHCPU, ZR0–131071 (131072) for Q12PH- and Q25PHCPU (Block conversion is not necessary.) • When using a 1 MB SRAM memory card: ZR0–517119 (517120), Block conversion is not necessary. • When using a 2 MB Flash- or 2 MB SRAM memory card: ZR0–1041407 (1041408), Block conversion is not necessary. • When using a 4 MB Flash memory card: ZR0–1042431 (1042432), Block conversion is not necessary.				
SB	Link special relay	SB0–7FF (2048)				Bit devices in a network
SW	Link special register	SW0–7FF (2048)				Register for Link data
Z	Index register	Z0–15 (16)				Register for indexing of devices
N	Nesting	N0–14 (15 Steps)				Displays the nesting of Master control processes
P	Pointer	P0–4095 (4096) The common pointer address is set by parameters.				Target of a jump instruction (CJ, SCJ, CALL, JMP)
I	Interrupt Pointer	I0–255 (256) The constant cyclic interval of system interrupt pointers I28 to 31 can be set up by parameters (0.5 to 1000 ms, 0.5 ms unit). Default values: I28: 100 ms; I29: 40 ms; I30: 20 ms; I31: 10 ms				Pointer for branching of interrupt programs
K	Decimal constant	• K -32768–32767 (16 bit instructions) • K -2147483648–2147483647 (32 bit instructions)				For specification of command values for timer and counter, pointer, interrupt pointer, number of bit devices and instruction values
H	Hexadecimal constant	• H0–FFFF (16 bit instruction) • H0–FFFFFFFF (32 bit instruction)				For specification of instruction values
FX	Function input	FX0–F (16)				Device for the status of input bits for subroutines.
FY	Function output	FY0–F (16)				Device for the status of output bits for subroutines.
FD	Function register	FD0–4 (5)				Status register for the input and output bits for subroutines
Link direct device		Specified form: J□□\X□□, J□□\Y□□, J□□\W□□, J□□\B□□, J□□\SW□□, J□□\SB□□				Device for accessing the link device directly. Exclusively used for CC-Link IE controller network and MELSECNET/H.
Intelligent function module device		Specified form: U□□\G□□				Device for accessing the buffer memory of the intelligent function module directly.

Tab. 4-6: *Device list of Q02PH-, Q06PH-, Q12PH- and Q25PHCPU*

* The address areas for these devices can be set with a programming device by parameters. The table shows the preset values.

4.1.5 Redundant CPU

Device name		Range (total number)		Explanation
		Q12PRHCPU	Q25PRHCPU	
X	Input	X0–1FFF (total number of I/O points: 8192) X0–0FFF (I/O points accessible via base units: 4096)		Input of external signals to the PLC, e. g. by key switch, rotary switch, limit switch, binary switch
Y	Output	Y0–1FFF (total number of I/O points: 8192) Y0–0FFF (I/O points accessible via base units: 4096)		Output of signals for control of external devices by program like magnetic valves, magnetic contactors, lamps, digital displays etc.
M	Special relay	SM0–2047 (2048)		Predefined devices for special applications and additional functions of the PLC.
	Internal relay*	M0–8191 (8192)		Auxiliary devices of the PLC
L	Latch relay*	L0–8191 (8192)		Auxiliary devices of the PLC Latch relays are buffered at power shut down
S	Step relay	S0–8191 (8192)		Application like M device, e. g. for marking one step number in a program for step operation of a process.
B	Link relay*	B0–1FFF (8192)		Bit devices in a network, which can't be output directly
F	Annunciator*	F0–2047 (2048)		Flag for marking of an error. If the error flag is set by an error recognition program during RUN operation, the corresponding error code will be stored in the special relay SD.
V	Edge relay*	V0–2047 (2048)		This relay is set by the negativ or positiv edge of the operation result, depending on the instruction.
T	Timer*	T0–2047 (2048) The low- and high-speed timers are specified by the instructions.		Incremental timer Measurement unit of the low-speed retentive timers: 1 to 1000 ms, 1 ms unit (100 ms by default) Measurement unit of the high-speed retentive timers: 0.1 to 100.0 ms, 0.1 ms unit (10.0 ms by default)
T (ST)	Retentive timer*	Max. 2048, The retentive timers are specified by parameters (preset to 0) The low- and high-speed retentive timers are specified by the instructions.		
C	Counter*	C0–1023 (1024)		Incremental counter for normal or interrupt processing
	Interrupt Counter*	Max. 256 (0 point by default, setting by parameters)		
D	Data register*	D0–12287 (12288)		Register for data storage
SD	Special register	SD0–2047 (2048)		Predefined register for storage of special data
W	Link register*	W0–1FFF (8192)		Register for Link data in a network

Tab. 4-7: *Device list of Q12PRH- and Q25PRHCPU*

Device name		Range (total number)		Explanation
		Q12PRHCPU	Q25PRHCPU	
R	File register	• When using the internal RAM: R0–131071 (131072) with block conversion in steps of 32768 registers • When using a 1 MB SRAM memory card: with block conversion in steps of 32768 registers, 517120 file registers are accessible. • When using a 2 MB Flash- or 2 MB SRAM memory card: with block conversion in steps of 32768 registers, 1041408 file registers are accessible. • When using a 4 MB Flash memory card: with block conversion in steps of 32768 registers, 1042432 file registers are accessible.		Extension of the data register area When using a Flash memory card only reading of the file registers is possible. It's not possible to use an ATA memory card
		• When using the internal RAM: ZR0–131071 (131072) (Block conversion is not necessary.) • When using a 1 MB SRAM memory card: ZR0–517119 (517120), Block conversion is not necessary. • When using a 2 MB Flash- or 2 MB SRAM memory card: ZR0–1041407 (1041408), Block conversion is not necessary. • When using a 4 MB Flash memory card: ZR0–1042431 (1042432), Block conversion is not necessary.		
SB	Link special relay	SB0–7FF (2048)		Bit devices in a network
SW	Link special register	SW0–7FF (2048)		Register for Link data
Z	Index register	Z0–15 (16)		Register for indexing of devices
N	Nesting	N0–14 (15 Steps)		Displays the nesting of Master control processes
P	Pointer	P0–4095 (4096) The common pointer address is set by parameters.		Target of a jump instruction (CJ, SCJ, CALL, JMP)
I	Interrupt Pointer	I0–255 (256) The constant cyclic interval of system interrupt pointers I28 to 31 can be set up by parameters (0.5 to 1000 ms, 0.5 ms unit). Default values: I28: 100 ms; I29: 40 ms; I30: 20 ms; I31: 10 ms		Pointer for branching of interrupt programs
K	Decimal constant	• K -32768–32767 (16 bit instructions) • K -2147483648–2147483647 (32 bit instructions)		For specification of command values for timer and counter, pointer, interrupt pointer, number of bit devices and instruction values
H	Hexadecimal constant	• H0–FFFF (16 bit instruction) • H0–FFFFFFFF (32 bit instruction)		For specification of instruction values
FX	Function input	FX0–F (16)		Device for the status of input bits for subroutines.
FY	Function output	FY0–F (16)		Device for the status of output bits for subroutines.
FD	Function register	FD0–4 (5)		Status register for the input and output bits for subroutines
Link direct device		Specified form: J□□\X□□, J□□\Y□□, J□□\W□□, J□□\B□□, J□□\SW□□, J□□\SB□□		Device for accessing the link device directly. Exclusively used for CC-Link IE controller network and MELSECNET/H.
Intelligent function module device		Specified form: U□□\G□□		Device for accessing the buffer memory of the intelligent function module directly.

Tab. 4-7: *Device list of Q12PRH- and Q25PRHCPU*

* The address areas for these devices can be set with a programming device by parameters. The table shows the preset values.

4.2 Memory capacity

A CPU of MELSEC System Q can access different memory devices, which differ in the drive number. In addition to the internal memory (RAM and FlashROM) all CPU types (except Q00(U)JCPU, Q00(U)CPU and Q01(U)CPU) have an extension slot for a memory card. Depending on the type of memory card, the access to this slot is by drive 1 or drive 2.

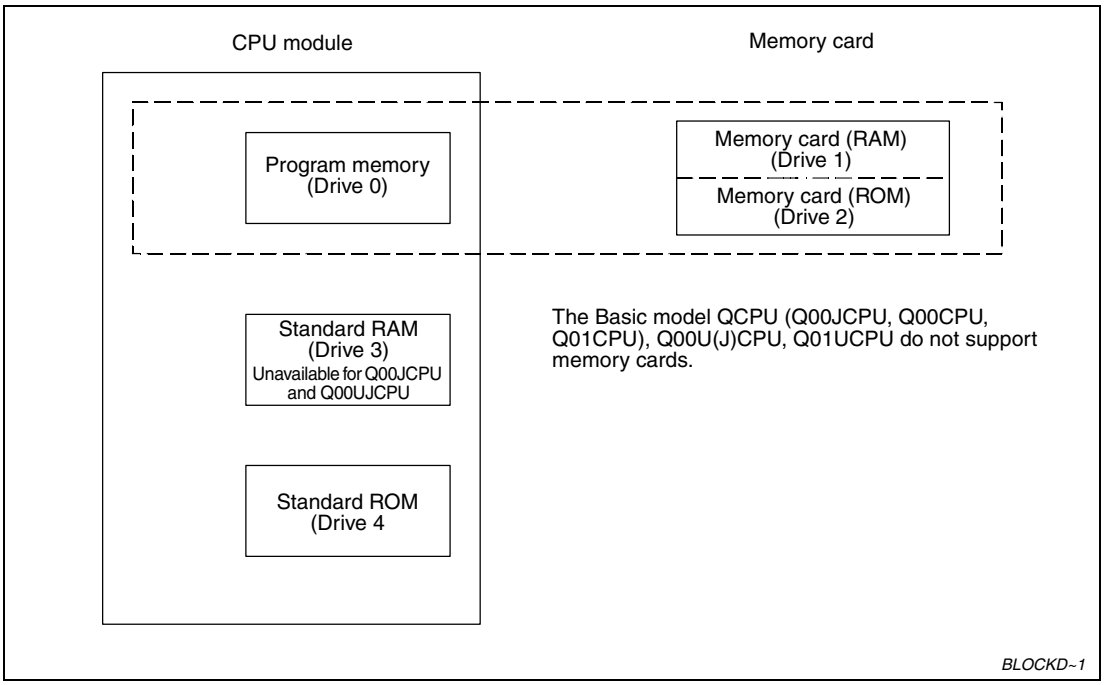


Fig. 4-1: *Memory configuration of MELSEC System Q-CPU modules*

The next pages show the memory capacities of the CPU modules.

Basic model QCPU and High performance model QCPU

Drive	Memory type	Q00J	Q00	Q01	Q02 Q02H	Q06H	Q12H	Q25H
No. 0 (CPU module built-in memory)	Program memory [Steps]	8 k	8 k	14 k	28 k	60 k	124k	252 k
	Program memory [kByte]	58	94		112	240	496	1008
	Storable number of files	6 ①			28	60	124	252 ②
No. 1	Memory card (RAM)	—			max. 2 MB			
	Storable number of files				max. 287			
No. 2	Flash card (ROM)	—			max. 4 MB			
	ATA card				max. 32 MB			
	Storable number of files				Flash card (ROM): max. 288 ATA card: max. 512			
No. 3 (CPU module built-in memory)	RAM [kByte]	—	64 128 ③		Q02: 64 Q02H: 64 (128 ④)	64 128 ④	256	
	Storable number of files	—	1		2 3 ③			
No. 4 (CPU module built-in memory)	Standard ROM [kByte]	58	94		112	240	496	1008
	Storable number of files	6 ①			28	60	124	252

Tab. 4-8: *Storable data and storage locations of Basic model QCPU and High performance model QCPU*

① Each of parameter, PLC parameter, sequence program, SFC program, device comment, and device initial value files can be stored.

② The CPU module can execute up to 124 programs.

③ For CPU modules with function version B (serial No. (first 5 digits) is 04122 or later).

④ For CPU modules with function version B (serial No. (first 5 digits) is 04012 or later).

Universal model QCPU

● Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU and Q03U(E)CPU

Drive	Memory type	Q00UJ	Q00U	Q01U	Q02U	Q03U Q03UE
No. 0 (CPU module built-in memory)	Program memory [Steps]	10 k		15 k	20 k	30 k
	Program memory [kByte]	40		60	80	120
	Storable number of files	32			64	124
No. 1	Memory card (RAM)	—			max. 8 MB	
	Storable number of files				max. 319	
No. 2	Flash card (ROM)	—			max. 4 MB	
	ATA card				max. 32 MB	
	Storable number of files				Flash card (ROM): max. 288 ATA card: max. 511	
No. 3 (CPU module built-in memory)	RAM [kByte]	—	128		128	192
	Storable number of files	—	1		3	3
No. 4 (CPU module built-in memory)	Standard ROM [kByte]	256	512		512	1024
	Storable number of files	128			128	256

Tab. 4-9: *Storable data of Universal model QCPUs Q00UJ, Q00U, Q01U, Q02U and Q03U(E)*

● Q04UD(E)CPU to Q26UD(E)CP

Drive	Memory type	Q04UDH Q04UDEH	Q06UDH Q06UDEH	Q10UDH Q10UDEH	Q13UDH Q13UDEH	Q20UDH Q20UDEH	Q26UDH Q26UDEH
No. 0 (CPU module built-in memory)	Program memory [Steps]	40 k	60 k	100 k	130 k	200 k	260 k
	Program memory [kByte]	160	240	400	520	800	1040
	Storable number of files	124		252①			
No. 1	Memory card (RAM)	max. 8 MB					
	Storable number of files	max. 319					
No. 2	Flash card (ROM)	max. 4 MB					
	ATA card	max. 32 MB					
	Storable number of files	Flash card (ROM): max. 288 ATA card: max. 511					
No. 3 (CPU module built-in memory)	RAM [kByte]	256	768	1024		1280	
	Storable number of files	3					
No. 4 (CPU module built-in memory)	Standard ROM [kByte]	512	1024	2048		4098	
	Storable number of files	256					

Tab. 4-10: *Storable data of Universal model QCPUs Q04UD(E)CPU to Q26UD(E)CP*

① The CPU module can execute up to 124 programs.

Process CPU

Drive	Memory type	Q02PH	Q06PH	Q12PH	Q25PH
No. 0 (CPU module built-in memory)	Program memory [Steps]	28 k	60 k	124k	252 k
	Program memory [kByte]	112	240	496	1008
	Storable number of files	28	60	124	252 ①
No. 1	Memory card (RAM)	max. 2 MB			
	Storable number of files	max. 287			
No. 2	Flash card (ROM)	max. 4 MB			
	ATA card	max. 32 MB			
	Storable number of files	Flash card (ROM): max. 288 ATA card: max. 512			
No. 3 (CPU module built-in memory)	RAM [kByte]	128		256	
	Storable number of files	2 3 ②			
No. 4 (CPU module built-in memory)	Standard ROM [kByte]	112	240	496	1008
	Storable number of files	28	60	124	252

Tab. 4-11: *Storable data of process CPUs*

① The CPU module can execute up to 124 programs.
② For CPU modules with function version B (serial No. (first 5 digits) is 04122 or later).

Redundant CPU

Drive	Memory type	Q12PRHCPU	Q25PRHCPU
No. 0 (CPU module built-in memory)	Program memory [Steps]	124k	252 k
	Program memory [kByte]	496	1008
	Storable number of files	124	252 ①
No. 1	Memory card (RAM)	max. 2 MB	
	Storable number of files	max. 287	
No. 2	Flash card (ROM)	max. 4 MB	
	ATA card	max. 32 MB	
	Storable number of files	Flash card (ROM): max. 288 ATA card: max. 512	
No. 3 (CPU module built-in memory)	RAM [kByte]	256	
	Storable number of files	2 3 ②	
No. 4 (CPU module built-in memory)	Standard ROM [kByte]	496	1008
	Storable number of files	124	252

Tab. 4-12: *Storable data of Redundant CPUs*

① The CPU module can execute up to 124 programs.
② For CPU modules with function version B (serial No. (first 5 digits) is 04122 or later).

4.3 Notes for handling

Precautions

Do not drop the module case or subject it to heavy impact since it is made of resin. Do not remove the printed-circuit board of each module from its case.

When drilling screw holes or wiring, cutting chips or wire chips should not enter ventilation slits.

NOTE

Fixing the module with a screw
The modules of MELSEC System Q can be secured with an additional screw (M3×12) to the base unit. Under normal conditions this screw is not needed. But it is recommended to use the screw, if large vibration is expected.
Tighten the module fixing screws within the specified tightening torque range of 36 to 48 Ncm.

CAUTION:

- ***Do not open the case of a module. Do not modify a module. This may cause fire, injuries or malfunction.***
- ***Use the product in the environment within the general specifications described in the Hardware Manual of MELSEC System Q. Never use the product in areas with dust, oily smoke, conductive dusts, corrosive or flammable gas, vibrations or impacts, or expose it to high temperature, condensation, or wind and rain.***
- ***Cut off all phases of the power source externally before starting the installation or wiring work. Not doing so may cause failure or malfunction of the module.***
- ***Do not drop or apply shock to the battery to be installed in the module. Doing so may damage the battery, causing the battery fluid to leak inside the battery. If the battery is dropped or any shock is applied to it, dispose of it without using.***
- ***After the first use of the product, do not mount or remove the module to or from the base unit, and the terminal block to or from the module more than 50 times (IEC 61131-2 compliant) respectively. Exceeding this limit may cause malfunction.***
- ***Before handling modules, touch a grounded metal object to discharge the static electricity from the human body.***

4.4 Part names and settings of Qn(P)(R)(H)CPUs

This chapter explains the part names and settings of the PLCs with basic model CPU, high performance model CPU, process CPU and redundant CPU. The following section4.5 is about the part names and settings of the PLCs with universal model CPU.

4.4.1 Part names of CPU modules

Q00JCPU

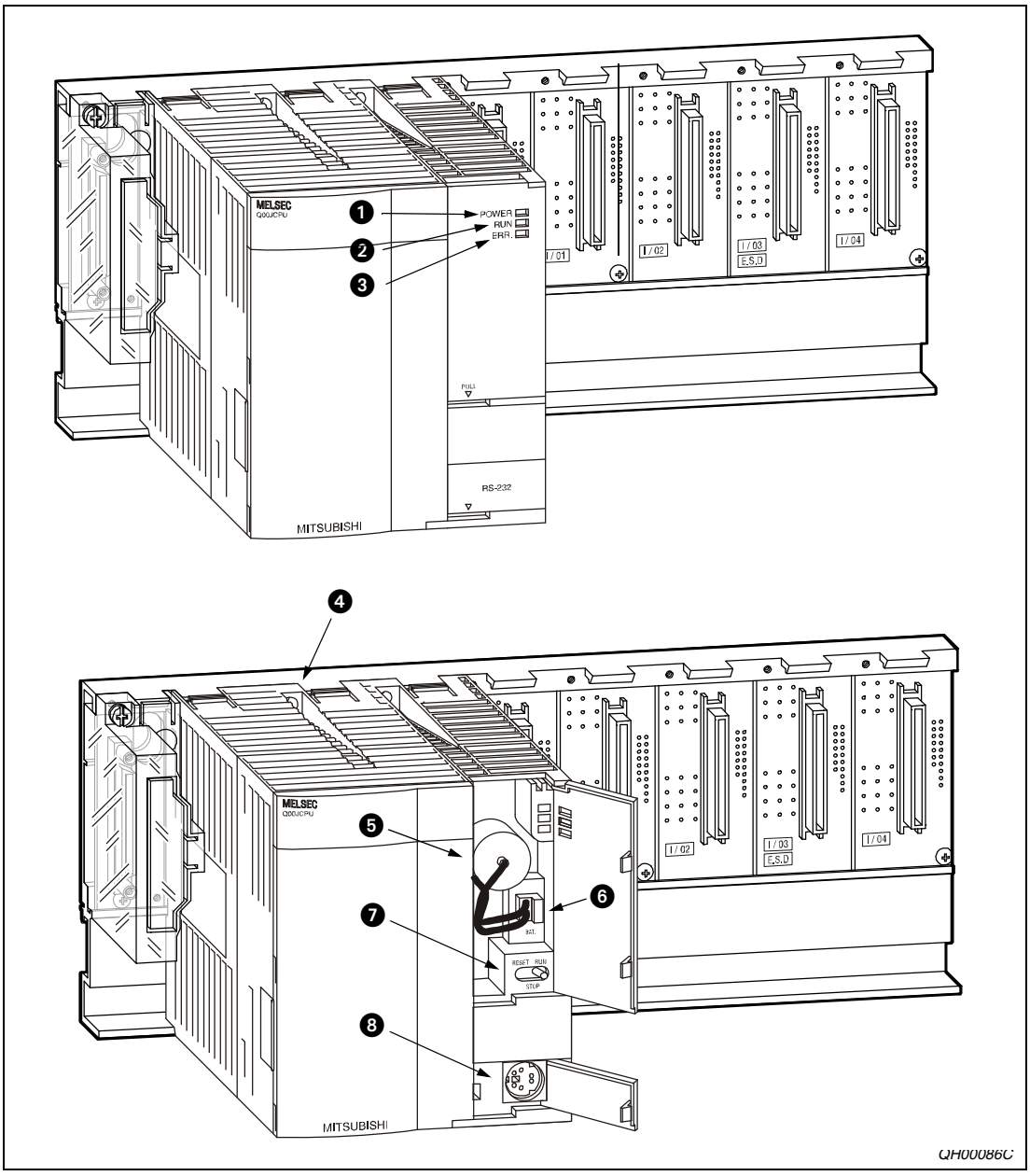


Fig. 4-2: *Part names of Q00JCPU*

No.	Name	Application
❶	POWER LED	Power indicator LED for 5 V DC. Turns on in green during normal output of 5 V DC.
❷	RUN LED	Indicates the operating status of the CPU module. • ON: During operation with the RUN/STOP/RESET switch set to "RUN". Executes sequence program operation. • OFF: During stop with the RUN/STOP/RESET switch set to "STOP". When an error that stops operation is detected. • FLICKER: When parameters/program is written during STOP and the RUN/STOP/RESET switch is moved from "STOP" to "RUN". The CPU is not in "RUN" mode. To turn on the RUN LED after writing the program/parameters, perform the following operations. - Perform reset with the RUN/STOP/RESET switch. - Set the RUN/STOP/RESET switch from "STOP" to "RUN". To turn on the RUN LED after writing the program/parameters without performing a reset, perform the following operation: - Set the RUN/STOP/RESET switch from "STOP" to "RUN" to "STOP" to "RUN".
❸	ERR. LED	Error indication • ON: When the self-diagnostic error that will not stop operation is detected (continuation of operation at error detection must be set in the parameter). • OFF: Normal • FLICKER: When an error is detected that stops operation.
❹	Base mounting hole	This hole is for fixing the Q00JCPU with a screw.
❺	Battery	Backup battery for use of the program memory, standard RAM, clock function and backup power time function.
❻	Battery connector pin	For connection of the battery lead wires. Lead wires are disconnected from the connector when shipping to prevent the battery from consuming.
❼	RUN/STOP/RESET switch	• RUN: Executes sequence program operation. • STOP: Stops sequence program operation. • RESET: Performs hardware reset, operation error reset, operation initialization or like.
❽	RS232 connector	Connector for connecting a programming device (peripheral device) by RS232.

Tab. 4-13: *Part names of Q00JCPU*

Q00CPU and Q01CPU

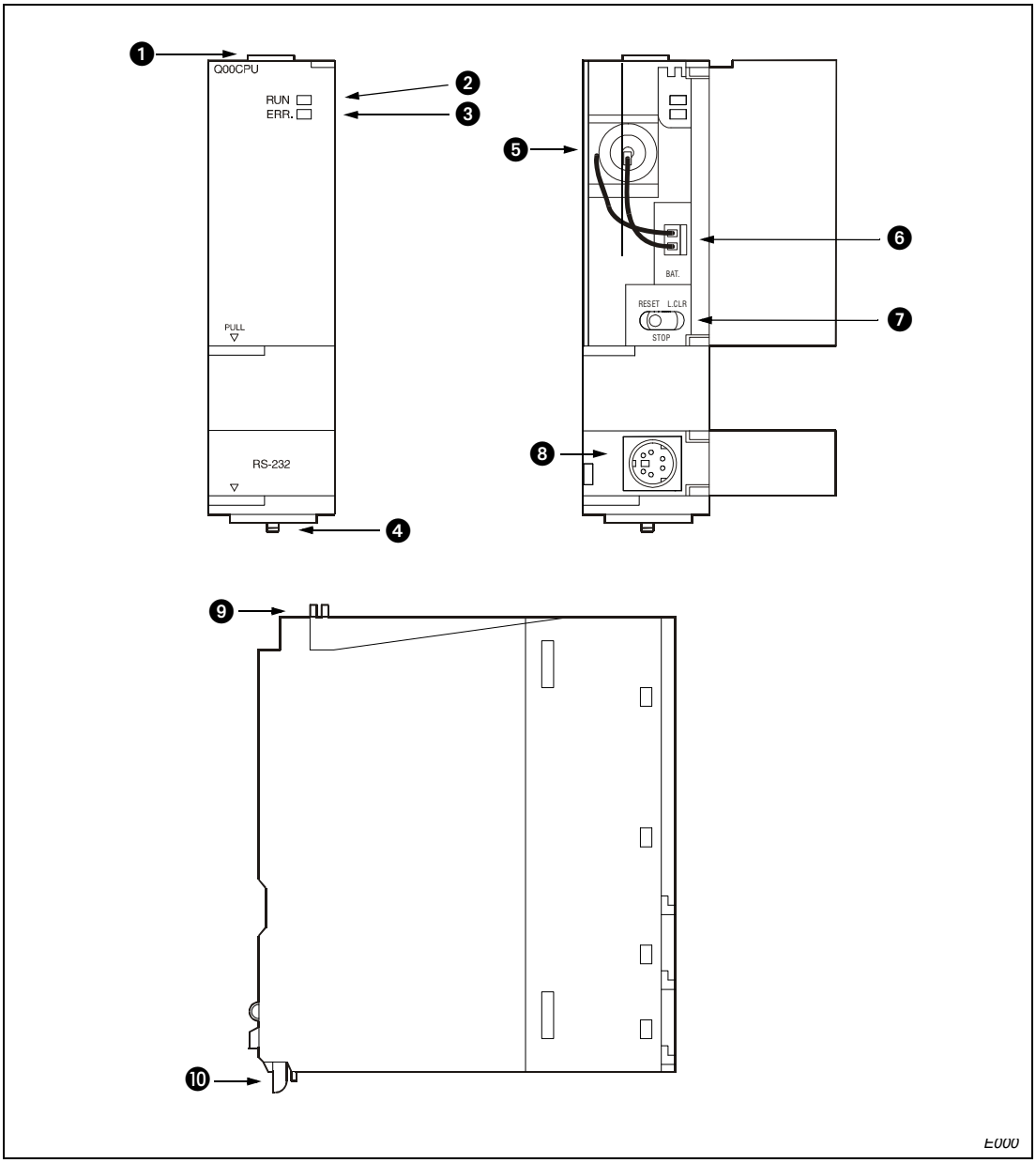


Fig. 4-3: *Part names of Q00CPU and Q01CPU*

No.	Name	Application
❶	Module fixing hook	Hook used to fix the module to the base unit.
❷	RUN LED	Indicates the operating status of the CPU module. • ON: During operation with the RUN/STOP/RESET switch set to "RUN". Executes sequence program operation. • OFF: During stop with the RUN/STOP/RESET switch set to "STOP". When an error that stops operation is detected. • FLICKER: When parameters/program is written during STOP and the RUN/STOP/RESET switch is moved from "STOP" to "RUN". The CPU is not in "RUN" mode. To turn on the RUN LED after writing the program/parameters, perform the following operations. - Perform reset with the RUN/STOP/RESET switch. - Set the RUN/STOP/RESET switch from "STOP" to "RUN". To turn on the RUN LED after writing the program/parameters without performing a reset, perform the following operation: - Set the RUN/STOP/RESET switch from "STOP" to "RUN" to "STOP" to "RUN".
❸	ERR. LED	Error indication • ON: When the self-diagnostic error that will not stop operation is detected (continuation of operation at error detection must be set in the parameter). • OFF: Normal • FLICKER: When an error is detected that stops operation.
❹	Module mounting lever	This spring loaded lever simplifies disassembling of the module from the base unit.
❺	Battery	Backup battery for use of the program memory, standard RAM, clock function and backup power time function.
❻	Battery connector pin	For connection of the battery lead wires. Lead wires are disconnected from the connector when shipping to prevent the battery from consuming.
❼	RUN/STOP/RESET switch	Switch for setting the operation mode • RUN: Executes sequence program operation. • STOP: Stops sequence program operation. • RESET: Performs hardware reset, operation error reset, operation initialization or like.
❽	RS232 connector	Connector for connecting a programming device (peripheral device) by RS232.
❾	Module fixing screw hole	Hole for the screw used to fix to the base unit. (M3x12 screw)
❿	Module fixing latch	Latch used to fix the module to the base unit.

Tab. 4-14: *Part names of Q00CPU and Q01JCPU*

Q02(P)(H)CPU, Q06(P)HCPU, Q12(P)HCPU and Q25(P)HCPU

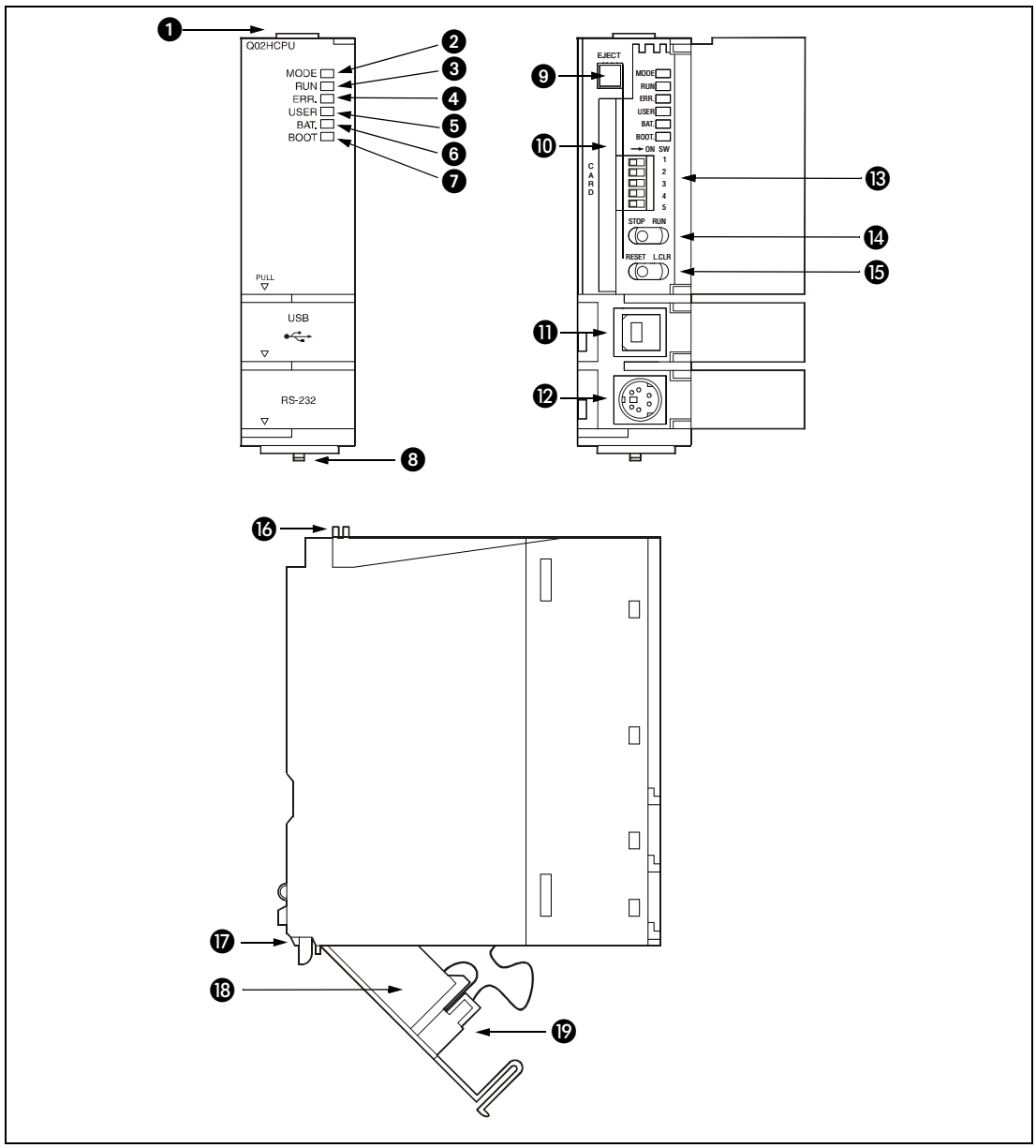


Fig. 4-4: *Part names of Q02(P)(H)-, Q06(P)H-, Q12(P)H- and Q25(P)HCPU*

No.	Name	Application
❶	Module fixing hook	Hook used to fix the module to the base unit.
❷	MODE LED	Indicates the mode of the CPU module: • GREEN: Q mode • ORANGE: A mode

Tab. 4-15: *Part names of Q02(H)-, Q06H-, Q12(P)H- and Q25(P)HCPU*

No.	Name	Application
❸	RUN LED	Indicates the operating status of the CPU module. • ON: During operation with the RUN/STOP switch set to "RUN". Executes sequence program operation. • OFF: During stop with the RUN/STOP switch set to "STOP". When an error that stops operation is detected. • FLICKER: Parameters or programs are written with the RUN/STOP switch set to "STOP" and then the RUN/STOP switch is turned from "STOP" to "RUN". The CPU is not in "RUN" mode. To turn on the RUN LED after writing the **program**, perform the following operations: - Set the RUN/STOP switch from "RUN" to "STOP" to "RUN". - Reset with the RESET/L.CLR switch. - Restart the programmable controller power. To turn on the RUN LED after writing the **parameters**, perform the following operations. - Reset with the RESET/L.CLR switch. - Restart the programmable controller power. (If the RUN/STOP switch is set from "RUN" to "STOP" to "RUN" after changing the parameters, intelligent function module parameters will not be updated.)
❹	ERR. LED	Error indication • ON: When the self-diagnostic error that will not stop operation is detected (continuation of operation at error detection must be set in the parameter). • OFF: Normal • FLICKER: When an error is detected that stops operation. (Flickers together with the BOOT LED when automatic write to standard ROM is completed normally.)
❺	USER LED	Display of user messages: • ON: Error detected by CHK instruction or annunciator (F) turned ON • OFF: Normal • FLICKER: Execution of latch clear
❻	BAT. LED	Displays the status of the battery • ON: Battery error due to reduction in battery voltages of CPU module or memory card. • OFF: Normal
❼	BOOT LED	Indication of boot operation • ON: Start of boot operation. • OFF: Non-execution of boot operation. • FLICKER: When automatic write to standard ROM is completed normally. (The ERR. LED flashes too)
❽	Module mounting lever	This spring loaded lever simplifies disassembling of the module from the base unit.
❾	Memory card EJECT button	Used to eject the memory card from the CPU module.
❿	Memory card installing connector	Connector used for installing the memory card to the CPU module.
⓫	USB connector	Connector for connection with USB-compatible programming device. (Not available for Q02CPU)
⓬	RS232 connector	Connector for connecting a programming device (peripheral device) by RS232.
⓭	DIP switches (System settings)	Used to set the items for operation of the CPU module. For the system protection and the valid parameter drives of the DIP switches, refer to section 4.4.2.
⓮	RUN/STOP switch	Switch for setting the operation mode • RUN: Executes sequence program operation. • STOP: Stops sequence program operation.
⓯	RESET/L.CLR switch	Switch for resetting the CPU and clearing the latches • RESET: Performs hardware reset, operation error reset, operation initialization or like. After performing reset, always return this switch to the neutral position. • L.CLR: Latch Clear, used to turn "Off" or clear to "zero" all latch area data set in the parameter.
⓰	Module fixing screw hole	Hole for the screw used to fix to the base unit (M3x12 screw). (optional).
⓱	Module fixing latch	Latch used to fix the module to the base unit.
⓲	Battery	Backup battery for use of program memory, standard RAM, clock function and the backup power time function.
⓳	Battery connector pin	For connection of the battery lead wires. Lead wires are disconnected from the connector when shipping to prevent the battery from consuming.

Tab. 4-15: *Part names of Q02(H)-, Q06H-, Q12(P)H- and Q25(P)HCPU*

Q12PRHCPU and Q25PRHCPU

Compared to the QnHCPU the redundant CPU moduls have additional controls (refer to fig. 4-5), which are explained in the following section.

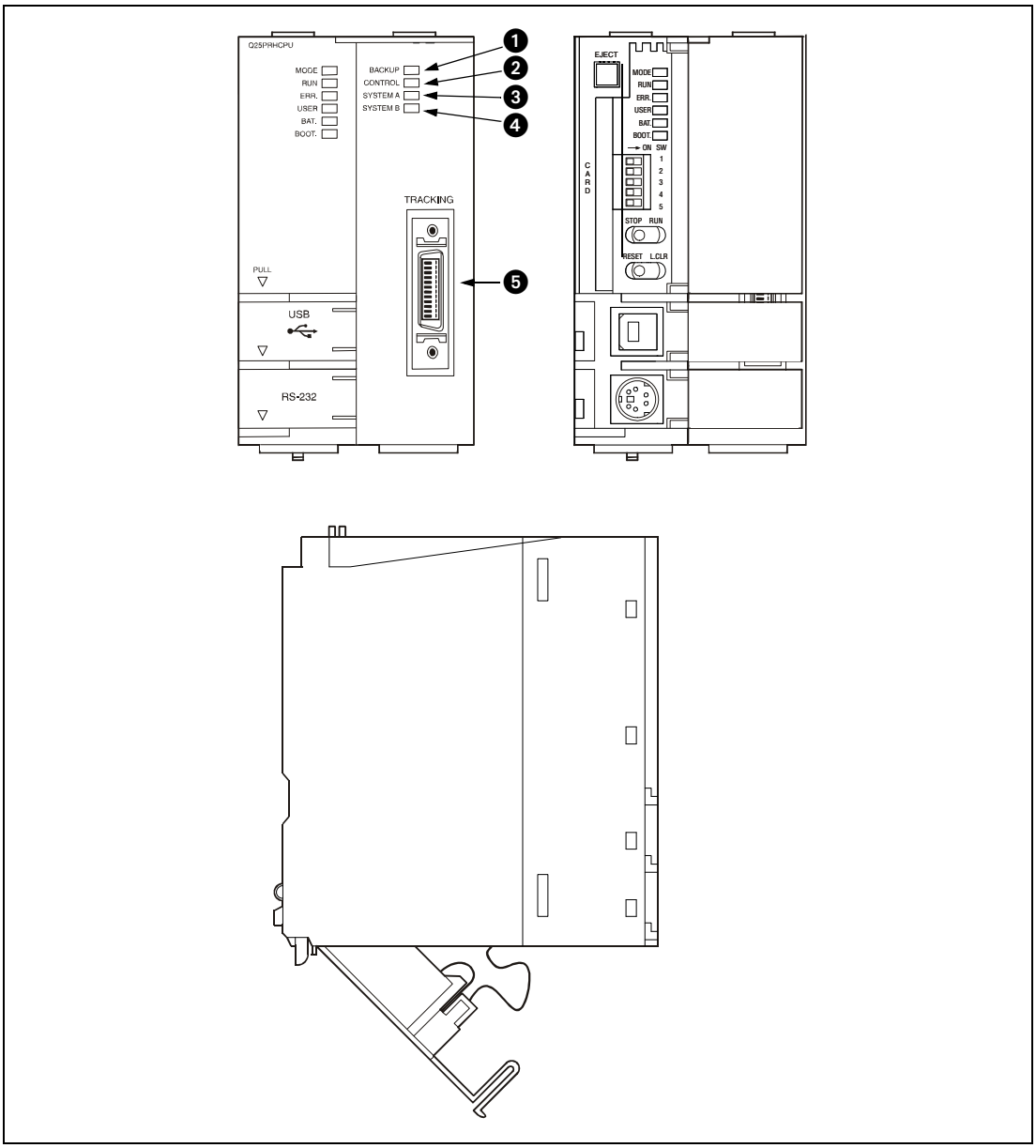


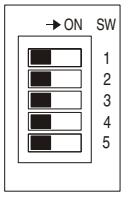
Fig. 4-5: *Part names of Q12PRHCPU and Q25PRHCPU*

No.	Name	Application
❶	BACKUP LED	Indicates the backup or separate mode while the system is running normally: • GREEN: Backup mode • RED: Status in which control (RUN) cannot be continued by system switching. • ORANGE: Separate mode • OFF: Debug mode (e. g. for optimising the program or trouble shooting) The LED indication is as follows when the memory copy from control system to standby system is executed: – LED of the standby system flickers (red or orange) during execution of memory copy, and is on after normal completion. – BACKUP LED of the control system is on (red or yellow) during execution of memory copy and after completion.
❷	CONTROL LED	Indicates the CPU module operates as control system or standby system. • ON: Control system (the standby system is normal and system switching is available); Debug mode • OFF: Standby system
❸	SYSTEM A LED	System assignment • ON: System A or debug mode. • FLICKER: When the tracking cable is disconnected while the system runs normally as the system A (keeps on flickering until the system A side tracking cable is connected). • OFF: System B (LED "SYSTEM B" LED turns on)
❹	SYSTEM B LED	System assignment • ON: System B or debug mode. • FLICKER: When the tracking cable is disconnected while the system runs normally as the system B (keeps on flickering until the system B side tracking cable is connected). • OFF: System A ("SYSTEM A" LED turns on.)
❺	TRACKING connector	For data transfer both redundant PLCs are connected with a tracking cable.

Tab. 4-16: *Part names of Q12PRHCPU and Q25PRHCPU*

4.4.2 DIP switches

The DIP switches are used for setting the system protection and the valid parameter drives for CPU types Q02, Q02H, Q06H, Q12H, Q12P(R)H, Q25H and Q25P(R)H. All switches are preset to off as factory default. Switches SW4 and SW5 must not be used (without function).

<table>
<tr><th>DIP switches</th><th>SW1</th><th colspan="2">SW2</th><th>SW3</th></tr>
<tr><td rowspan="6"> 

QH00025C</td><td rowspan="6">System protection
• OFF: No protection
• ON: Protection</td><td colspan="3">Parameter-valid drive
Parameters cannot be stored in standard RAM (Drive 3)</td></tr>
<tr><td>SW2</td><td>SW3</td><td>Parameter drive:</td></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>

Tab. 4-17: *DIP switches*

4.4.3 Transfer of a program with a programming device

NOTE

Before writing a program to the CPU module, set the system protect setting switch (DIP switch: SW1) of the CPU module to off (not protected). Enter the correct password, if the CPU is password secured.

When writing a program with CPU module set to "STOP"

When writing a program with the CPU placed in the STOP status, operate the switches in the following procedure:

- To set to RUN status with device memory data cleared:
  - ① Set the RESET/L.CLR switch resp. the RUN/STOP/RESET switch to the RESET position once and return it to the original neutral position.
  - ② Set the mode switch to RUN position.

    The CPU module is placed in the RUN status (RUN LED: On).
- To set to RUN status with device memory data **not** cleared (held):
  - ① Set the mode switch (RUN/STOP switch or RUN/STOP/RESET switch) to RUN position.

    The RUN LED flashes.
  - ② Set the mode switch to "STOP" position.
  - ③ Set the mode switch to "RUN" position again.

    The CPU module is placed in the RUN status (RUN LED: On).

NOTES

When a program was written to the program memory during boot operation, also write the program to the boot source memory. If the program is not written to the boot source memory, the old program will be executed at the next boot operation.

If the CPU is stopped and restarted by the programming device after program transfer, no operation is needed for the switches of the CPU module.

When writing a a program while CPU module is running

When a program is written while CPU module is running, no operation is needed for the switches of the CPU module.
At this time, the device memory data are not cleared.

NOTE

While the CPU module is running (RUN status) program changes are done in the program memory.
When a program was written to the program memory while CPU module is running, also write the program to the boot source memory. If the program is not written to the boot source memory, the old program will be executed at the next boot operation.

4.4.4 Latch clear operation

Latch clear (switch off or set to 0) can be performed for stored Latch data set by parameters.

NOTE The valid/invalid for latch clear in the clear range of latch clear operation can be set for each device. The setting can be mode in the device setting of the PLC parameter.

Q00JCPU, Q00CPU and Q01CPU

The CPU modules Q00J, Q00 and Q01 are not equipped with a switch for latch clear operation. Latch clear can only be performed by the remote latch clear operation of GX (IEC) Developer.

Q02CPU, Q02HCPU, Q06HCPU, Q12(P)(R)HCPU, Q25(P)(R)HCPU

To perform latch clear, operate the switches in the following procedure:

① Set the RUN/STOP switch to "STOP".

② Set the RESET/L.CLR switch to the L.CLR position several times until the USER LED flashes (ready for latch clear).

③ Set the RESET/L.CLR switch to the L.CLR position one more time.

The USER LED turns off (latch clear complete).

NOTE In addition to the way of using the RESET/L.CLR switch for latch clear, remote latch clear may be performed from GX (IEC) Developer.

4.4.5 Data transfer from memory card to standard ROM

① Power off the programmable controller.

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

③ Set the DIP switches on the CPU module (section 4.4.2) so that the valid parameter drive is matched with the memory card to be installed.
When a SRAM card is installed: SW2: On, SW3: Off
When a Flash card/ATA card is installed: SW2: Off, SW3: On

④ Power on the programmable controller.

⑤ The BOOT LED will flash when automatic write to standard ROM is completed.

⑥ Turn off the programmable controller.

⑦ Remove the memory card, and then set the valid parameter drive to the standard ROM with the CPU module's DIP switches.
Standard ROM: SW2: On, SW3: On

The parameters and programs will be booted from the standard ROM to the program memory when the programmable controller is turned on to enable actual operations.

NOTE The Data transfer from memory card to standard ROM can be selected in the programming software GX Developer or GX IEC Developer.

4.5 Part names and settings of universal CPU modules

4.5.1 Part names of CPU modules

Q00UJCPU

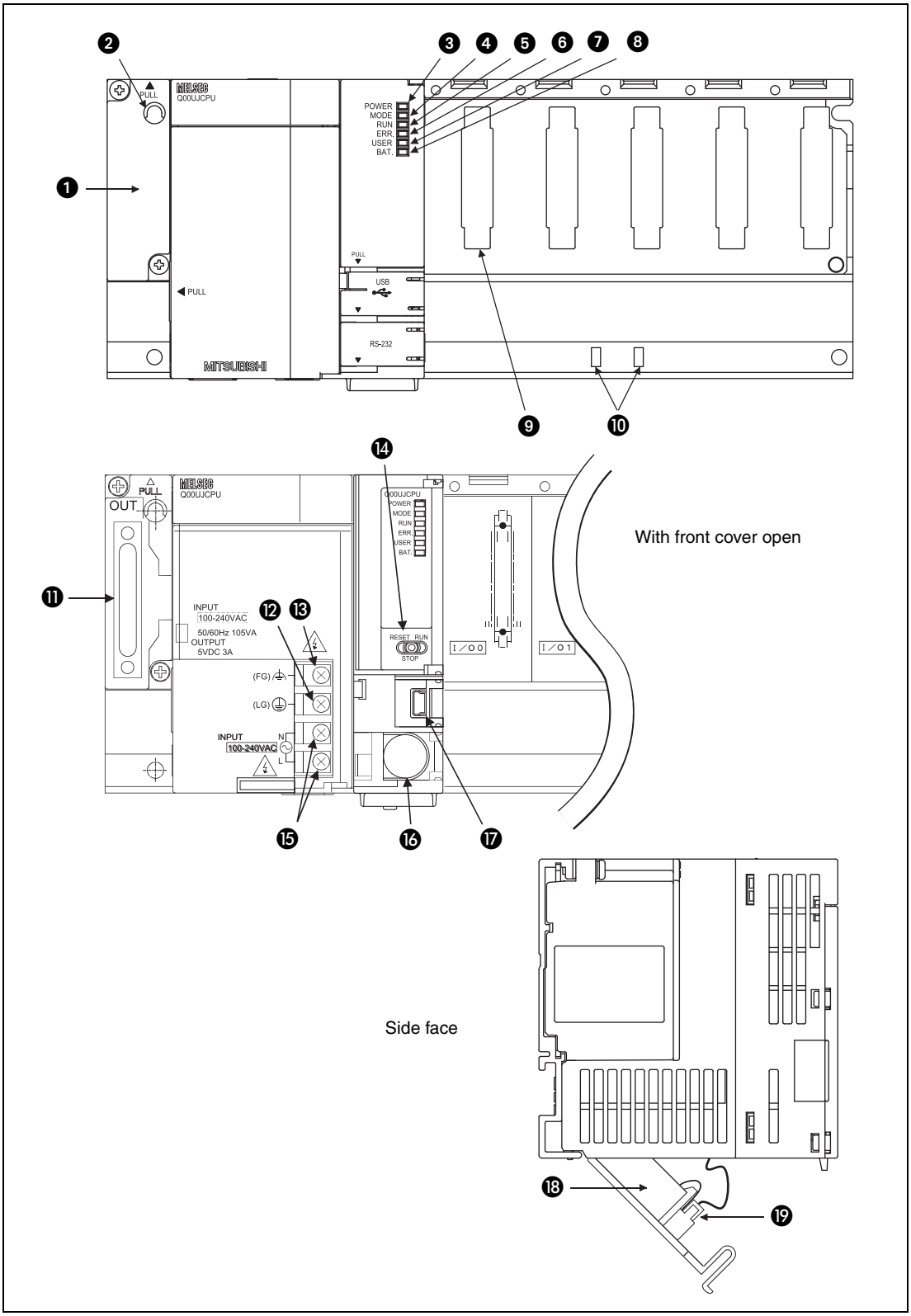


Fig. 4-6: *Part names of Q00UJCPU*

No.	Name	Application
❶	Cover for extension cable connector	Protective cover for extension cable connector. Remove this cover when connecting an extension base unit.
❷	Base mounting hole (∅ 5 mm)	Fixing holes (M4) for the base unit when not mounting on a DIN rail.
❸	POWER LED	Power indicator LED for 5 V DC. Turns on in green during normal output of 5 V DC.
❹	MODE LED	Indicates the mode of the CPU module • ON: Q mode • OFF: – Executional conditioned device test in process – Forced on/off of external devices in process
❺	RUN LED	Indicates the operating status of the CPU module. • ON: The PLC operates the program with cyclic processing (RUN status). • OFF: During stop with the RUN/STOP/RESET switch set to "STOP". When an error that stops operation is detected. • FLICKER: When parameters or a program is written during STOP and the RUN/STOP/RESET switch is moved from "STOP" to "RUN". The CPU is not in "RUN" mode. To turn on the RUN LED after writing the program, perform the following operations: – Shift the RUN/STOP/RESET switch from "RUN" to "STOP" to "RUN". – Perform reset with the RUN/STOP/RESET switch (refer to section 4.5.3). – Power on the programmable controller again. To turn on the RUN LED after writing the parameters, perform the following operations. – Perform reset with the RUN/STOP/RESET switch. – Power on the programmable controller again. (If the RUN/STOP/RESET switch is shifted from "STOP" to "RUN" to "STOP" to "RUN" after changing the parameter values, the new values are not reflected on the parameters related to the intelligent function module, such as the network parameters.)
❻	ERR. LED	Error indication • ON: When the self-diagnostic error that will not stop operation is detected (continuation of operation at error detection must be set in the parameter). • OFF: Normal • FLICKER: – When an error that stops operation is detected. – When reset operation is performed with the RUN/STOP/RESET switch.
❼	USER LED	Display of user messages: • ON: Annunciator (F) turned on. • OFF: Normal
❽	BAT. LED	Display of user messages: • ON (green): Turned on for 5 seconds after restoring of data backed up to the standard ROM by the latch data backup is completed. • FLICKER (green): Flashes when backup of data to the standard ROM by latch data backup is completed. • FLICKER (yellow): Battery error due to voltage drop of the CPU module battery. • OFF: Normal
❾	Module connector	Connector used for mounting an I/O or intelligent function module. To the connector of the spare space where no module is mounted, fit the accessory connector cover or the blank cover module (QG60) to prevent dust from entering)
❿	DIN rail adapter mounting holes	Holes for mounting a DIN rail adapter.
⓫	Extension cable connector	Connector for transferring signals to or from the extension base unit. Connect an extension cable.
⓬	LG terminal	Power filter ground
⓭	FG terminal	Ground terminal connected with the shield pattern of the printed circuit board.
⓮	RUN/STOP/RESET switch	• RUN: Executes sequence program operation. • STOP: Stops sequence program operation. • RESET: Performs hardware reset, operation error reset, operation initialization or like.

Tab. 4-18: *Part names of Q00UJCPU*

No.	Name	Application
⓯	Power input terminals	Power input terminals for connection of a 100 V AC to 240 V AC power supply.
⓰	RS232 connector	Connector for connecting a programming device (peripheral device) by RS232.
⓱	USB connector	Connector for connection with USB-compatible programming device.
⓲	Battery	Backup battery for use of the program memory, standard RAM, clock function and backup power time function.
⓳	Battery connector pin	For connection of the battery lead wires. Lead wires are disconnected from the connector when shipping to prevent the battery from consuming.

Tab. 4-18: *Part names of Q00UJCPU*

Q00UCPU and Q01UCPU

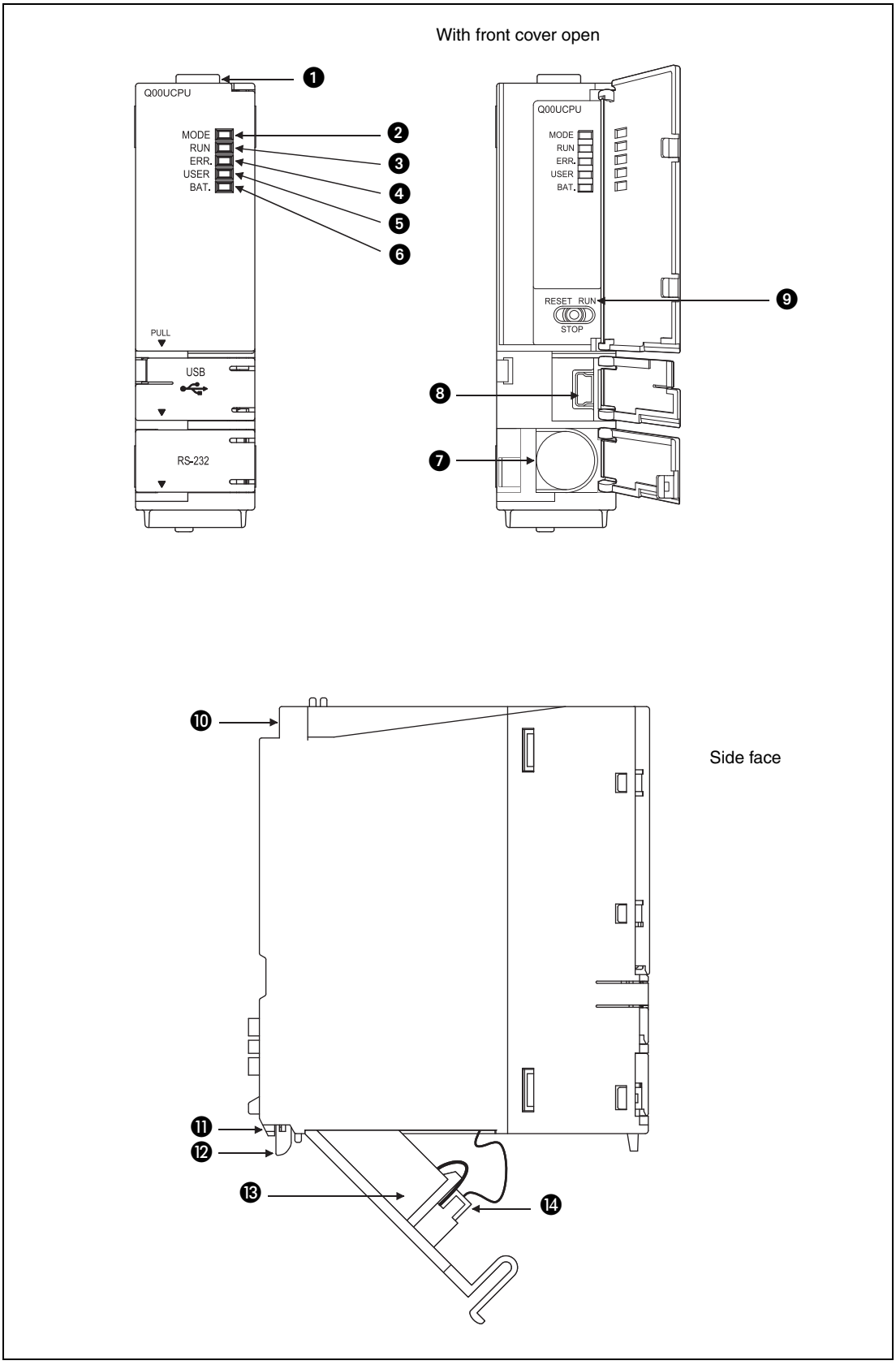


Fig. 4-7: *Part names of Q00UCPU and Q01UCPU*

No.	Name	Application
❶	Module fixing hook	Hook used to fix the module to the base unit.
❷	MODE LED	Indicates the mode of the CPU module • ON: Q mode • OFF: – Executional conditioned device test is in process – Forced on and off function for external I/O is in process. – Data backup and restore to/from memory card after exchange of the CPU.
❸	RUN LED	Indicates the operating status of the CPU module. • ON: The PLC operates the program with cyclic processing (RUN status). • OFF: During stop with the RUN/STOP/RESET switch set to "STOP". When an error that stops operation is detected. • FLICKER: When parameters or a program is written during STOP and the RUN/STOP/RESET switch is moved from "STOP" to "RUN". The CPU is not in "RUN" mode. To turn on the RUN LED after writing the program, perform the following operations: – Shift the RUN/STOP/RESET switch from "RUN" to "STOP" to "RUN". – Perform reset with the RUN/STOP/RESET switch (refer to section 4.5.3). – Power on the programmable controller again. To turn on the RUN LED after writing the parameters, perform the following operations. – Perform reset with the RUN/STOP/RESET switch. – Power on the programmable controller again. (If the RUN/STOP/RESET switch is shifted from "STOP" to "RUN" to "STOP" to "RUN" after changing the parameter values, the new values are not reflected on the parameters related to the intelligent function module, such as the network parameters.)
❹	ERR. LED	Error indication • ON: When the self-diagnostic error that will not stop operation is detected (continuation of operation at error detection must be set in the parameter). • OFF: Normal • FLICKER: – When an error that stops operation is detected. – When reset operation is performed with the RUN/STOP/RESET switch.
❺	USER LED	Display of user messages: • ON: Annunciator (F) turned on. • OFF: Normal
❻	BAT. LED	Display of user messages: • ON (yellow): Battery error due to battery voltage drop of the memory card. • FLICKER (yellow): Battery error due to voltage drop of the CPU module battery. • ON (green): Turned on for 5 seconds after restoring of data backed up to the standard ROM by the latch data backup is completed. • FLICKER (green): Flashes when backup of data to the standard ROM by latch data backup is completed. • OFF: Normal
❼	USB connector	Connector for connection with USB-compatible programming device.
❽	RS232 connector	Connector for connecting a programming device (peripheral device) by RS232.
❾	RUN/STOP/RESET switch	• RUN: Executes sequence program operation. • STOP: Stops sequence program operation. • RESET: Performs hardware reset, operation error reset, operation initialization or like.
❿	Module fixing holes	Hole for the screw used to fix to the base unit. (M3x12 screw)
⓫	Module fixing hook	Hook used to fix the module to the base unit.
⓬	Module mounting lever	This spring loaded lever simplifies disassembling of the module from the base unit.
⓭	Battery	Backup battery for use of the program memory, standard RAM, clock function and backup power time function.
⓮	Battery connector pin	For connection of the battery lead wires. Lead wires are disconnected from the connector when shipping to prevent the battery from consuming.

Tab. 4-19: *Part names of Q00UCPU and Q01UCPU*

Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU

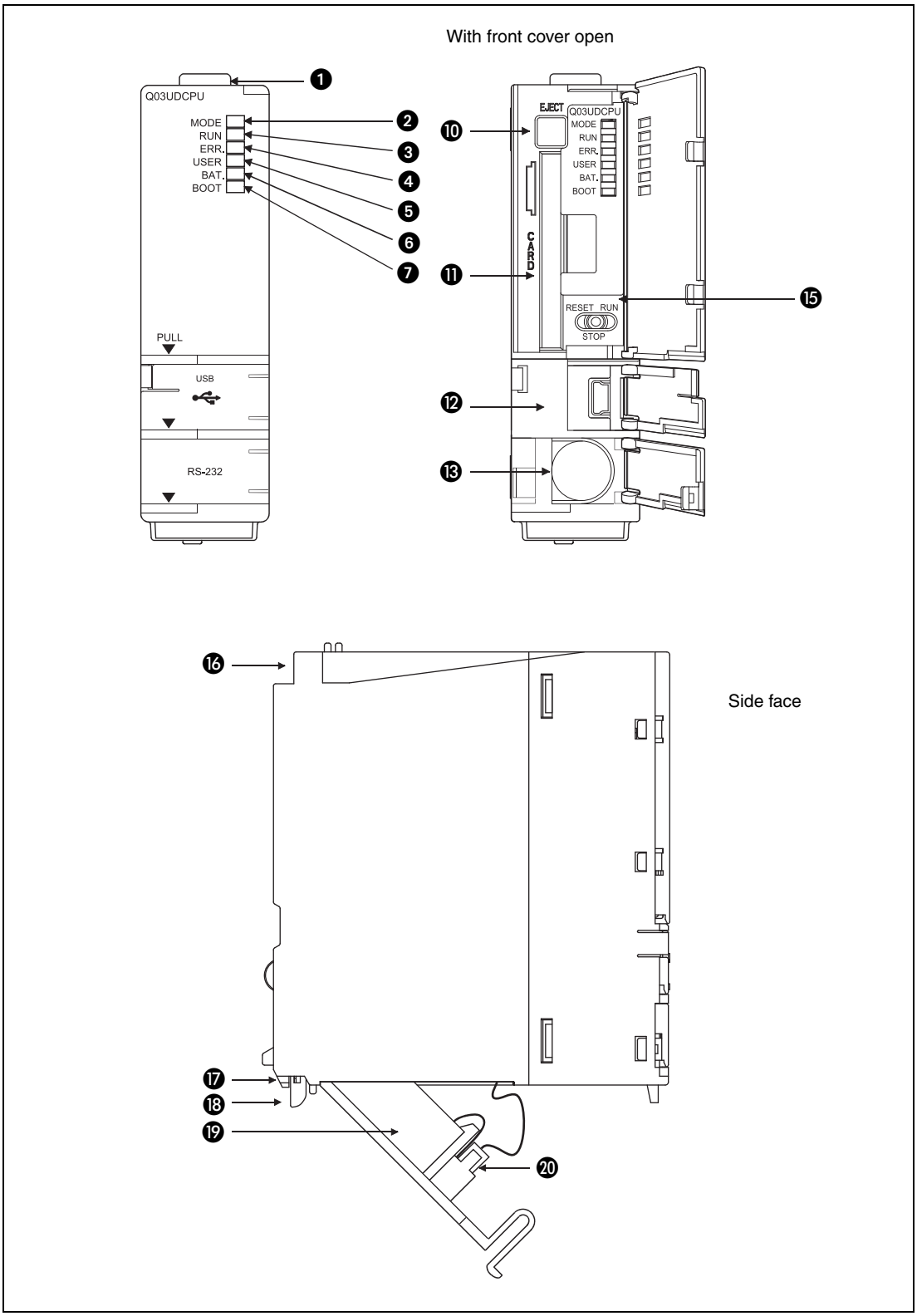


Fig. 4-8: *Part names of Q02UCPU, Q03UDCPU or Q□UDHCPU*

For the description of the part names please refer to page 4-39.

Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU

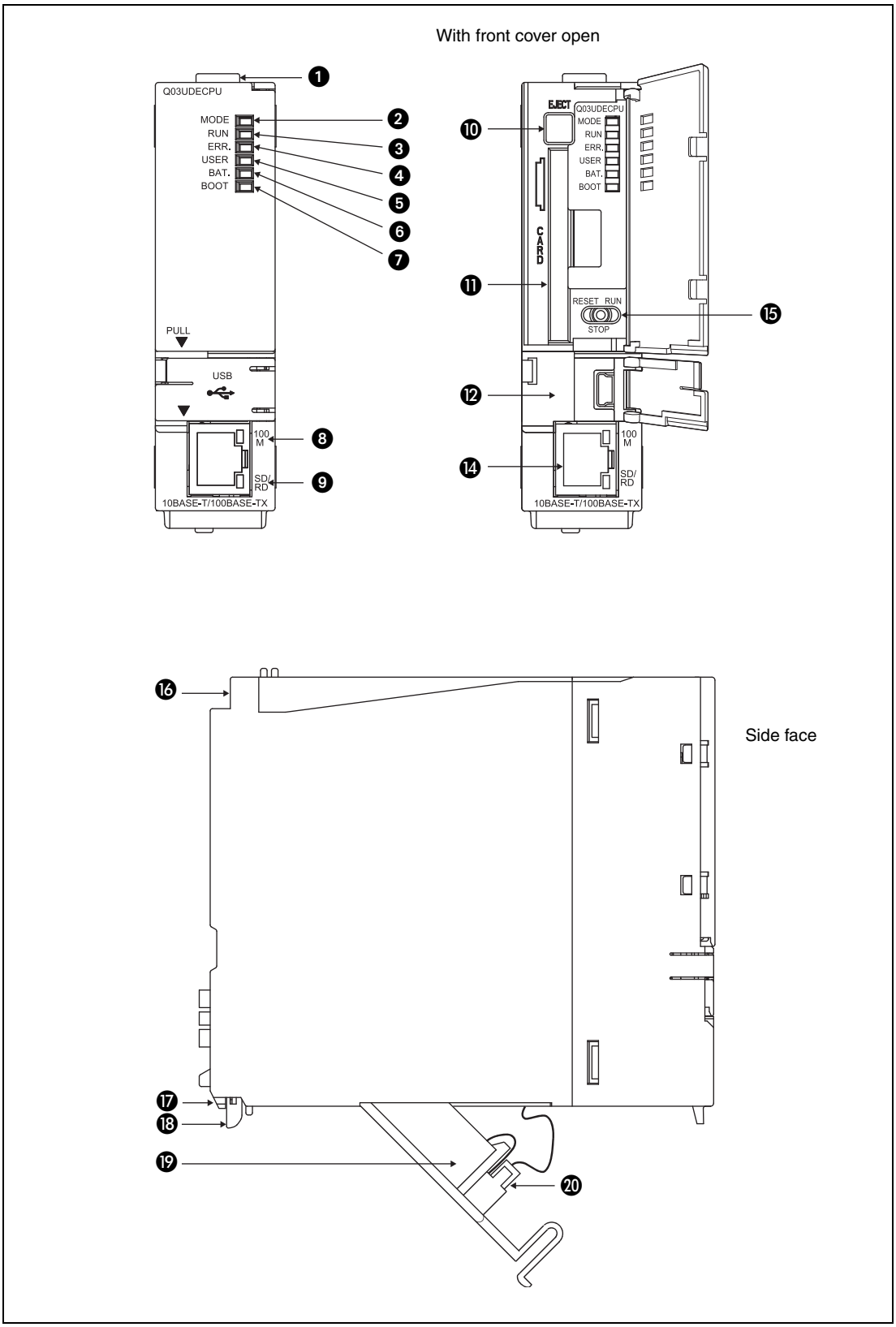


Fig. 4-9: *Part names of Q03UDECPU or Q□UDEHCPU*

No.	Name	Application
❶	Module fixing hook	Hook used to fix the module to the base unit.
❷	MODE LED	Indicates the mode of the CPU module • ON: Q mode • OFF: – Executional conditioned device test is in process – Forced on and off function for external I/O is in process – CPU module change function with memory card is in process
❸	RUN LED	Indicates the operating status of the CPU module. • ON: The PLC operates the program with cyclic processing (RUN status). • OFF: During stop with the RUN/STOP/RESET switch set to "STOP". When an error that stops operation is detected. • FLICKER: When parameters or a program is written during STOP and the RUN/STOP/RESET switch is moved from "STOP" to "RUN". The CPU is not in "RUN" mode. To turn on the RUN LED after writing the program, perform the following operations: – Shift the RUN/STOP/RESET switch from "RUN" to "STOP" to "RUN". – Perform reset with the RUN/STOP/RESET switch (refer to section 4.5.3). – Power on the programmable controller again. To turn on the RUN LED after writing the parameters, perform the following operations. – Perform reset with the RUN/STOP/RESET switch. – Power on the programmable controller again. (If the RUN/STOP/RESET switch is shifted from "STOP" to "RUN" to "STOP" to "RUN" after changing the parameter values, the new values are not reflected on the parameters related to the intelligent function module, such as the network parameters.)
❹	ERR. LED	Error indication • ON: When the self-diagnostic error that will not stop operation is detected (continuation of operation at error detection must be set in the parameter). • OFF: Normal • FLICKER: • FLICKER: – When an error that stops operation is detected. – When reset operation is performed with the RUN/STOP/RESET switch.
❺	USER LED	Display of user messages: • ON: Annunciator (F) turned on • OFF: Normal
❻	BAT. LED	Display of user messages: • ON (yellow): Battery error due to battery voltage drop of the memory card. • FLICKER (yellow): Battery error due to voltage drop of the CPU module battery. • ON (green): Turned on for 5 seconds after restoring of data backed up to the standard ROM by the latch data backup is completed. • FLICKER (green): Flashes when backup of data to the standard ROM by latch data backup is completed. • OFF: Normal
❼	BOOT LED	Indication of boot operation • ON: Start of boot operation • OFF: Non-execution of boot operation
❽	100M LED	Transfer speed display of the ETHERNET interface • ON: Connected at 100 Mbps • OFF: – Connected at 10 Mbps – Not connected
❾	SD/RD LED	Status display of the ETHERNET interface • ON: Data being sent/received • OFF: No data being sent/received
❿	Memory card EJECT button	Used to eject the memory card from the CPU module.
⓫	Memory card installing connector	Connector used for installing the memory card to the CPU module.

Tab. 4-20: *Part names of Q02UCPU, Q03UD(E)CPU and Q□UD(E)HCPU*

No.	Name	Application
⑫	USB connector	Connector for connection with USB-compatible programming device.
⑬	RS232 connector	Connector for connecting a programming device (peripheral device) by RS232.
⑭	Ethernet connector	10BASE-T/100BASE-TX-Connection (RJ45-Connector)
⑮	RUN/STOP/RESET switch	• RUN: Executes sequence program operation. • STOP: Stops sequence program operation. • RESET: Performs hardware reset, operation error reset, operation initialization or like.
⑯	Module fixing screw hole	Hole for the screw used to secure to the base unit. (M3x12 screw)
⑰	Module fixing hook	Hook used to fix the module to the base unit.
⑱	Module mounting lever	This spring loaded lever simplifies disassembling of the module from the base unit.
⑲	Battery	Backup battery for use of the program memory, standard RAM, clock function and backup power time function.
⑳	Battery connector pin	For connection of the battery lead wires. Lead wires are disconnected from the connector when shipping to prevent the battery from consuming.

Tab. 4-20: *Part names of Q02UCPU, Q03UD(E)CPU and Q□UD(E)HCPU*

4.5.2 Transfer of a program with a programming device

When writing a program with CPU module set to "STOP"

When writing a program with the CPU placed in the STOP status, operate the switches in the following procedure:

- To set to RUN status with device memory data cleared:
  - ① Set the RUN/STOP/RESET switch to the RESET position once (approx. 1 second) and return it to the STOP position.
  - ② Set the mode switch to RUN position.

    The CPU module is placed in the RUN status (RUN LED: On).
- To set to RUN status with device memory data **not** cleared (held):
  - ① Set the mode switch (RUN/STOP/RESET switch) to RUN position.

    The RUN LED flashes.
  - ② Set the mode switch to "STOP" position.
  - ③ Set the mode switch to "RUN" position again.

    The CPU module is placed in the RUN status (RUN LED: On).

NOTES

When a program was written to the program memory during boot operation, also write the program to the boot source memory. If the program is not written to the boot source memory, the old program will be executed at the next boot operation.

If the CPU is stopped and restarted by the programming device after program transfer, no operation is needed for the switches of the CPU module.

When writing a a program while CPU module is running

When a program is written while CPU module is running, no operation is needed for the switches of the CPU module.
At this time, the device memory data are not cleared.

NOTE

While the CPU module is running (RUN status) program changes are done in the program memory.
When a program was written to the program memory while CPU module is running, also write the program to the boot source memory. If the program is not written to the boot source memory, the old program will be executed at the next boot operation.

4.5.3 Reset operation

For the Universal model QCPU, the RUN/STOP/RESET switch of the CPU module is used to switch between the RUN status and STOP status and to perform RESET operation. Moving the RUN/STOP/RESET switch to the reset position will not reset it immediately.

NOTES

Hold the RUN/STOP/RESET switch in the RESET position until reset processing is complete (the flashing ERR. LED turns off).
If you release your hand from the RUN/STOP/RESET switch during reset processing (the ERR. LED is flashing), the switch will return to the STOP position and reset processing cannot be completed.

Operate the RUN/STOP/RESET switch with your fingertips. To prevent the switch from being damaged, do not use any tool such as screw driver.

Perform reset operation with the RUN/STOP/RESET switch as shown in following figure:

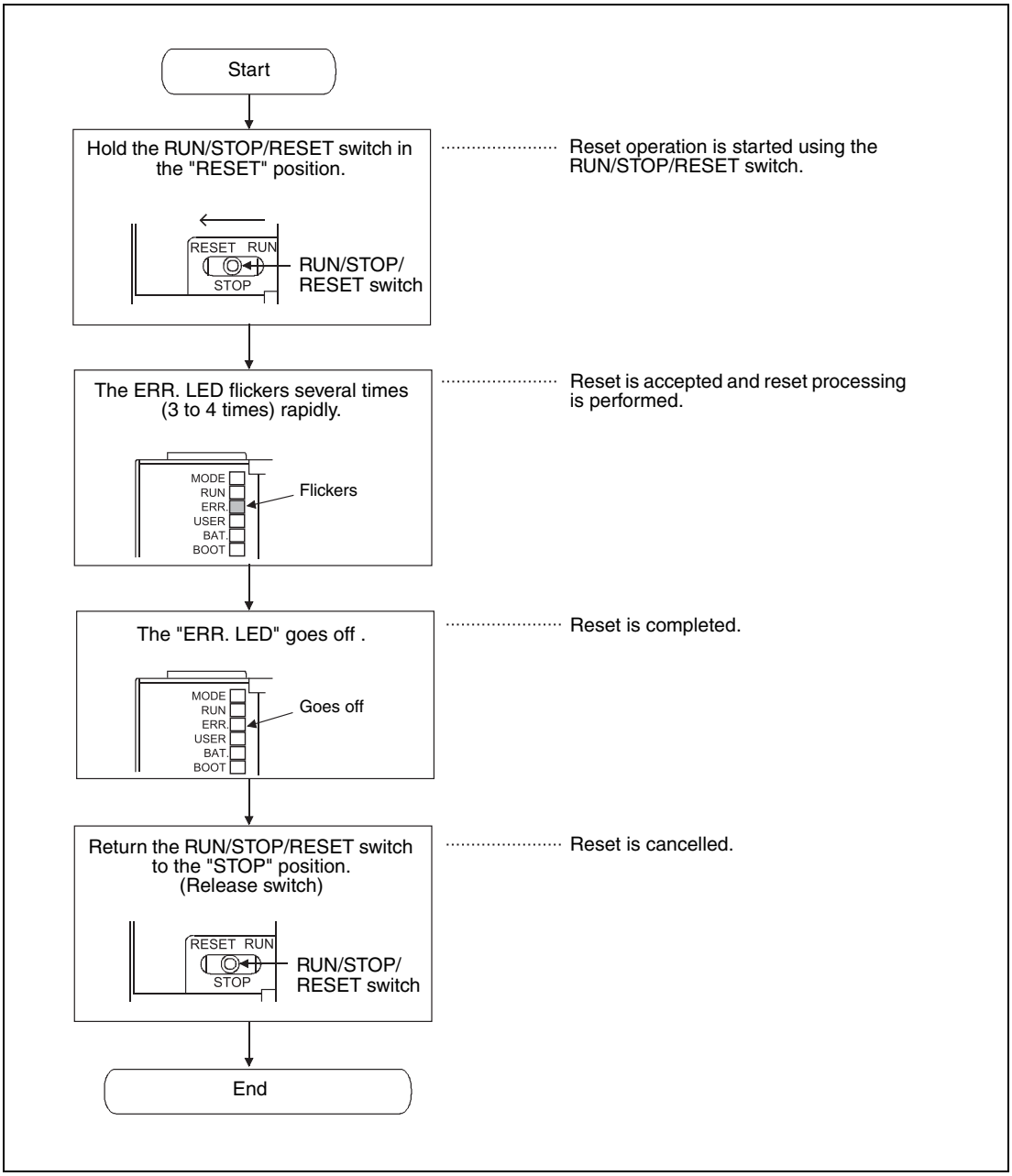


Fig. 4-10: *Reset operation for Universal model QCPU*

4.5.4 Latch clear operation

Latch clear (switch off or set to 0) can be performed for stored Latch data set by parameters.

NOTE

The valid/invalid for latch clear in the clear range of latch clear operation can be set for each device. The setting can be mode in the device setting of the PLC parameter.

The Universal model QCPUs are not equipped with a switch for latch clear operation.
Latch clear can only be performed by the remote latch clear operation of GX (IEC) Developer.

4.6 Checking serial number and function version of the CPU module

Certain functions and features, such as the memory capacity of the standard RAM, are determined by the serial number and the function version of the CPU. The serial number and function version of the CPU module can be checked on the rating plate located on the side face of the module:

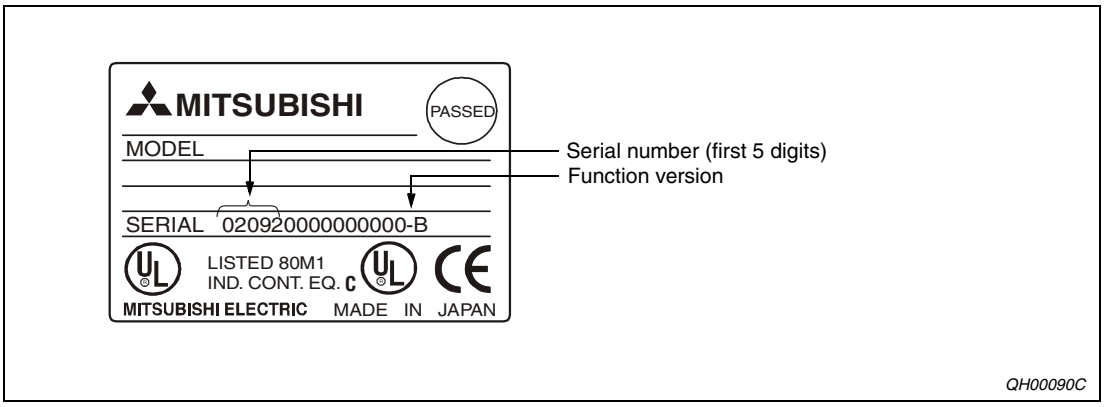


Fig. 4-11: *Rating plate*

The serial number is shown on the rating plate located on the front of the module. This does not apply to the following CPU modules:

- Modules manufactured in mid-September 2007 or earlier.
- Redundant CPUs and Q00JCPU.

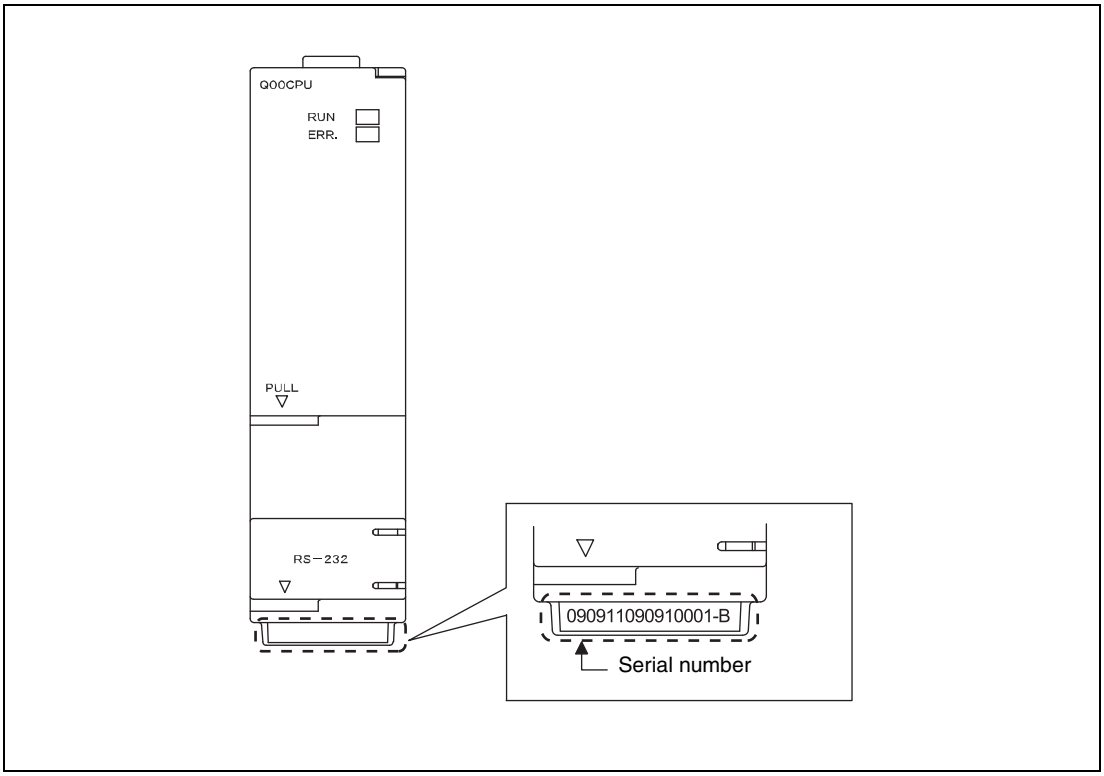


Fig. 4-12: *Serial number display on the front of the module*

The informations may also be checked using a programming device and the programming software GX Developer (Version 6 or later) or GX IEC Developer during CPU operation. To display the screen for checking the serial number and function version, select [Diagnostics] [System monitor] and click the ***Product Inf. List*** button.

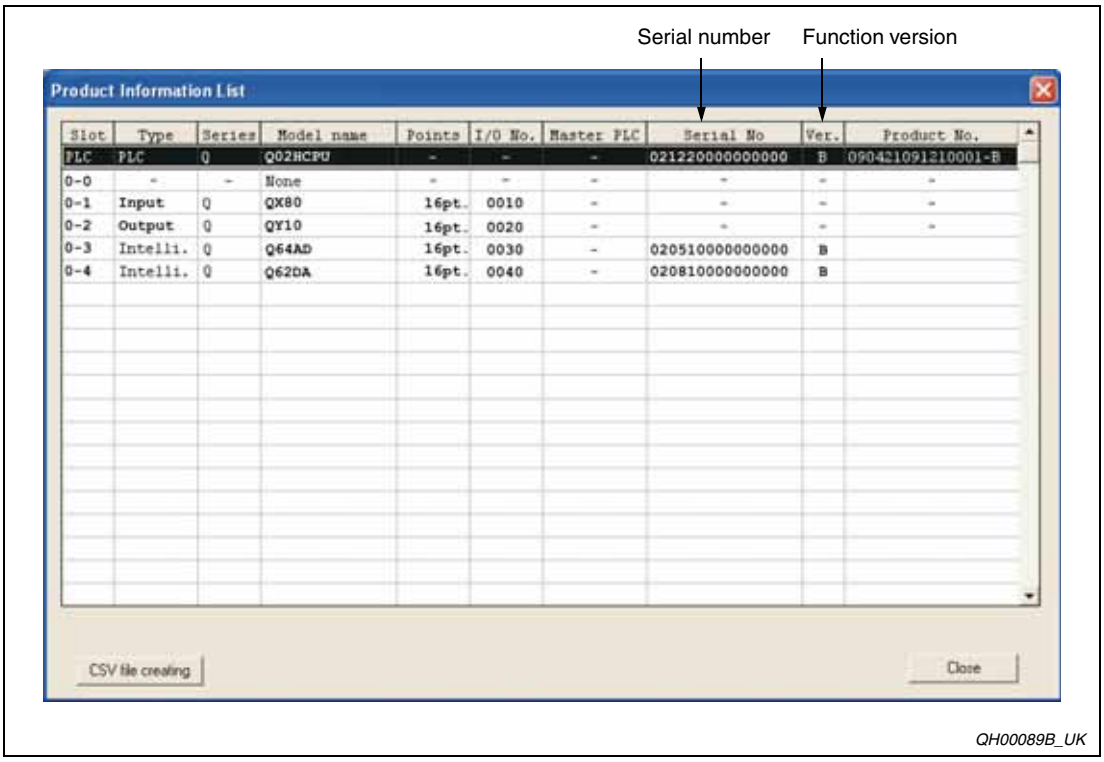


Fig. 4-13: *Product information list*

On the screen, the serial number and function version of intelligent function modules can also be checked.

5 Memory cards and batteries

5.1 Memory card

All CPU types of MELSEC System Q except Q00(U)JCPU, Q00(U)CPU and Q01(U)CPU are equipped with a memory card slot. There are battery buffered RAM Memory cards (reading and writing by CPU) and permanent ROM memory cards (only readible by CPU) available.

Memory card	CPU module					
	Basic model QCPU and High performance model QCPU		Process CPU	Redundant CPU	Universal model QCPU	
	Q00JCPU Q00CPU Q01CPU	Q02CPU Q02HCPU Q06HCPU Q12HCPU Q25HCPU	Q02PHCPU Q06PHCPU Q12PHCPU Q25PHCPU	Q12PRHCPU Q25PRHCPU	Q00UJCPU Q00UCPU Q01UCPU	Q02UCPU Q03UD(E)CPU Q04UD(E)HCPU Q06UD(E)HCPU Q10UD(E)HCPU Q13UD(E)HCPU Q20UD(E)HCPU Q26UD(E)HCPU
Q2MEM-1MBS	○	●	●	●	○	●
Q2MEM-2MBS		●	●	●		
Q3MEM-4MBS		○	○	○		
Q3MEM-8MBS		○	○	○		
Q2MEM-2MBF		●	●	●		
Q2MEM-4MBF		●	●	●		
Q2MEM-8MBA		●	●	●		
Q2MEM-8MBA		●	●	●		
Q2MEM-16MBA		●	●	●		
Q2MEM-32MBA		●	●	●		

Tab. 5-1: *Memory cards and applicable CPU modules*

○: Not usable

●: Usable

5.1.1 Specifications

Memory card	Specifications				
	Type of memory	Memory size ① [kByte]	Memory size ① [Files]	External dimensions (HxWxD) [mm]	Weight [g]
Q2MEM-1MBS	SRAM	1011.5	255	45x42.8x3.3	15
Q2MEM-2MBS		2034	287		
Q3MEM-4MBS		4078	319	74x42.8x8.1	30
Q3MEM-8MBS		8172	319		31
Q2MEM-2MBF	Flash card	2035	288	45x42.8x3.3	15
Q2MEM-4MBF		4079	288		
Q2MEM-8MBA	ATA card (ROM)	7940 ② 7948 ③ 7982 ④	512 (511 for Universal model QCPU)	45x42.8x3.3	15
Q2MEM-16MBA		15932 ② 15948 ③ 15982 ④			
Q2MEM-32MBA		31854			

Tab. 5-2: *Memory card specifications*

① after formatting

② For ATA card when the manufacturer control number is D or earlier

③ For ATA card when the manufacturer control number is E

④ For ATA card when the manufacturer control number is F or later

The manufacturer control number of ATA cards

The manufacturer control number of the ATA card is written on the label on the back of the ATA card. When character string including the manufacturer control number is 4 digits, the third digit from the leftmost is the manufacturer control number.

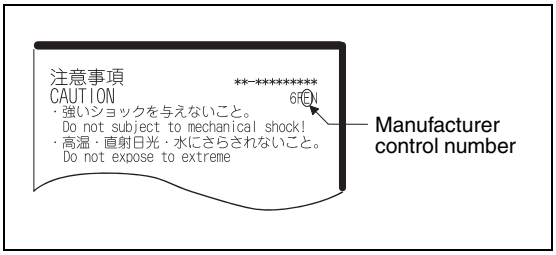


Fig. 5-1:
Manufacturer control number of ATA cards

When character string is 3 digits, the manufacturer control number is "B".

ATA card memory size indication in special register SD603

When the ATA card is used, the value stored in the special register SD603 indicates the memory size and differs depending on the manufacturer control number and CPU module type.
When the CPU module is the Universal model QCPU, the ATA card size is stored in SD603 in units of K bytes.
When the module is not the Universal model QCPU, 8000, 16000, or 32000 is stored in SD603 and the value depends on the manufacturer control number and CPU module type

Memory card	Manufacturer control No.	Value stored in special register SD603		
		High performance model QCPU, Process CPU and Redundant CPU		Universal model QCPU
		Serial No. (first 5 digits) is 09011 or earlier	Serial No. (first 5 digits) is 09012 or later	
Q2MEM-8MBA	"D" or earlier	8000	8000	ATA card size [kByte]
	"E"	16000	8000	
	"F" or later	32000	16000	
Q2MEM-16MBA	"D" or earlier	16000	16000	
	"E"	16000	16000	
	"F" or later	32000	32000	
Q2MEM-32MBA	"D" or earlier	32000	32000	
	"E"			
	"F" or later			

Tab. 5-3: *Memory size indication in special register SD603*

5.1.2 Handling the memory card

Formatting of memory card

Any SRAM or ATA card must have been formatted to use in the CPU module. Since the SRAM or ATA card purchased is not yet formatted, format it using GX (IEC) Developer before use.
Formatting is not necessary for Flash cards.

NOTE

Do not format an ATA card other than by GX Developer or GX IEC Developer.
(If formatted using format function of Microsoft® Windows®, the ATA card may not be usable in a CPU module.)

SRAM card battery

A battery used to backup for power failure is supplied with the SRAM cards Q2MEM-1MBS, Q2MEM-2MBS, Q3MEM-4MBS and Q3MEM-8MBS.
Before using the SRAM card, install the battery.

NOTES

The battery of the CPU does not buffer the SRAM memory card, when the power supply is shut off. Use a separate battery for the memory card.

The battery of the memory card does **not** buffer the data of the program memory and internal RAM of the CPU, when the power supply is shut off. Install a separate battery, to buffer these memory areas.

Types of files which can be stored on memory card

For the types of the files that can be stored on each memory card, refer to the manuals of the CPU modules used.

Errors when the installation of the memory card is wrong

Poor insertion of the memory card may result in "ICM.OPE.ERROR".

If the CPU module operation for an error is set to "Stop" in the Parameters, the CPU module stops its operation upon the occurrence of "ICM.OPE.ERROR".

Increase of scanning time when the memory card is installed

When the memory card is installed, the scanning time is increased by several 10 ms max. 1 scan is only added, when the CPU module executes mount processing.

5.1.3 Installing and removing a memory card

Memory cards Q2MEM-1MBS and Q2MEM-2MBS

- Installation

The installation of the memory card is possible, when the power supply of the CPU is on. 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 (refer to sections 4.4.1 and 4.5.1).

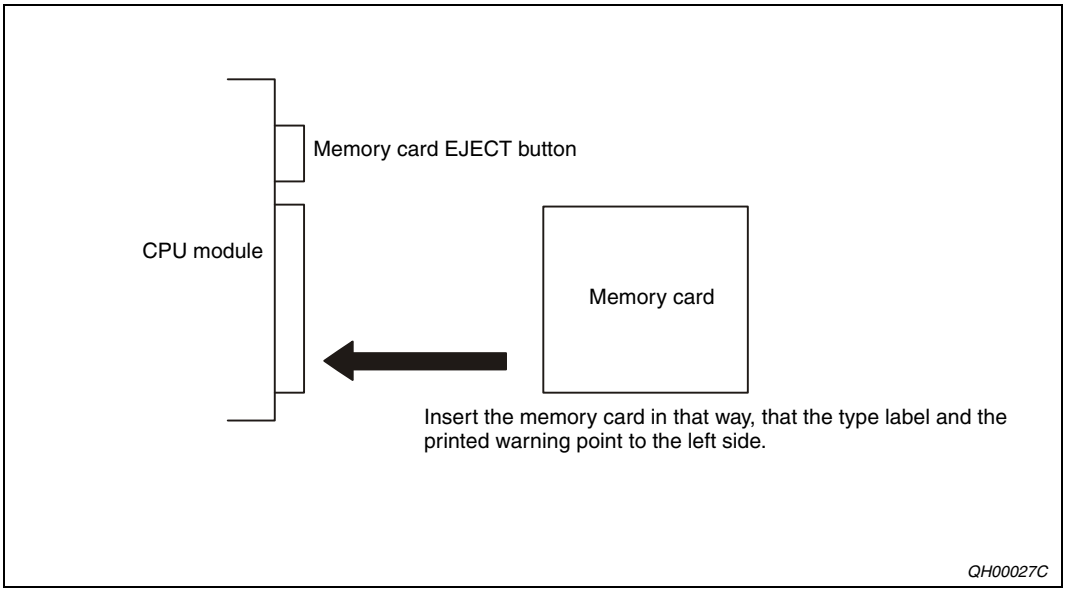


Fig. 5-2: *Install the memory card*

- Removal

When removing the memory card from the CPU module, press the memory card EJECT button to pull out the memory card (refer to sections 4.4.1 and 4.5.1). Using plastic tweezers to pull out the memory card is effective when the memory card cannot be removed smoothly.

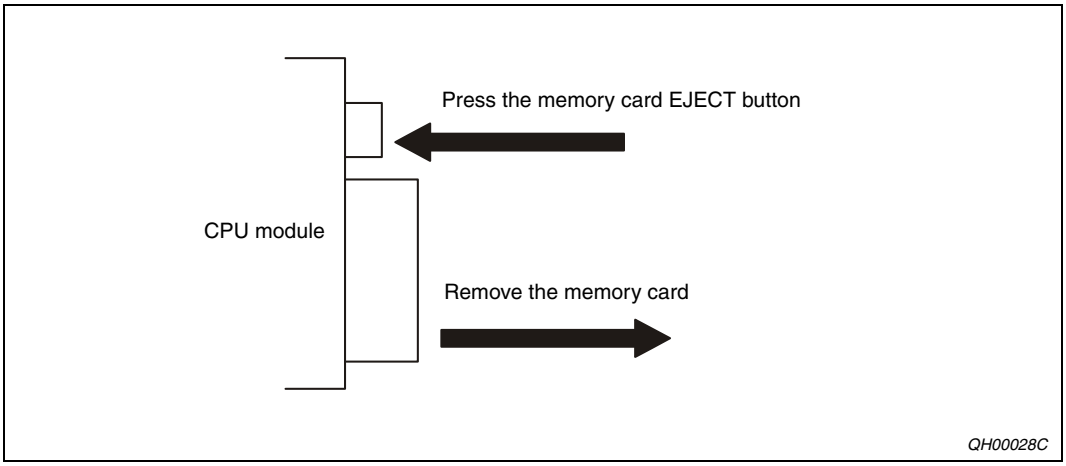


Fig. 5-3: *Remove the memory card*

Memory cards Q3MEM-4MBS and Q3MEM-8MBS

- Installation

After installation the memory cards Q3MEM-4MBS and Q3MEM-8MBS stick out of the CPU module main body. Therefore the lid of the CPU module must be removed and a memory card protective cover has to be set to the CPU module after installation.

① Turn OFF power supply of the CPU module and remove the lid of the CPU module main body.

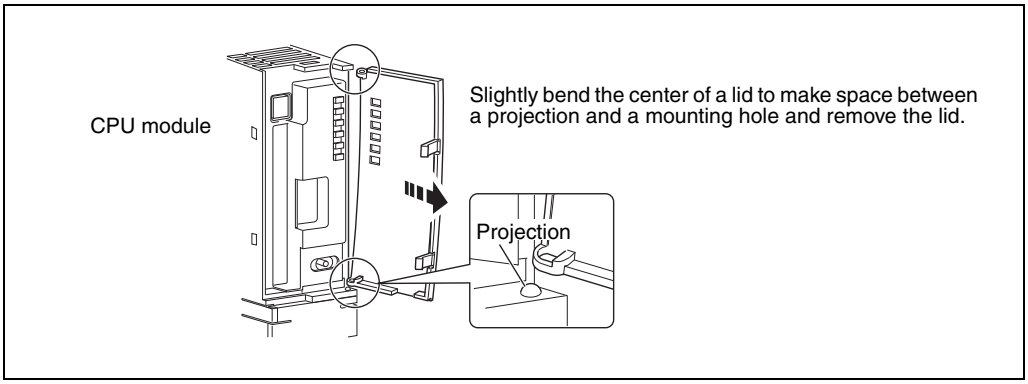


Fig. 5-4: *Remove the lid*

② Install a memory card to a memory card slot of the CPU module main body.

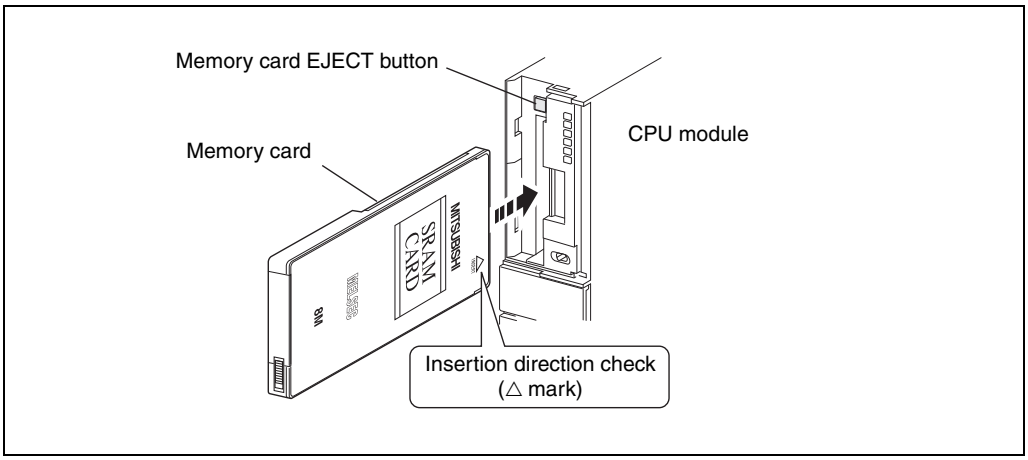


Fig. 5-5: *Installing a memory card*

③ Set a memory card protective cover to the CPU module

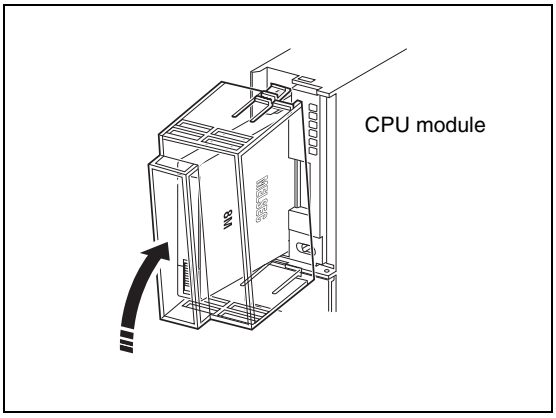


Fig. 5-6:
The cover protects the ATA memory card, sticking out of the CPU module main body.

- Removal

  When removing a memory card Q3MEM-4MBS or Q3MEM-8MBS from the CPU module main body, the memory card protective cover must be removed.

  ① Turn OFF power supply of the CPU module and remove a memory card protective cover from the CPU module.

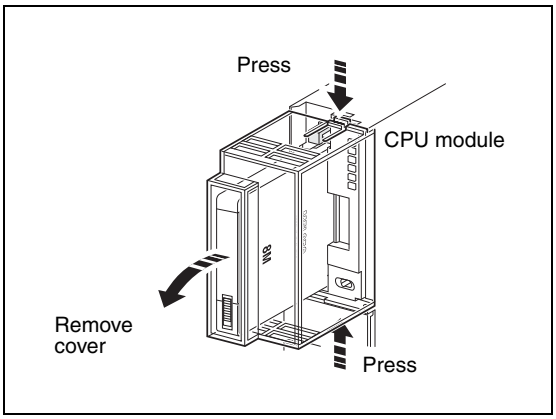


Fig. 5-7:
To remove a memory card protective cover, press fixing claws of top/ bottom.

  ② Press the EJECT button to eject a memory card (refer to sections 4.4.1 and 4.5.1).

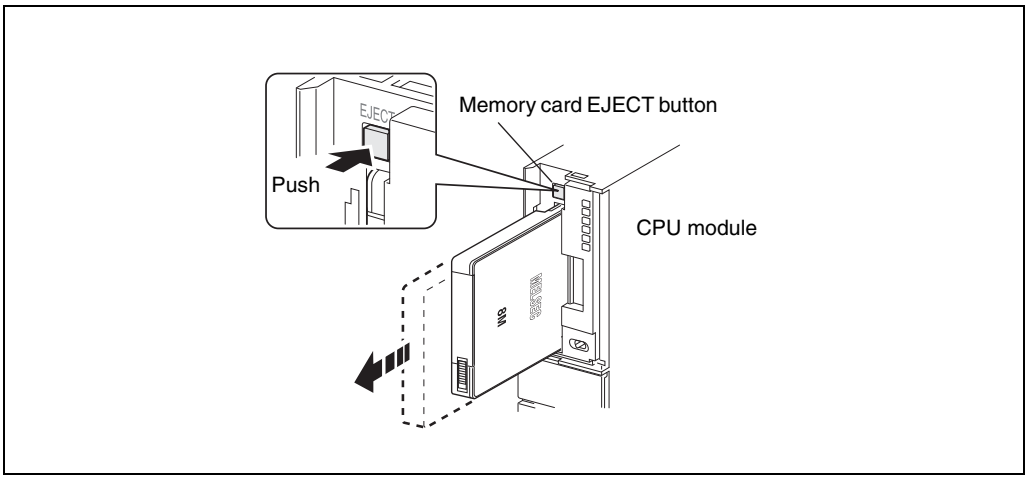


Fig. 5-8: *Removing a memory card*

To remove the memory card during power on

Special relays of the CPU indicate, if a memory card is installed and if it can be removed:

- SM600 = 1: Memory card can be used.
  SM600 = 0: Memory card cannot be used.

  The special relay SM600 is set by the system, when the memory card is installed and ready to use.

- SM604 = 1: Memory card is being used.
  SM604 = 0: Memory card is not being used.

  When accessing the memory card by the CPU module the system sets or resets the special relay SM604.

- SM605 = 1: Memory card removal/insertion prohibited.
  SM605 = 0: Memory card removal/insertion allowed.

  SM605 is turned on/off by the user.

- SM609 = 1: Memory card is being removed.
  SM609 = 0: Memory card removal prohibited.

  SM609 has to be set by the user before removing the memory card and will be reset by the operating system of the CPU after removing the memory card.

Keep the following sequence when removing the memory card with power supply on:

① Turn off "SM605" if it is on.

② Turn on the special relay "SM609" using the sequence program or the programming device.

③ Check the special relays SM600 and SM604 with the programming device, if they are reset.

④ Remove the memory card.

NOTE

Note that the data in the memory card may be damaged if the above mentioned procedures are not performed correctly.
Poor insertion of the memory card may result in "ICM.OPE.ERROR". Also, if the CPU module operation for an error is set to "Stop" in the Parameters, the CPU module stops its operation upon the occurrence of "ICM.OPE.ERROR".

5.1.4 Setting the write protect switch

The data of the SRAM and FlashROM memory card can be protected aginst erasing with the write protect switch.

After shipping, the write protection of the memory card is switched off, so that changing of data is possible all the time.

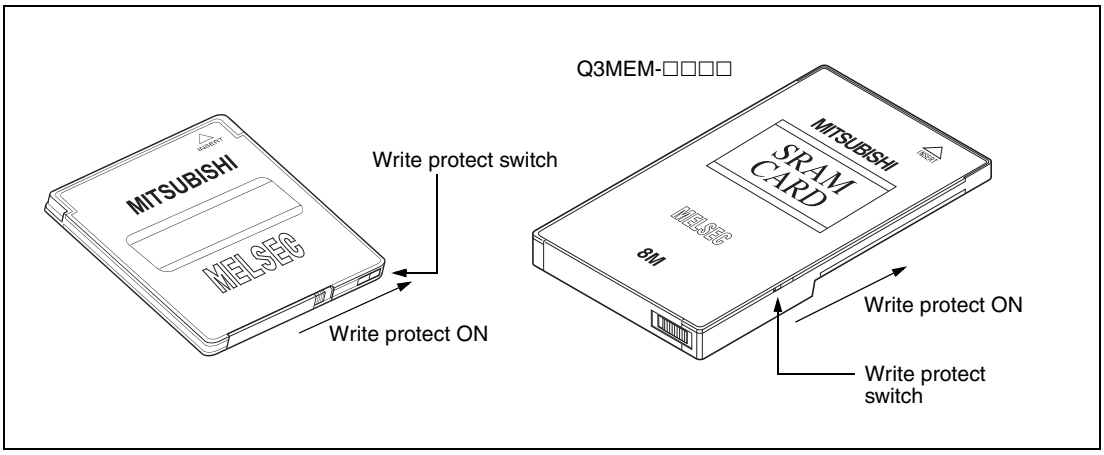


Fig. 5-9: *Write protect switch of memory cards*

5.2 Batteries

The specified life of the battery does not depend on the current consumption. Replace the battery always after this time even if there was no voltage failure during this time (refer to section 10.3.1).

5.2.1 Battery specifications

Item	Q6BAT	Q7BAT*	Q2MEM-BAT	Q3MEM-BAT
Classification	Manganese dioxide lithium primary battery			
Initial voltage	3.0 V	3.0 V	3.0 V	3.0 V
Capacity	1800 mAh	5000 mAh	48 mAh	550 mAh
Battery life when stored	5 years (at 20 °C)			
Application	For data retention of the program memory, standard RAM, and latch device during power failure		Power failure backup for SRAM card Q2MEM-□□□□	Power failure backup for SRAM card Q3MEM-□□□□
Lithium content	0.49 g	1.52 g	0.014 g	0.15 g

Tab. 5-4: *Battery specifications*

* Battery Q7BAT is not available in EU countries.

5.2.2 Battery installation

The battery of the Q00JCPU, Q00CPU and Q01CPU is behind the upper front cover of the CPU module. At all other PLC CPU models of MELSEC System Q mounting of the battery is done from the bottom side.

When shipping, the battery connector is disconnected, to prevent discharge or short circuit of the battery during transport and storage.

Connect the battery before start up.

Q6BAT battery installation procedure

Open the CPU module front cover (for basic model QCPU) or the module bottom cover (for other modules) and confirm that the battery is loaded correctly.

Insert the battery connector into the connector pin on the case. Be sure that the insertion direction is correct.

At those modules where the battery is mounted from the bottom side, check if the connector is properly inserted into the respective holder inside the battery case.

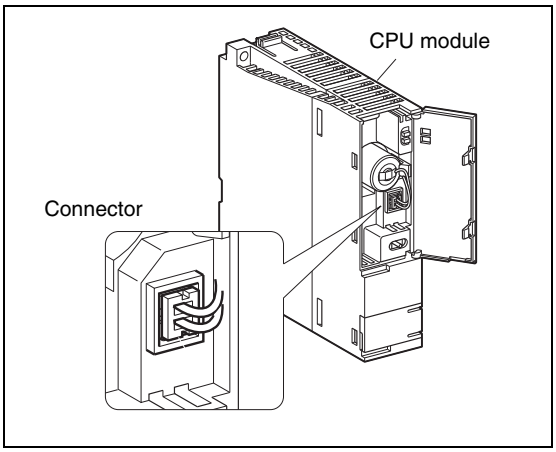


Fig. 5-10:
Location of battery for Basic model QCPU

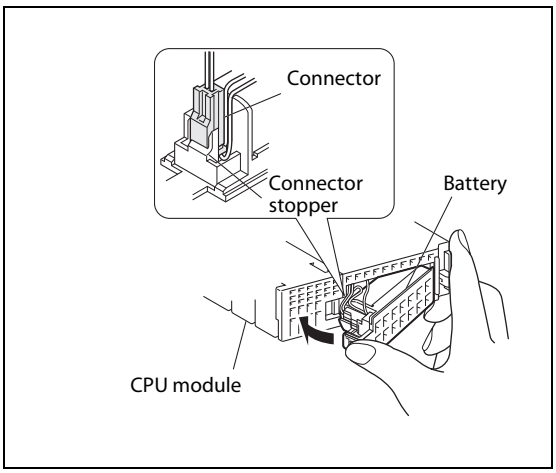


Fig. 5-11:
Location of the battery at the bottom side of the module

Q7BAT-SET battery installation procedure

NOTE

Battery Q7BAT is not available in EU countries.
The following description of mounting the battery Q7BAT is for operation of the MELSEC PLC in a non EU country and for increasing the battery capacity.
For dimensions of the CPU modules with mounted battery Q7BAT refer to the appendix.

The standard battery can be replaced by the battery Q7BAT with considerable higher capacity, except for basic model CPUs Q00JCPU, Q00CPU and Q01CPU. The Q7BAT is not inserted into the battery holder of the CPU module, but mounted with a separate housing under the CPU module.

① Open the CPU module bottom cover.

② Disconnect the connector connecting the Q6BAT to the CPU module.

③ Remove the Q6BAT and cover from the CPU module.

④ Connect the Q7BAT-SET (Battery Q7BAT and battery holder) to the battery connector of the CPU module and set it into the connector holder of the battery holder.

⑤ Mount the battery holder to the CPU module. The same notches are for fixing as for the cover of the battery case.

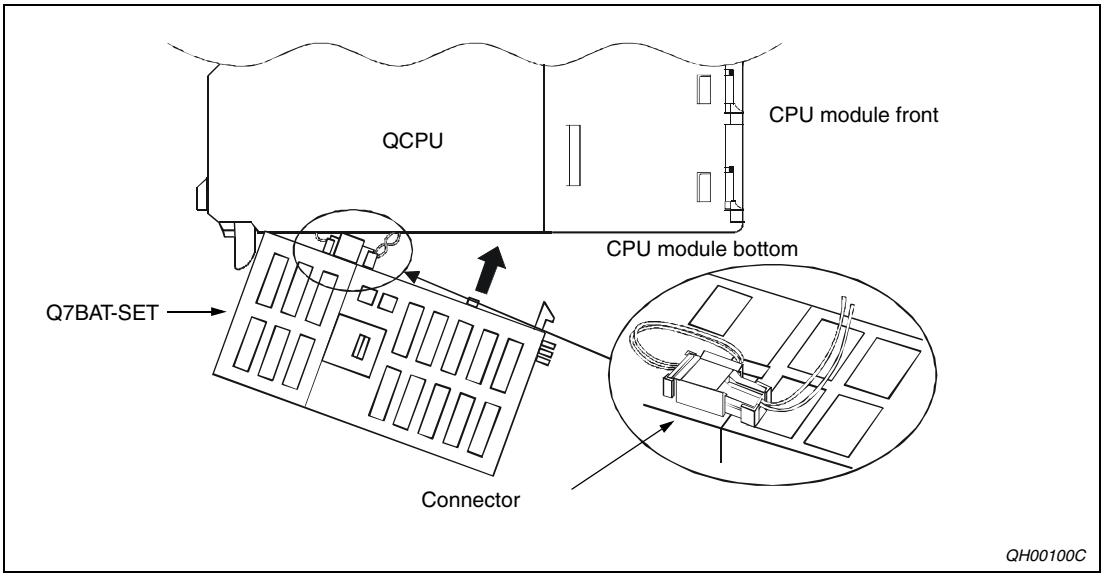


Fig. 5-12: *Q7BAT-SET battery installation procedure*

5.2.3 Battery installation into the memory card

The battery is not mounted into the battery holder to prevent discharge or short circuit during transport and storage.

Insert the buffer battery into the memory card before start up.

Battery installation into the SRAM cards Q2MEM-1MBS and Q2MEM-2MBS

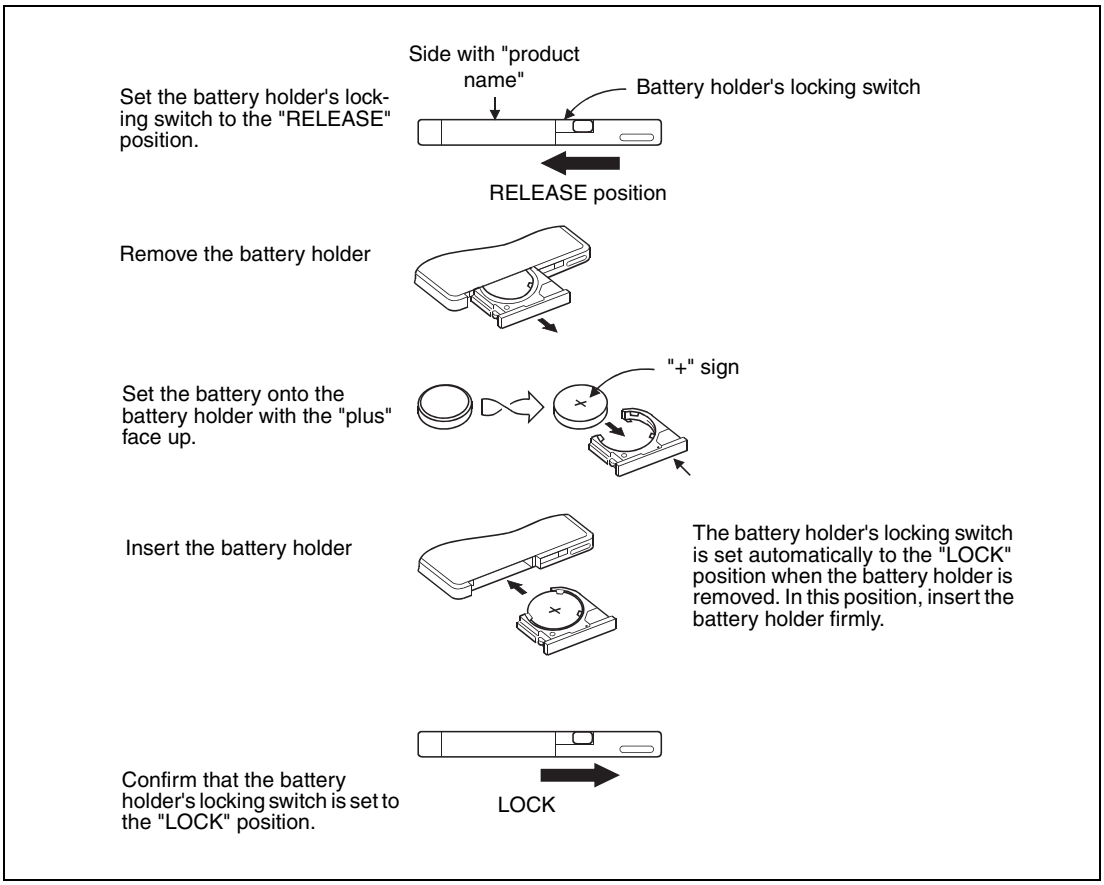
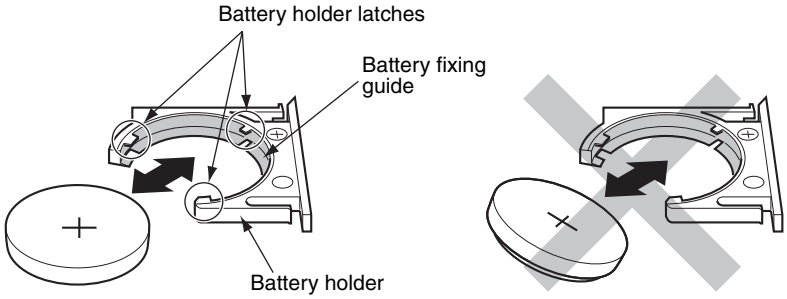


Fig. 5-13: *Battery installation into memory cards Q2MEM-□□□*

NOTE

Insert or remove the battery in the horizontal direction along the battery holder fixing guide. Failure to do so may damage the latches of the battery holder.



Battery installation into the SRAM cards Q3MEM-4MBS and Q3MEM-8MBS

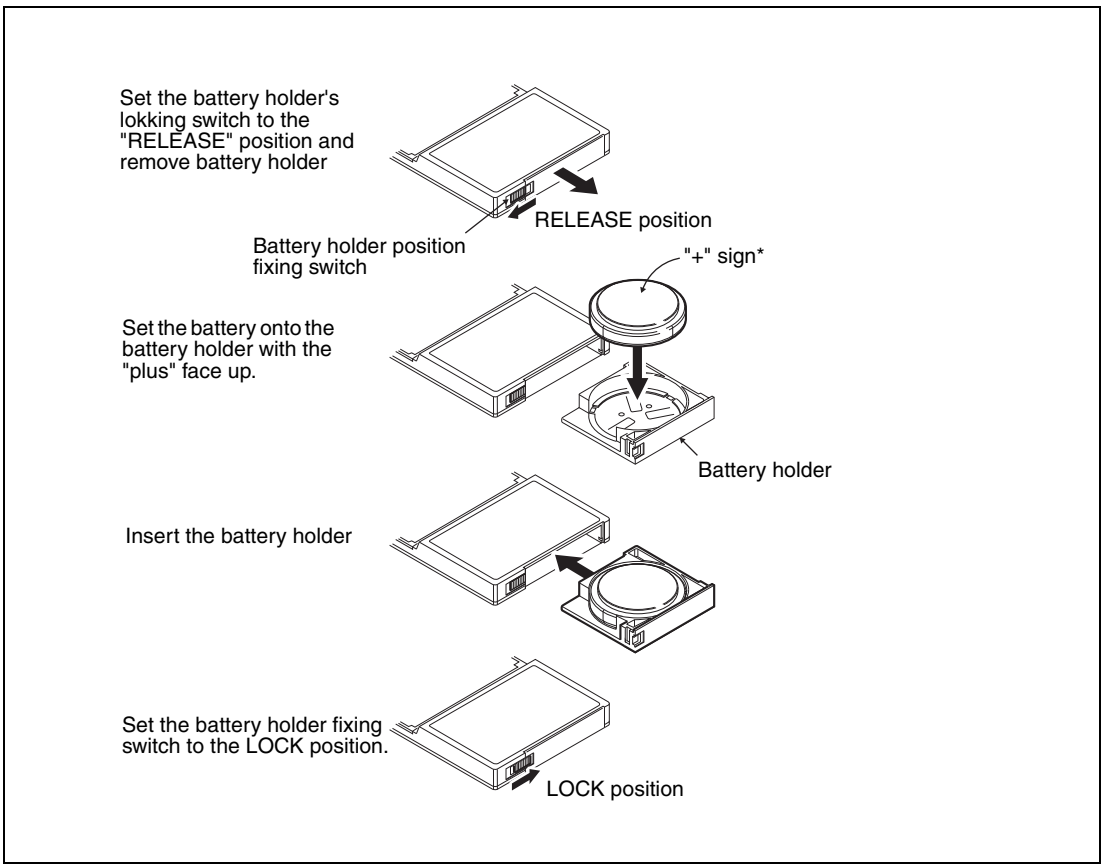
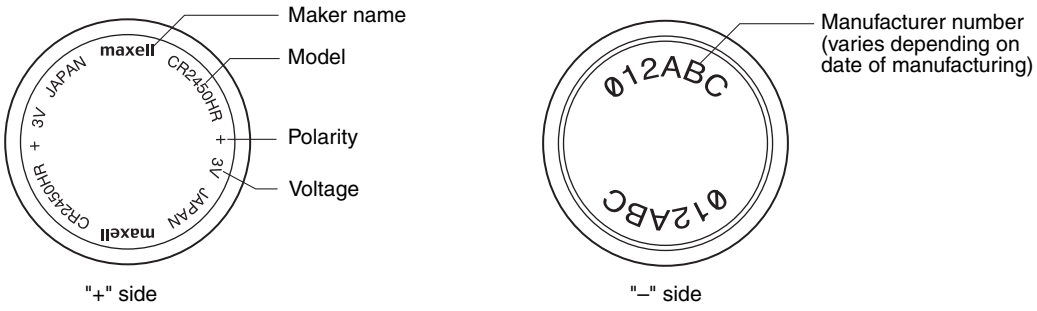


Fig. 5-14: *Battery installation into memory cards Q3MEM-□□□*

* The following figure shows the direction of a battery.



5.2.4 Handling instructions

- Do not short circuit
- Do not open the battery
- Do not place in fire
- Do not heat the battery
- Do not solder the battery

6 Input and output modules

6.1 Selecting I/O modules

Triac outputs

It is recommended to use triac output modules instead of relay output modules if:

- The outputs should be switched in fast sequence on and off
- A load with high inductance or low power factor should be switched

When using relays for these applications, the life of relay contacts is reduced considerably.

On and off times when switching inductive loads

The on and off time for switching an inductive loads must be minimum 1 s.

Inrush current

When controlling external counters or time switches with DC/DC converters, problems can occur at the output module by periodical current peaks, when only the mean value of the current was taken into consideration for selecting the module.

A resistor or an inductance in series to the load can reduce current peaks. Alternatively select an output module for switching higher load currents.

Input response time

The response time of input modules can be set by parameters. Increase the response time for example to disable short noise pulses, which be recognised with short response time as a set input.

On the other hand "real" input pulses may not be recognised, if the response time is set too long. The following table shows the response time and the corresponding minimum recognisable pulse width.

Response time setting [ms]	Minimum value of pulse width that may be imported [ms]
1	0.3
5	3
10	6
20	12
70	45

Tab. 6-1: *Recognisable pulses*

Overload protective function

Fuses installed in output modules cannot be replaced. They are designed to protect external wiring if the module outputs are shorted.

Therefore, output modules may not be protected from a short circuit.

If an output module becomes faulty due to any cause other than a short circuit, its fuse may not function.

Overload and overheat protective functions for QY81P

If an overcurrent keeps flowing due to overload, heat is generated to activate the overheat protective function. This protective function is designed to protect the internal elements of the module, not the external equipment.

The overload protective function is activated in 1 point increments in terms of 1 A to 3 A/point. The overload protective function returns operation to normal when the load becomes a rated load.

The overheat protective function is activated in 2 point increments (Y0/Y1, Y2/Y3, etc.) and when overheat protection is activated, that of 2 points is activated simultaneously. By high temperature of one output circuit the overload protection of other outputs may be activated.

If an output turns ON at the activation of the overheat protective function, the actual output voltage oscillates between 0 V and load voltage.
At the load voltage of 24 V, the average voltage during oscillation is approx. 7 V.

If the output is switched off by the overload protective function, no voltage is output.

To ensure that the output is turned OFF at the activation of the overheat protective function, use an external load which switches OFF at 7 V or more.

The overheat protective function automatically returns operation to normal when heat reduces.

Number of simultaneously set inputs

The number of signals, which can be turned ON simultaneously in an input module, varies according to the input voltage and ambient temperature. The number of inputs, which can be turned ON simultaneously is shown in the following diagrams.

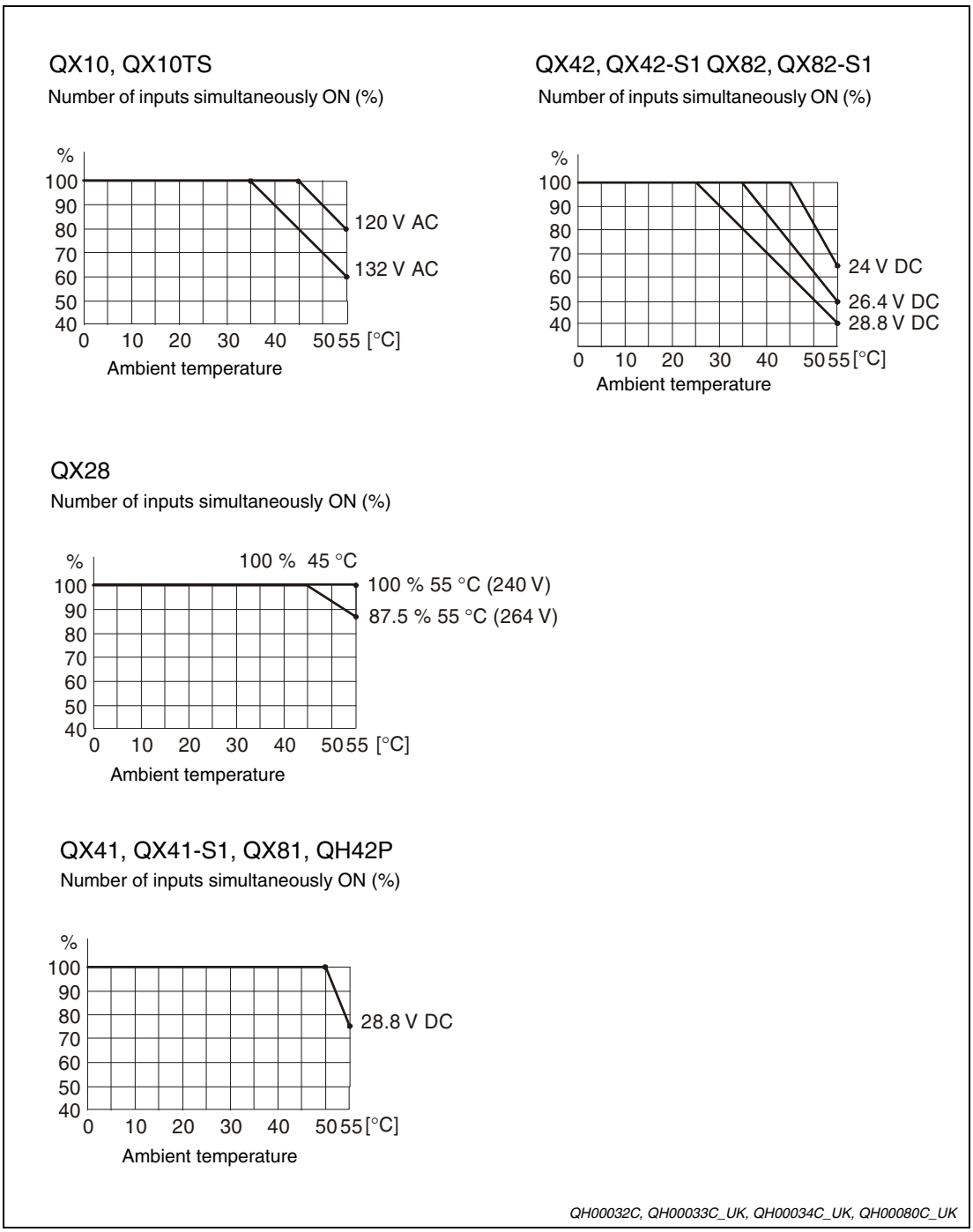


Fig. 6-1: *Maximum number of inputs simultaneously ON*

Service value of relay life

The following chart shows the actual service value of relay life for a relay output module QY10 or QY10-TS.

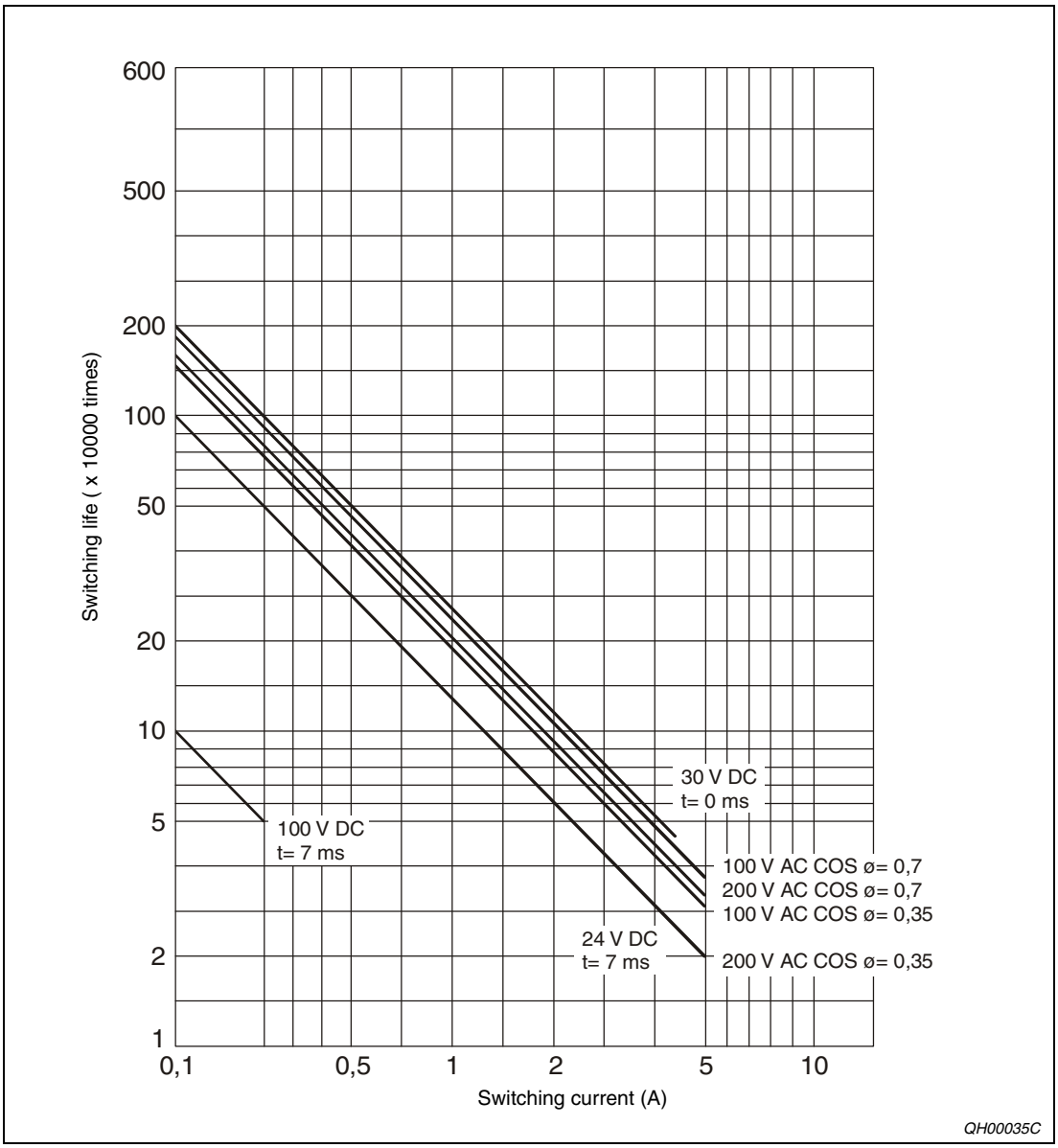


Fig. 6-2: *Service value of relay life depending on switching current*

Screws tightening torque range

Screw location	Tightening torque range
Module fixing screw (M3x12)	36 to 48 Ncm
I/O module terminal block screw (M3)	42 to 58 Ncm
I/O module terminal block mounting screw (M3)	66 to 89 Ncm

Tab. 6-2: *Screws tightening torque range*

6.2 Part names

Part names of I/O modules with terminal block

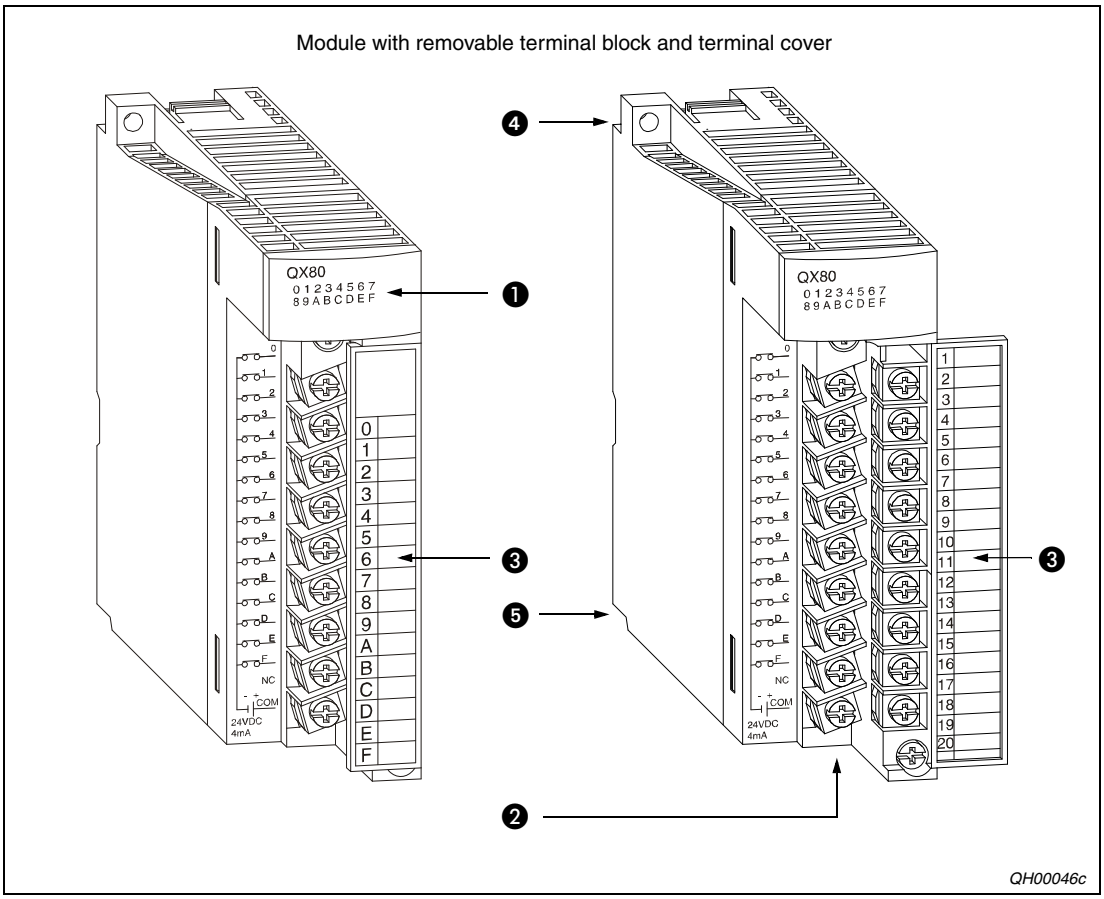


Fig. 6-3: *Part names of I/O modules with terminal block*

No.	Name	Description
❶	I/O indicator LED	Indicates the ON/OFF status of I/O and lit when I/O is ON.
❷	Terminal block	Used to connect power and I/O signal wires.
❸	Terminal cover	The cover protects the terminals against touching.
❹	Module fixing screw hole	Used to fix the module to the base unit (M3x12 screw)
❺	Module loading lever	Used to load the module into the base unit.

Tab. 6-3: *Part names description*

Part names of I/O modules with spring terminals

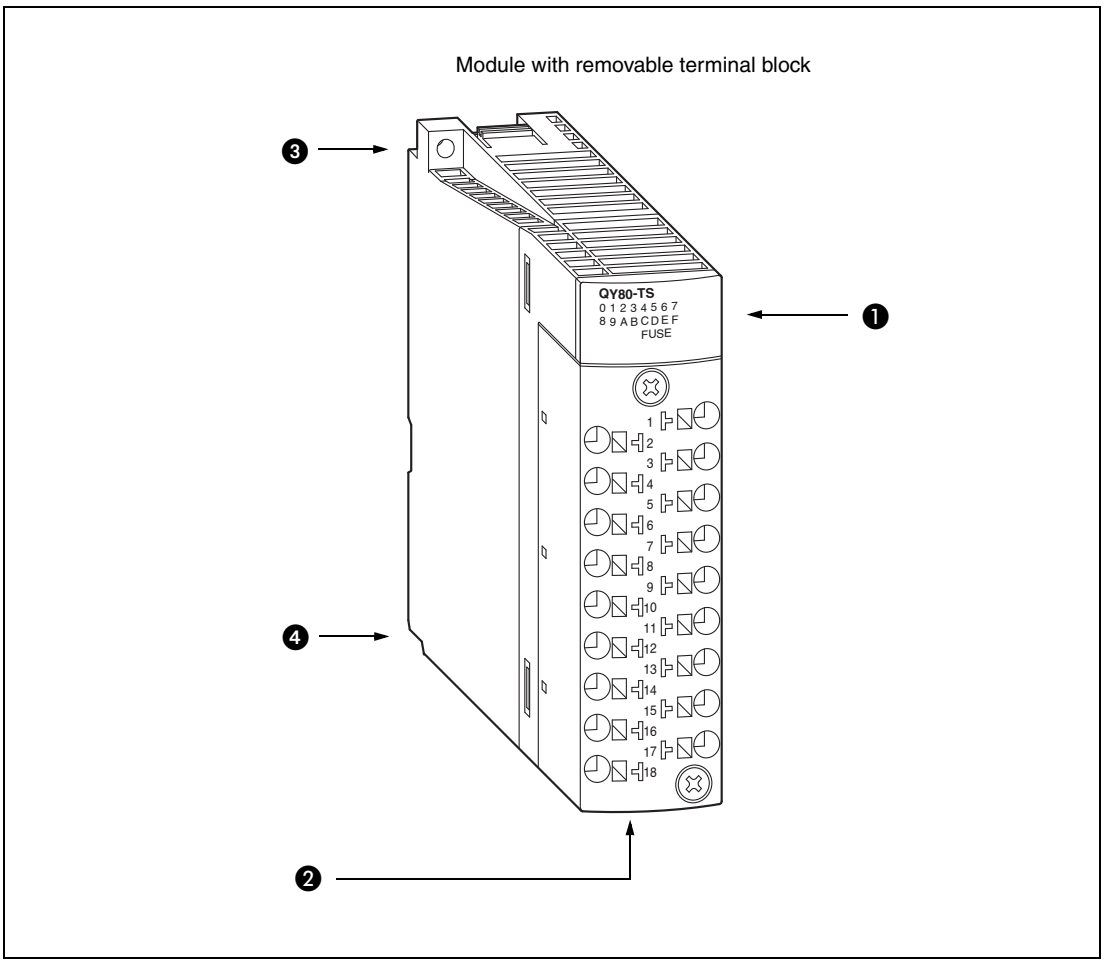


Fig. 6-4: *Part names of I/O modules with spring terminals*

No.	Name	Description
❶	I/O indicator LED	Indicates the ON/OFF status of I/O and lit when I/O is ON.
❷	Terminal block	Spring clamp terminal block for input and output signals and power supply.
❸	Module fixing screw hole	Used to fix the module to the base unit (M3x12 screw)
❹	Module loading lever	Used to load the module into the base unit.

Tab. 6-4: *Part names description*

Part names of modules with connector

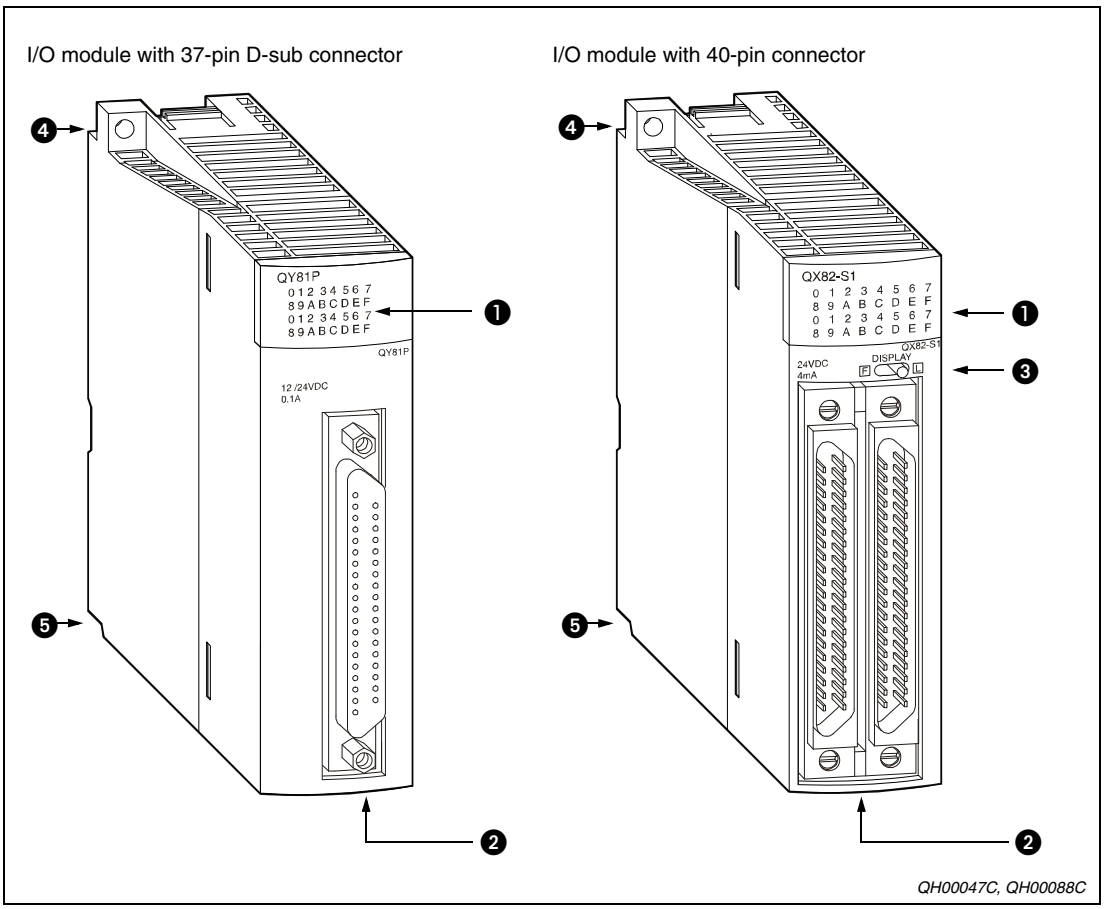


Fig. 6-5: *Part names of modules with connector*

No.	Name	Description
❶	I/O indicator LED	Indicates the ON/OFF status of I/O and lit when I/O is ON.
❷	37-pin D-sub connector 40-pin connector	Designed for 32- or 64-point module and used to connect power and I/O signal wires.
❸	Indication selector switch (64-point modules only)	Used to switch the LED indications between the first-half 32 points and latter-half 32 points of a 64-point module.
❹	Module fixing screw hole	Used to fix the module to the base unit (M3x12 screw)
❺	Module loading lever	Used to load the module into the base unit.

Tab. 6-5: *Part names description*

7 Power supply modules

7.1 Overview

Observe the input voltage, output current and the power consumption of the mounted modules when selecting the power supply.

For information about power consumption of the different modules refer tochapter 3 and chapter 12.

Redundant power supply

To continue the operation of a PLC system or remote I/O station, when a power supply failure occurs, two of each power supply Q63RP or Q64RP can be mounted on a base unit Q38RB, Q68RB or Q65WRB.

During normal operation (no power supply failure) the base unit is supplied by both power supplies. If a failure of one power supply occurs, the other power supply takes over the total supply of the base unit. The LED of the failed power supply changes its colour from green to red. Replacement of the module is possible, during system operation.

In case of a failure the total supply is done by one power supply. Therefore the current of the base unit and of the mounted modules must not exceed 8.5 A.

When connecting the uninterruptive power supply (UPS)

In case of connecting the power supplies to an UPS (uninterruptable power supply), the input voltage of the power supplies may go maximum 5 % below the rated voltage.

Notes on handling

CAUTION:

- ***Note the different input voltages of the power supplies.***
- ***Do not drop the devices or subject them to heavy impact.***
- ***Do not remove the printed-circuit board of the device from its case.***
- ***When drilling screw holes or wiring, cutting chips or wire chips should not enter ventilation slits.***
- ***Tighten the fixing screws using torque within the ranges of the table 7-1.***

Screw	Tightening torque range (Ncm)
Terminal screw (M3.5x7)	66 to 89
Module fixing screw (M3x12)	36 to 48

Tab. 7-1: *Tightening torque range*

7.2 Selecting the power supply module

7.2.1 Base unit that can be used in combination with power supply module

Following table describes the base unit that can be used in combination with the power supply module respectively.

Power supply module	Base unit							
	Main base unit				Extension base unit			
	Q33B Q35B Q38B Q312B	Q32SB Q33SB Q35SB	Q38RB	Q38DB Q312DB	Q52B Q55B	Q63B Q65B Q68B Q612B	Q68RB	Q65WRB
Q61P-A1 Q61P-A2 Q61P Q61P-D Q62P Q63P Q64P Q64PN	●	○	○	●	○	●	○	○
Q61SP	○	●	○	○	○	○	○	○
Q63RP Q64RP	○	○	●	○	○	○	●	●*

Tab. 7-2: *Combinations of base units and power supply modules*

○: Combination not available

●: Combination available

* When mounting the Q64RP to the Q65WRB, use the Q64RP whose serial number (first six digits) is "081103" or later. The vibration condition described in the general specifications may not be met if the the Q64RP whose serial number (first six digits) is "081102" or earlier is mounted.

7.2.2 Output currents of the power supplies

The power consumption of the base unit and of the mounted CPU, I/O and intelligent function modules must not exceed maximum current of the power supply. Calculate the overall current consumption before selecting a power supply.

Main base unit	Rated output current of power supply module at 5 V DC	Power supply module
Q33B Q35B Q38B Q312B Q38DB Q312DB	3.0 A	Q61P-A1, Q61P-A2, Q61P, Q61P-D, Q63P
	6.0 A	Q62P
	8.5 A	Q64P, Q64PN
Q32SB Q33SB Q35SB	2.0 A	Q61SP
Q38RB	8.5 A	Q63RP, Q64RP

Tab. 7-3: *Selecting the power supply modules for main base units*

Extension base unit	Rated output current of power supply module at 5 V DC	Power supply module
Q63B Q65B Q68B Q612B	3.0 A	Q61P-A1, Q61P-A2, Q61P, Q61P-D, Q63P
	6.0 A	Q62P
	8.5 A	Q64P, Q64PN
Q68RB Q65WRB	8.5 A	Q63RP, Q64RP

Tab. 7-4: *Selecting the power supply modules for extension base units*

7.2.3 Life detection power supply module Q61P-D

The power supply Q61P-D is equipped with life detection. This function estimates the remanent life time of the power supply and indicates it by a LED and by an isolated contact. Together with the POWER LED, failure diagnostics are also possible.

<table>
<tr><th colspan="3">LED located on the front of the module</th><th rowspan="2">LIFE OUT terminal</th><th rowspan="2">Module status</th></tr>
<tr><th>POWER</th><th colspan="2">LIFE</th></tr>
<tr><td>OFF</td><td colspan="2">OFF</td><td>OFF</td><td>• AC power is not input
• Power failure (including momentary power failure for 20 ms or more)
• Power supply module failure</td></tr>
<tr><td rowspan="7">ON (green)</td><td colspan="2">ON (green)</td><td rowspan="2">ON</td><td>Normal operation</td></tr>
<tr><td colspan="2">ON (orange)</td><td>Normal operation (Remaining life approx. 50 %)*</td></tr>
<tr><td rowspan="2">Flicker (orange)</td><td>ON: 5 s
OFF: 1 s</td><td rowspan="3">OFF</td><td>Normal operation (Remaining life approx. 1 year)*
Replacement of the module is recommended</td></tr>
<tr><td>ON: 0.5 s
OFF: 0.5 s</td><td>Normal operation
(Remaining life approx. 6 months)*</td></tr>
<tr><td colspan="2">OFF</td><td>Life expired</td></tr>
<tr><td colspan="2">ON (red)</td><td rowspan="3">Turns off and on three times at intervals of 1 second and then off</td><td>Ambient temperature is out of range (Ambient temperature is exceeding the specification)</td></tr>
<tr><td>Flicker (red)</td><td>ON: 1 s
OFF: 1 s</td><td>Function failure (Normal processing is not available due to a failure of the life diagnostics circuit in the module)</td></tr>
<tr><td colspan="2" rowspan="2">OFF</td><td>Ambient temperature is out of range (Ambient temperature is exceeding the specification and also the life detection function has stopped.)</td></tr>
<tr><td>ON (orange)</td><td>OFF</td><td>Watchdog timer error in the module</td></tr>
</table>

Tab. 7-5: *Indication of remaining life (power supply module Q61P-D)*

* The remaining life of the module varies depending on the ambient temperature.
(If the ambient temperature rises by 10 °C, the remaining life of the module will be shortened by half.)

Connect the terminal $\overline{\text{LIFE OUT}}$ to an external lamp or to an PLC input for monitoring by the sequence program to recognise a shorted lifetime.

7.3 Part names

Main differences between the power supplies are their input voltages. The output voltage of 5 V is directly input to the base unit and not accessible by terminals.

Besides the 5 V output, the Q62P has an additional output with 24 V/0.6 A.

Q61P-A1, Q61P-A2, Q61P, Q61P-D, Q61SP, Q62P, Q63P, Q64P, Q64PN

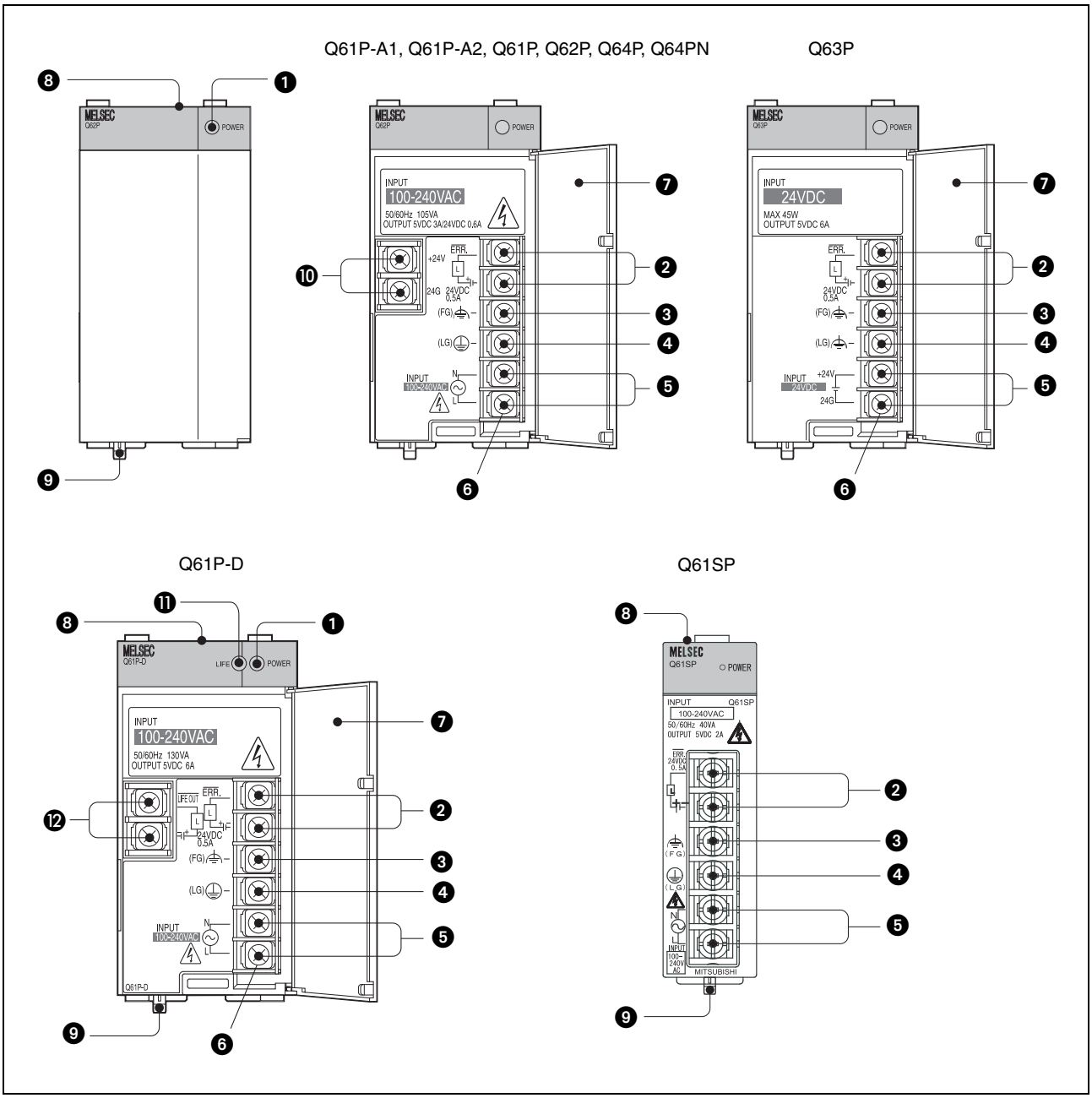


Fig. 7-1: *Part names of power supply modules*

No.	Name	Application
❶	POWER LED	Operation indication: • ON (green): Normal (5 V DC output) • OFF: – DC power supply is not on – blown fuse – Power failure (including an momentary power failure longer than the allowable momentary power failure period) – DC power supply is on but the power supply module is out of order. (5 V DC error, overload, internal circuit failure)
❷	$\overline{\text{ERR}}$ terminal	Error output (max. 24 V, 0.5 A) Turns on when the entire system operates normally. Turns off (opens) when • a stop error (including reset) occurs in the CPU module • AC power is not supplied • the fuse is blown. In a multiple CPU system, turns off when a stop error occurs in any of the CPU modules. Normally off when mounted on an extension base unit.
❸	FG terminal	Ground terminal connected to the shield pattern of the printed circuit board.
❹	LG terminal	Grounding for the power supply filter.
❺	Power input terminals	Terminals for input voltage of the power supply
❻	Terminal screw	M3.5x7
❼	Terminal cover	Protective cover of the terminal block
❽	Module fixing screw hole	Used to secure the module to the base unit. M3x12 screw (user-prepared)
❾	Module mounting lever	This spring loaded lever simplifies disassembling of the module from the base unit.
❿	24 V DC terminal	Used to supply 24 V DC/0.6 A power to inside the output module (Q62P only)
⓫	LIFE LED	Indication of life detection function: • ON (green): When operation has started • ON (orange): Remaining life of the module approx. 50 % • Flash (orange): On for 5 seconds and off for 1 second: Module remaining life is approx. 1 year. At intervals of 0.5 seconds: Module remaining life is approx. 6 months • Flash (red): Function failure • ON (red): Ambient temperature out of range (Ambient temperature of the module is exceeding the specification) • OFF: – Module life expired. (Turns on red for 1 second after power-on) – Ambient temperature is out of range (Ambient temperature of the module is exceeding the specification and also the life detection function is stopped.)
⓬	$\overline{\text{LIFE OUT}}$ terminal	Output signal of the terminal turns off (opens) when • module remaining life is 1 year or less • the watchdog timer error is detected in the module (in this case POWER LED is on in orange). The output signal of the terminal turns off and on at intervals of one second for three times and then off (opens) when • the ambient temperature is detected out of range • the life diagnostics error (including detection error) is detected The above operations are also available when the module Q61P-D is mounted on an extension base unit. (In this case the POWER LED of the Q61P-D on the extension base unit may turn on in dull red when the module is turned off. Note that this does not indicate an error.)

Tab. 7-6: *Description for part names of power supply modules*

Q63RP and Q64RP

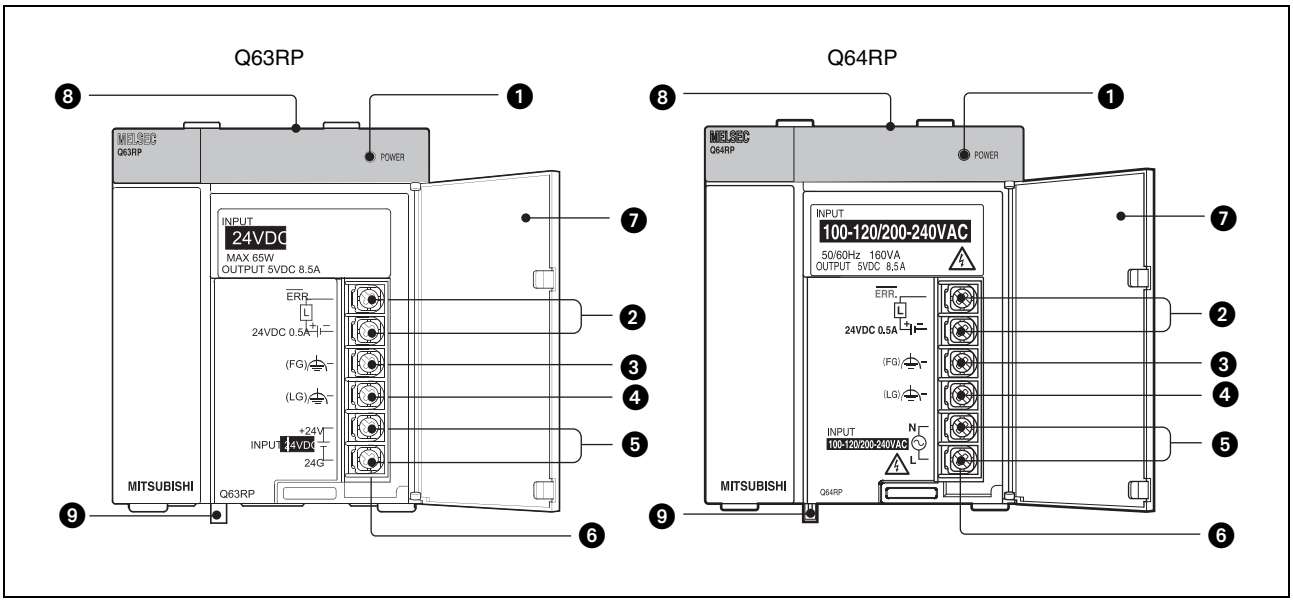


Fig. 7-2: *Part names of power supply modules Q63RP and Q64RP*

No.	Name	Application
❶	POWER LED	Operation indication: • ON (green): Normal operation (5 V DC output) • ON (red): DC power is input but the power supply module is faulty (5 V DC error, overload, or internal circuit failure) • OFF: – DC power not input, power failure (including momentary power failure longer than the allowable momentary power failure period) – blown fuse
❷	$\overline{\text{ERR}}$ terminal	Error output (max. 24 V, 0.5 A) • When power supply is mounted on redundant power main base unit (Q3□RB): Turns on when the system on the redundant power main base unit operates normally. Turns off (open) when – the power supply module fails – the DC power supply is not input – a CPU module stop error (including a reset) occurs – or the fuse is blown. Turns off (open) when a stop error occurs in any of the CPU modules in a multiple CPU system. • When power supply is mounted on redundant power extension base unit (Q6□RB): Turns on when the power supply module operates normally Turns off (open) when – the power supply module fails – the DC power supply is not input – or the fuse is blown.
❸	FG terminal	Ground terminal connected to the shield pattern of the printed circuit board.
❹	LG terminal	Grounding for the power supply filter.
❺	Power input terminals	Terminals for input voltage of the power supply
❻	Terminal screw	M3.5x7
❼	Terminal cover	Protective cover of the terminal block
❽	Module fixing screw hole	Screw hole for securing a module to the base unit. M3x12 screw (user-prepared)
❾	Module mounting lever	This spring loaded lever simplifies disassembling of the module from the base unit.

Tab. 7-7: *Description for part names of power supply modules*

7.4 Wiring of power supply modules

The following figure shows the schematic wiring of the different power supply types.

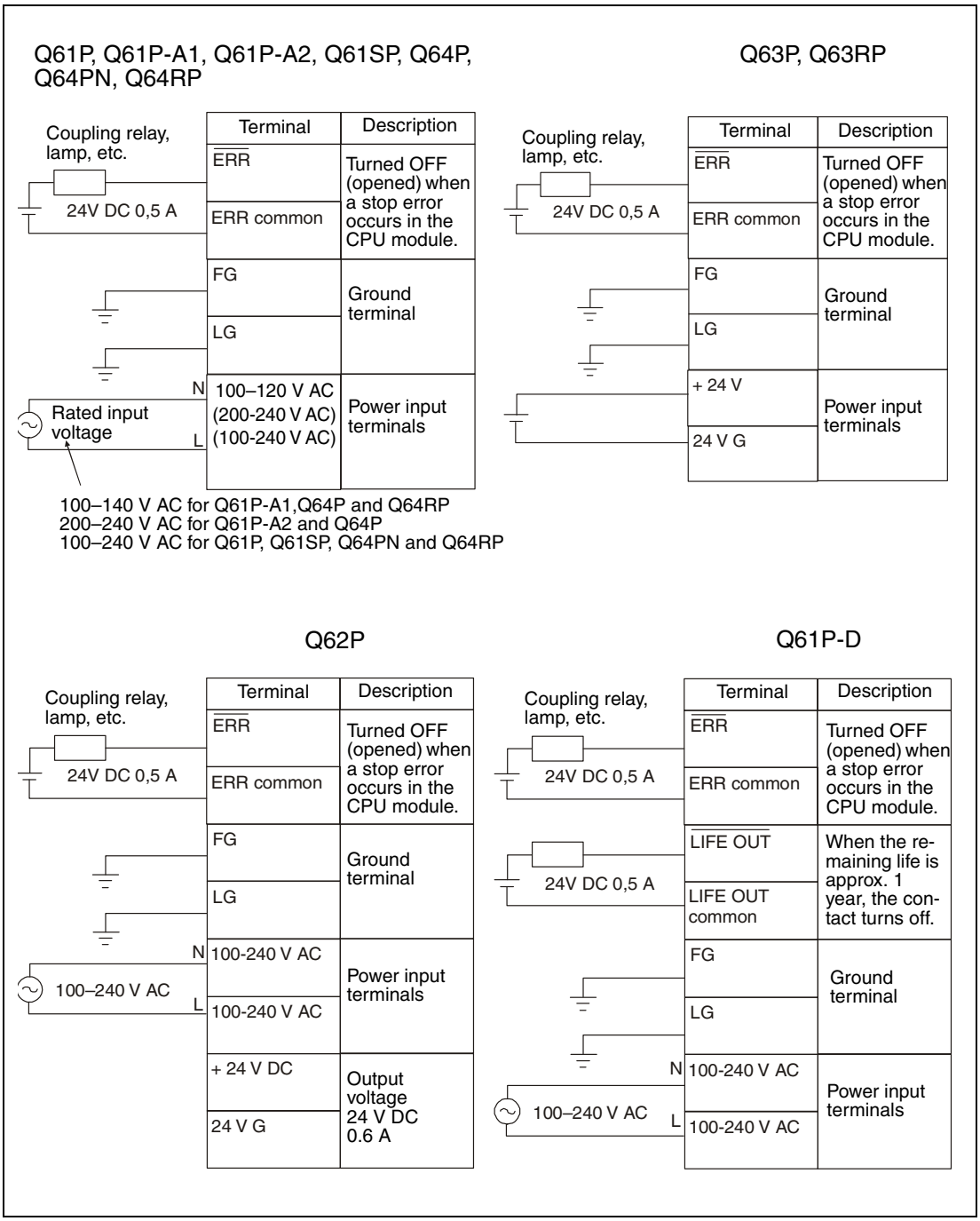


Fig. 7-3: *Wiring of power supply modules*

NOTES

Ground the LG and FG terminals to the protective ground conductor.

Check the rated voltage and terminal layout of the power supply carefully, before wiring.

When one of the redundant power supplies Q63RP or Q64RP fails or when the input voltage of one power supply shuts off, the other one takes over the whole power supply. Specify your redundant system, that the capacity of one power supply is sufficient for the power consumption of all modules.
When using two power supplies per base unit, the input voltage should be separated with separate fuses, contactors etc. For replacement of one power supply due to failure or maintenance, each power supply should be switched off separately.

The internal fuse of the power supplies can't be replaced by the user. Please contact your local Mitsubishi service center or representative for replacing.

Use the output contact $\overline{\text{ERR}}$ to indicate a failure. Only wire this output when needed. The maximum cable length must not exceed 30 m.
The output contact $\overline{\text{ERR}}$ has no function (always off) when the power supply is mounted on an extension base unit.

Do not input a voltage of 200 to 240 V AC into the Q61P-A1 or a voltage of 100 to 120 V AC into the Q61P-A2.

The Q64P and Q64RP automatically recognize the rated input voltage waveform to switch the input voltage between 100 to 120 V AC and 200 to 240 V AC. Input voltages from 85 to 132 V AC and 170 to 264 V AC are possible.
Q64P and Q64RP are not compatible with the intermediate voltage (133 to 169 V AC).

The maximum cable length for the $\overline{\text{LIFE OUT}}$ contact must not exceed 30 m.

8 Base units

8.1 Overview

The MELSEC System Q offers a wide variety of main and extension base units. Up to four CPU modules, one power supply, input/output modules and intelligent function modules can be mounted on the main base units Q33B-E, Q35B-E, Q38B-E and Q312B-E. Two redundant power supplies Q63RP or Q64RP can be mounted on the main base unit Q38RB-E, so that system performance is increased. This main base unit has additionally 8 slots for up to four CPU moduls and I/O or intelligent function modules.

The compact dimensions of the main base units Q32SB, Q33SB and Q35SB allow to build space saving PLC systems.*

The extension base units Q52B and Q55B have no power supply slot and are supplied by the power supply of the main base unit over the extension cable.

Input, output and intelligent function modules can be mounted on the extension base units Q63B, Q65B, Q68B and Q612B. It has its own power supply for the modules. Use the extension base unit Q68RB for two redundant power supplies Q63RP or Q64RP, to continue operation while one power supply fails.

The base units are connected by extension cable.

* The main base units Q32SB, Q33SB and Q35SB have no connector for an extension base unit. Therefore the connection of extension base units or GOTs is not possible via the extension bus.

8.1.1 Extension base units that can be combined with the main base unit

The following table shows the possible combinations of main and extension base units of MELSEC System Q.

Main base unit	Extension base unit			
	Q52B Q55B	Q63B Q65B Q68B Q612B	Q68RB	Q65WRB ②
Q00JCPU ① Q00UJCPU ①	●	●	○	○
Q33B Q35B Q38B Q312B	●	●	○	●
Q32SB Q33SB Q35SB	○	○	○	○
Q38RB	●	○	●	●
Q38DB Q312DB	●	●	○	○

Tab. 8-1: *Combination of base units*

○: Combination not available

●: Combination available

① Combination of base unit, power supply module and CPU

② Applicable only in a redundant system.

8.1.2 Precautions on using the base units Q52B and Q55B

When extension base unit Q52B or Q55B is used, a power of 5 V DC is supplied from the power supply module on the main base unit through an extension cable.

Observe the following points, when specifying a PLC system with the base units Q52B and Q55B:

- The power consumption of the modules mounted on the main base unit and on the base units Q52B and Q55B must not exceed the output current of the main base unit power supply.
- When using the Q52B or Q55B, make sure that the "IN" connector of the Q52B or Q55B is supplied with 4.75 V DC or higher.
- The Q5□B can be used if the voltage drop caused by extension cable is 0.15 V DC or lower. You can calculate the voltage drop occuring at extension cables by multiplying the extension cable conductor resistance (refer to section 8.2) with the power consumption of the extension base unit. Load large current consumption modules on the main base unit.
- For connection of extension base unit Q52B and QQ55B the use of cable Q05B is strongly recommended.

8.2 Extension cable

The extension cables are connected to transfer signals between a main base unit and an extension base unit or between extension base units.

Item		QC05B	QC06B	QC12B	QC30B	QC50B	QC100B
Cable length	m	0.45	0.6	1.2	3.0	5.0	10.0
Conductor resistance value	Ω	0.044	0.051	0.082	0.172	0.273	0.530
Weight	kg	0.15	0.16	0.22	0.40	0.60	1.11

Tab. 8-2: *Extension cable specifications*

CAUTION:

When the extension cables are used in combination, overall distance of the combined cable must be 13.2 m or less.

8.3 Part names and settings

CAUTION:

- ***Do not drop the parts or subject them to heavy impact.***
- ***Do not remove the printed-circuit board of the parts from their cases.***
- ***When drilling screw holes or wiring, cutting chips or wire chips should not enter ventilation slits.***

8.3.1 Part names

Main base units Q33B-E, Q35B-E, Q38B-E, Q38RB-E, Q312B-E, Q38DB, Q312DB

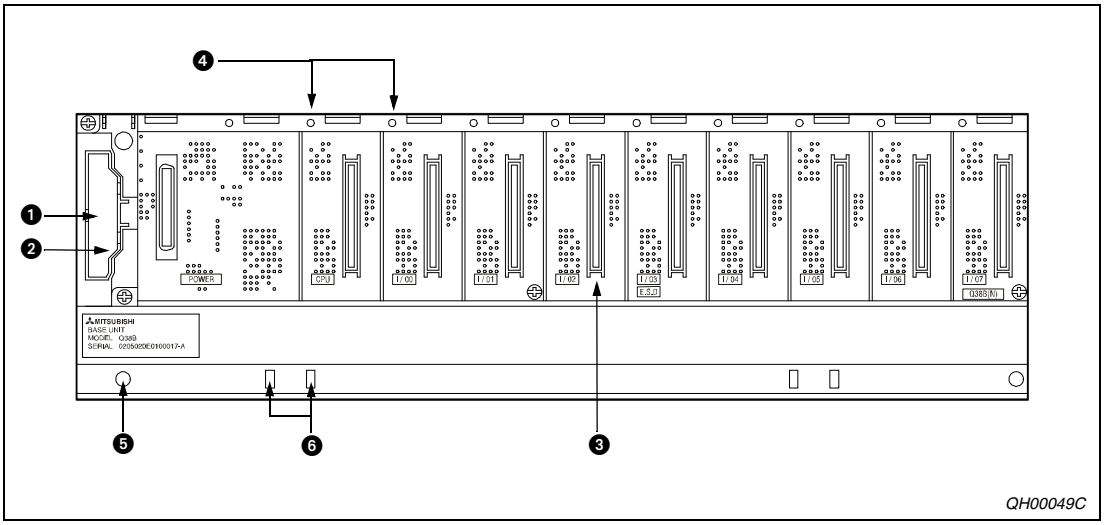


Fig. 8-1: *Part names of main base units Q3□B, Q3□RB and Q3□DB*

No.	Name	Application
❶	Extension cable connector	Connector for connecting an extension cable (for signal communications with the extension base unit).
❷	Base cover	Do not remove the whole cover. 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.
❸	Module connector	Connectors for installing the Q series power supply module (two redundant power supply modules for the Q38RB-E), up to four CPU modules, I/O modules, and intelligent function modules. 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.
❹	Module fixing screw hole	Screw hole for fixing the module to the base unit. Screw size: M3x12
❺	Base mounting hole	Hole for mounting this base unit onto the panel such as a control panel (for M4 screw)
❻	DIN rail adapter mounting hole	Hole for mounting DIN rail adapter.

Tab. 8-3: *Description for part names of main base units*

Main base units Q32SB, Q33SB and Q35SB

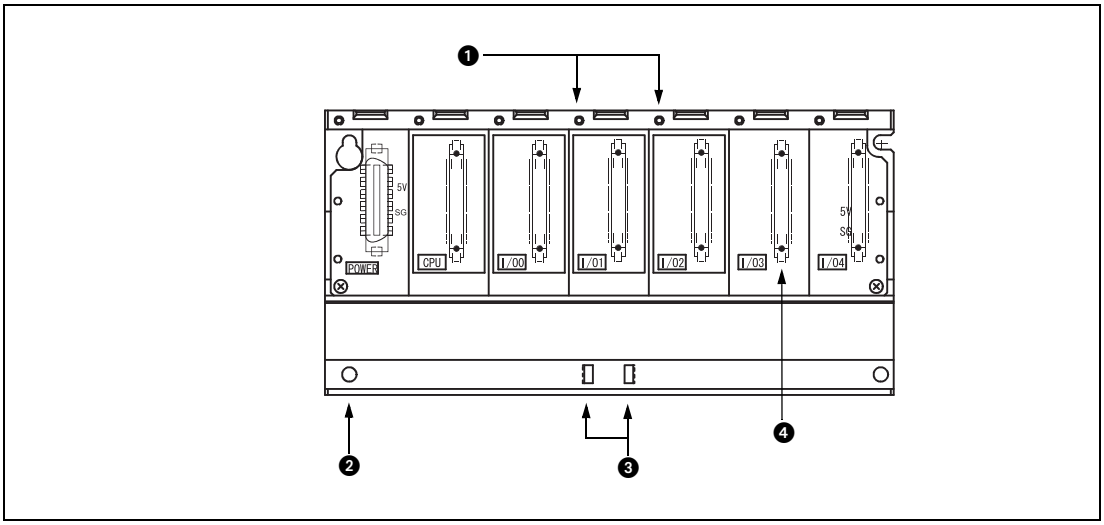


Fig. 8-2: *Part names of main base units Q3□SB*

No.	Name	Application
❶	Module fixing screw hole	Screw hole for fixing the module to the base unit. Screw size: M3x12
❷	Base mounting hole	Hole for mounting this base unit onto the panel such as a control panel (for M4 screw)
❸	DIN rail adapter mounting hole	Hole for mounting DIN rail adapter.
❹	Module connector	Connectors for installing the Q series power supply module, CPU modules, I/O modules, and intelligent function modules. 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.

Tab. 8-4: *Description for part names of main base units Q3□SB*

Extension base units Q52B and Q55B

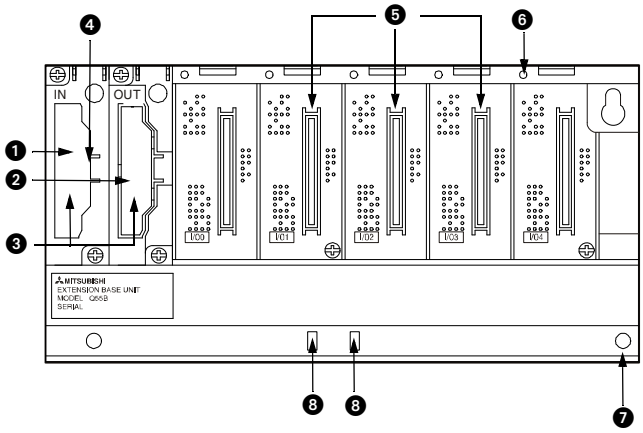


Fig. 8-3: *Part names of extension base units Q52B and Q55B*

No.	Name	Application
❶	Extension cable connector (IN)	Connector for connecting an extension cable (IN) (for signal communications with the main base unit or other extension base unit)
❷	Extension cable connector (OUT)	Connector for connecting an extension cable (OUT) (for signal communications with another extension base unit).
❸	Base cover of cable connectors	Protective cover of extension cable connector.
❹	Stage No. setting connector	Connector for setting the number of bases of the extension base unit. 7 extension stages can be set.
❺	Module connector	Connectors for installing the I/O modules and intelligent function modules. 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.
❻	Module fixing screw hole	Screw hole for fixing the module to the base unit. Screw size: M3x12
❼	Base mounting hole	Hole for mounting this base unit onto the panel such as a control panel (for M4 screw)
❽	DIN rail adapter mounting hole	Hole for mounting DIN rail adapter.

Tab. 8-5: *Description for part names of extension base units Q52B and Q55B*

Extension base units Q63B, Q65B, Q68B Q68RB and Q612B

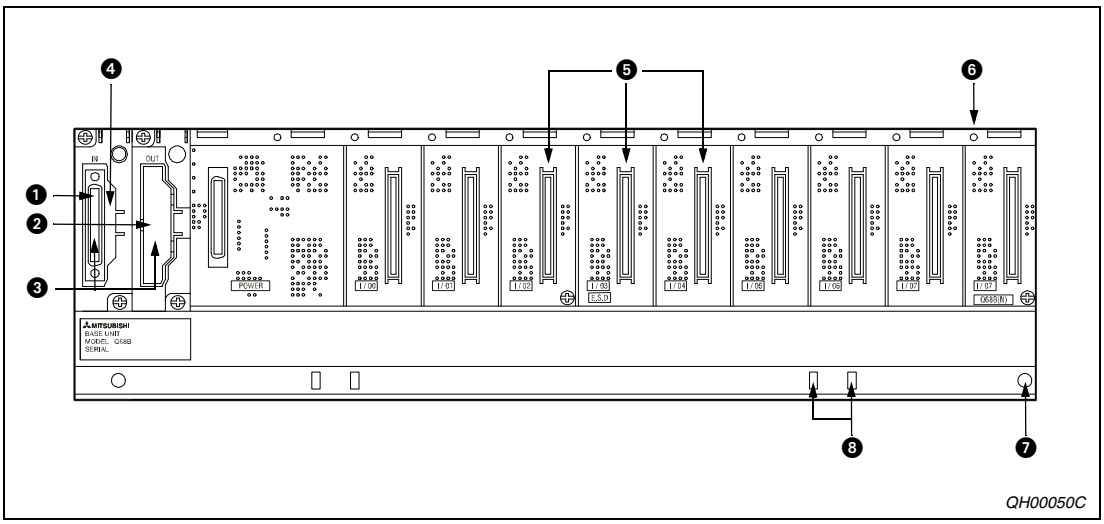


Fig. 8-4: *Part names of extension base units*

No.	Name	Application
❶	Extension cable connector (IN)	Connector for connecting an extension cable (IN) (for signal communications with the main base unit or other extension base unit)
❷	Extension cable connector (OUT)	Connector for connecting an extension cable (OUT) (for signal communications with another extension base unit).
❸	Base cover of cable connectors	Protective cover of extension cable connector.
❹	Stage No. setting connector	Connector for setting the number of bases of the extension base unit. 7 extension stages can be set.
❺	Module connector	Connectors for installing the power supply module (two redundant power supply modules for the Q38RB), I/O modules, and intelligent function modules. 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.
❻	Module fixing screw hole	Screw hole for fixing the module to the base unit. Screw size: M3x12
❼	Base mounting hole	Hole for mounting this base unit onto the panel such as a control panel (for M4 screw)
❽	DIN rail adapter mounting hole	Hole for mounting DIN rail adapter.

Tab. 8-6: *Description for part names of extension base units*

Redundant extension base unit Q65WRB

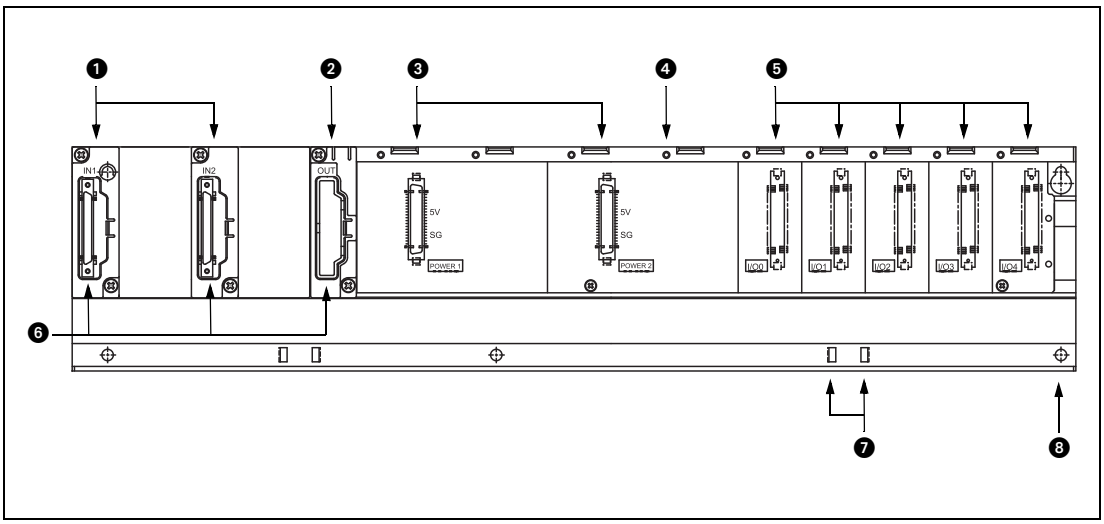


Fig. 8-5: *Part names of redundant extension base unit Q65WRB*

No.	Name	Application
❶	Extension cable connectors (IN1 and IN2)	Connector for connecting an extension cable (for signal communications with the redundant system of the main base unit).
❷	Extension cable connectors (OUT)	Connector for connecting an extension cable (OUT) (for signal communications with an extension base unit Q68RB).
❸	Connectors for power supply modules	Connectors for installing two redundant power supply modules Q63RP or Q64RP.
❹	Module fixing screw hole	Screw hole for fixing the module to the base unit. Screw size: M3x12
❺	Module connector	Connectors for installing the I/O modules, and intelligent function modules. 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.
❻	Base cover of cable connectors	Protective cover of extension cable connector.
❼	DIN rail adapter mounting hole	Hole for mounting DIN rail adapter.
❽	Base mounting hole	Hole for mounting this base unit onto the panel such as a control panel (for M4 screw)

Tab. 8-7: *Description for part names of redundant extension base unit Q65WRB*

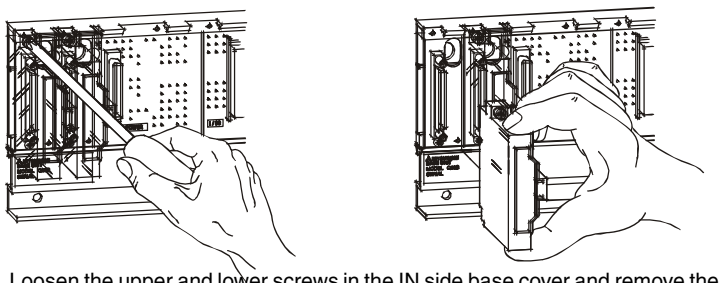
NOTE

It's only possible to use the extension base unit Q65WRB in a redundant system as the first extension stage (direct connection to the main base unit).
Extension base No. setting (refer to following section 8.3.2) is not possible and not required for the Q65WRB.

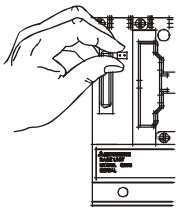
8.3.2 Setting the extension stage number

When using two or more extension base units, the extension stage number must be set with their extension stage number setting connectors. The extension stage number is set to 1 by factory default. There is no need to set the extension stage number, when only one extension base unit with factory default status is connected to the main base unit.

The extension stage number setting connector of the extension base unit is located under the IN side base cover.



Loosen the upper and lower screws in the IN side base cover and remove the base cover from the extension base unit.

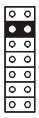
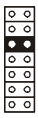
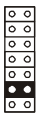
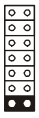


Insert the connector pin in the required extension stage number location of the connector (see below).

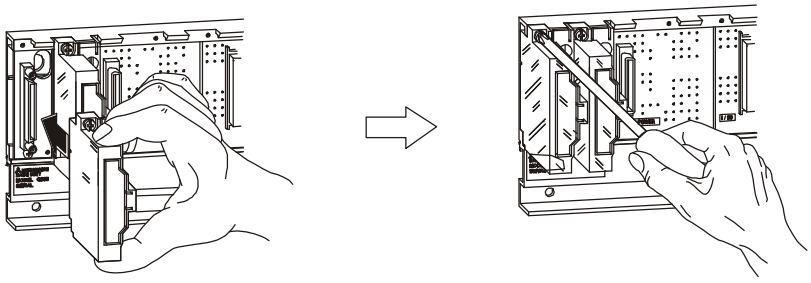
QH00011C

Fig. 8-6: *Setting the extension stage number*

Setting of connector pins for extension bases:

	Number setting for extension stages						
	1	2	3	4	5	6	7
Setting of connector pins							

Tab. 8-8: *Settings of connector pins*



After setting install the base cover to the extension base unit and tighten the base cover screw.

Fig. 8-7: *Base cover removal procedure*

NOTES

Please note, that the maximum number of extension base units, which can be connected to the main base unit is depending on the CPU type:

Q00JCPU, Q00UJCPU:	2
Q00CPU, Q00UCPU, Q01CPU, Q01UCPU, Q02UCPU:	4
Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU:	7
Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU:	7
Q03UD(E)CPU, Q04UD(E)HCPU, Q06UD(E)HCPU, Q10UD(E)HCPU, Q13UD(E)HCPU, Q20UD(E)HCPU, Q26UD(E)HCPU:	7
Q12PRH and Q25PRH:	7 (refer to following note)

The extension base unit cannot be connected when the serial number (first five digits) of the redundant CPU Q12PRH- or Q25PRHCPU is "09011" or earlier.
For a main base unit with redundant Q12PRHCPU or Q25PRHCPU from serial number 09012… on, the extension is possible with up to seven base units and maximum 63 modules.
Connect the Q65WRB to the first extension base. Since the Q65WRB is fixed to the first extension base, base number setting is not required. Use the Q68RB for the second extension base to the seventh extension base. Set the extension stage number as described above.

If a prohibited extension stage number is set, "BASE LAY ERROR" (error code: 2010) occurs.

CAUTION:

- ***Never set more than one jumper on the connector pins of the extension base unit.***
- ***Set the extension stage number for extension base units in the order of connecting, starting from the one connected to the main base unit. The same jumper setting for more than one extension base unit or a missing jumper causes malfunction.***

8.3.3 Connection and disconnection of extension cable

NOTE

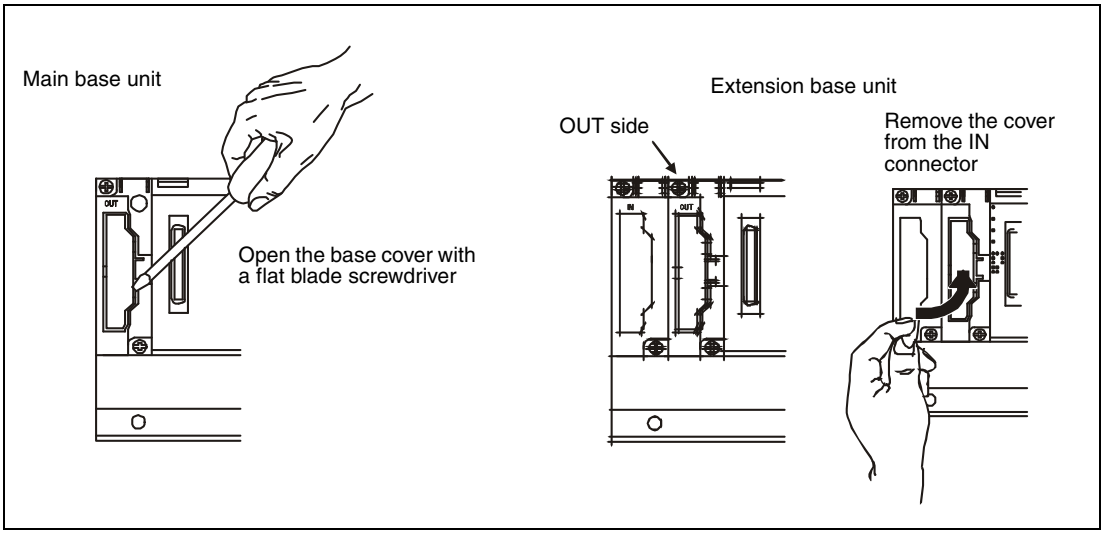
Always plug the OUT side connector of a base unit and the IN side connector of the next base unit with an extension cable.
The system will not operate properly if the extension cable is connected in the form of IN to IN, OUT to OUT or IN to OUT.

Instructions for handling an extension cable:

- Connect the extension cable to the base unit with the base cover installed to the base unit. After you have set the extension number to the extension base unit, reinstall and screw the base cover.

  To connect an extension cable to the main base unit, remove the portion under the OUT characters on the base cover. This also applies to a case where an extension cable is connected to the OUT side connector of the extension base unit.

  Remove the cover from the IN connector of the extension base unit.



- Do not squeeze the extension cable.
- When connecting or disconnecting an extension cable, do not hold the ferrite cores mounted at both ends of the cable. **Only** hold the connector part of the cable (refer to the following figure). Holding the ferrite core may cause a cable disconnection in the connector.

  Also, if the ferrite core position is shifted, the characteristic will change. When handling the cable, do not to shift the ferrite core position.

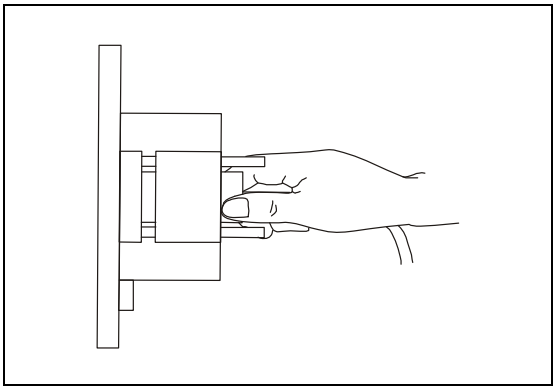


Fig. 8-8:
Hold the connector part of the extension cable

- When laying an extension cable, secure 55 mm or more as the minimum cable bending radius. If it is less than 55 mm, a malfunction may occur due to characteristic deterioration, cable disconnection or the like.
- After fitting the extension cable, always tighten the extension cable connector fixing screws. (Tightening torque: 0.2 Nm.)

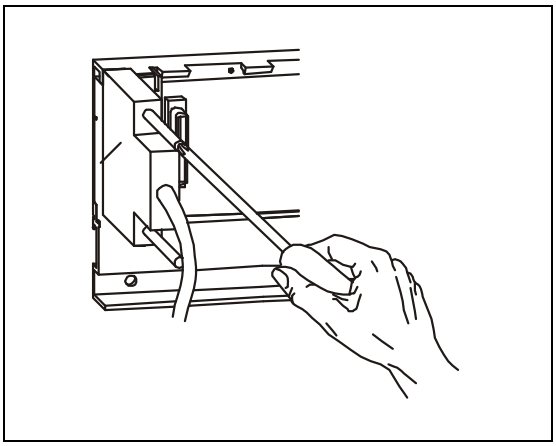


Fig. 8-9:
Connection of extension cable connector with screws

Disconnection of extension cable

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

8.4 I/O Number assignment

A CPU of the MELSEC System Q automatically recognises the slots available in main and extension base units and assigns addresses to the inputs and outputs accordingly.

The assignment can also be done by the user. Thus slots can be left empty or addresses can be reserved for future extensions.

The following figure shows examples for I/O assignment:

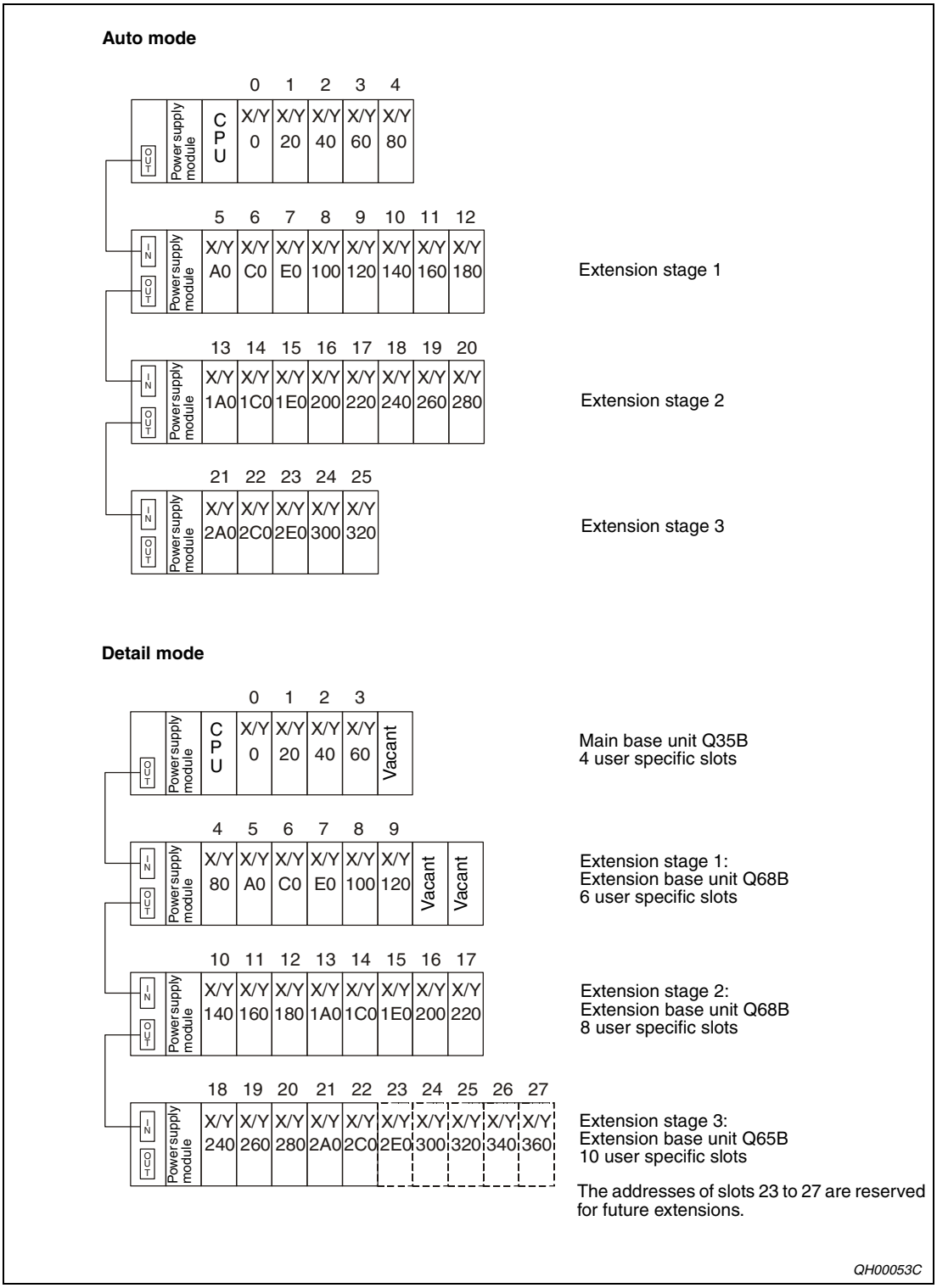


Fig. 8-10: *I/O number assignment example*

9 Installation

9.1 Safety guidelines

DANGER:

- ***Outputs may remain on or off due to a failure of an output module relay or transistor. Configure an external circuit for monitoring output signals that could cause a serious accident.***
- ***In an output module, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.***
- ***Malfunction may occour if an external power supply or the programmable controller is faulty. To prevent any malfunction which may affect the whole system and in a fail-safe viewpoint, provide an external circuit to the areas which can result in machine breakdown and accidents (e.g. emergency stop, protective and interlock circuits) must be constructed outside the programmable controller.***

When the programmable controller is powered on and off, normal control output may not be done momentarily due to a delay or a start-up time difference between the programmable controller power supply and the external power supply (DC in particular) for the control target.

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

Malfunction may occour if an external power supply or the programmable controller is faulty. To prevent any malfunction which may affect the whole system and in a fail-safe viewpoint, provide an external circuit to the areas which can result in machine breakdown and accidents (e.g. emergency stop, protective and interlock circuits) must be constructed outside the programmable controller.

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

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

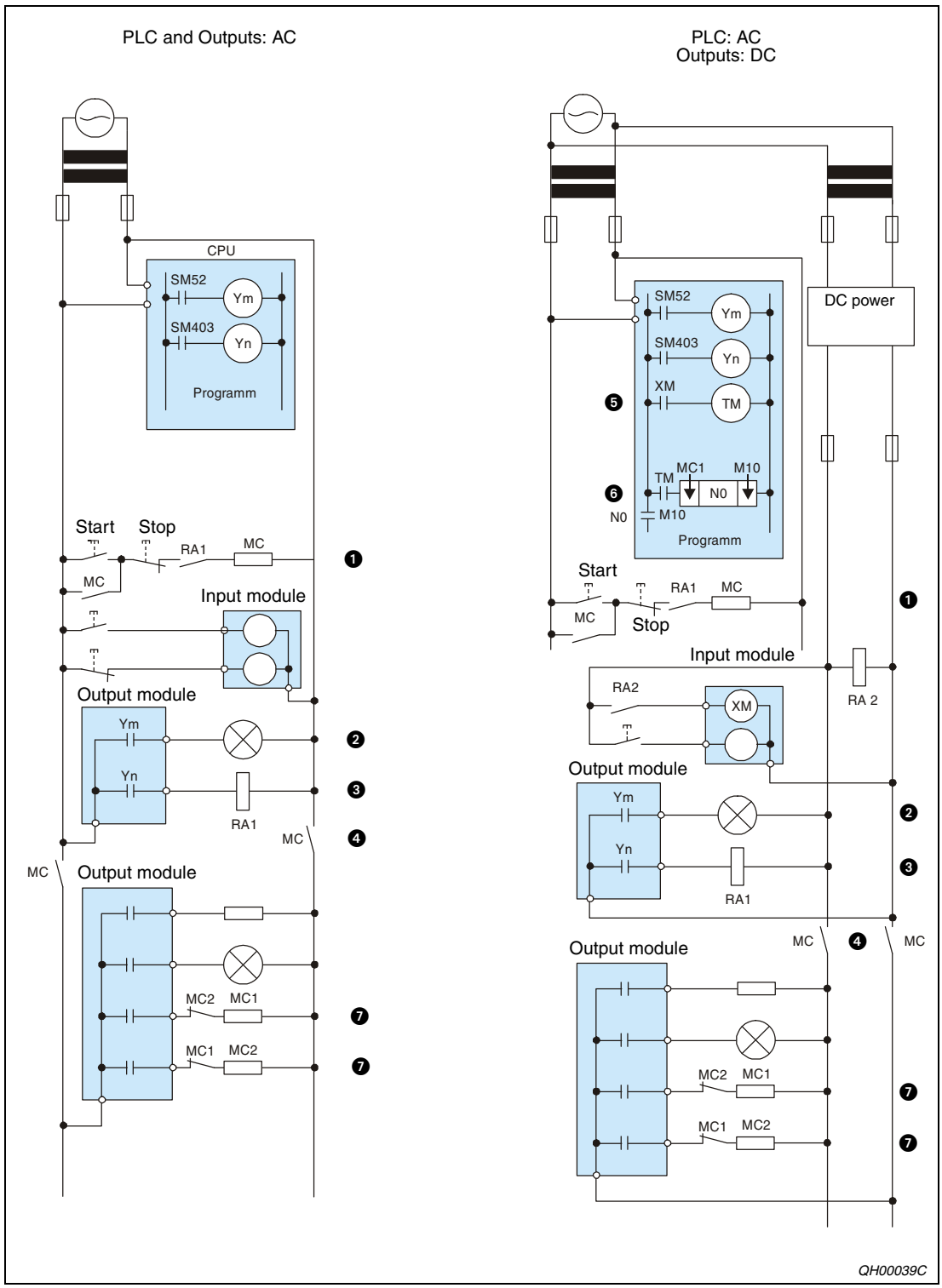


Fig. 9-1: *System design circuit example (when not using $\overline{\text{ERR.}}$ terminal)*

❶ MC is switched by RA1 when the CPU is in mode RUN.

❷ Low battery alarm (Lamp or buzzer).

❸ RA1 is switched by SM403 when the CPU is in mode RUN.

❹ The outputs are switched off by MC when the CPU is in mode STOP.

❺ When the DC voltage is switched on, RA2 starts the timer TM via input XM.

❻ The DC power supply for the input signals is switched on, when the timer TM stops and the DC voltage is present.

❼ Interlock circuits as necessary. Provide external interlock circuits for conflicting operations, such as forward rotation and reverse rotation, and for parts that could damage the machine or cause accidents if no interlock were used.

The power-on procedure is as follows:

- For AC:
  - Turn power on.
  - Set CPU to RUN.
  - Turn on the start switch.
  - When the magnetic contactor (MC) comes on, the output equipment is powered and may be driven by the program.

- For AC/DC:
  - Turn power on.
  - Set CPU to RUN.
  - When DC power is established, RA2 goes ON.
  - Timer (TM) times out after the DC power reaches 100 %. (The TM set value must 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.) If a voltage relay is used at RA2, no timer (TM) is required in the program.
  - Turn on the start switch.
  - When the magnetic contactor (MC) comes on, the output equipment is powered and may be driven by the program.

System design circuit example (when using $\overline{\text{ERR.}}$ terminal of power supply module):

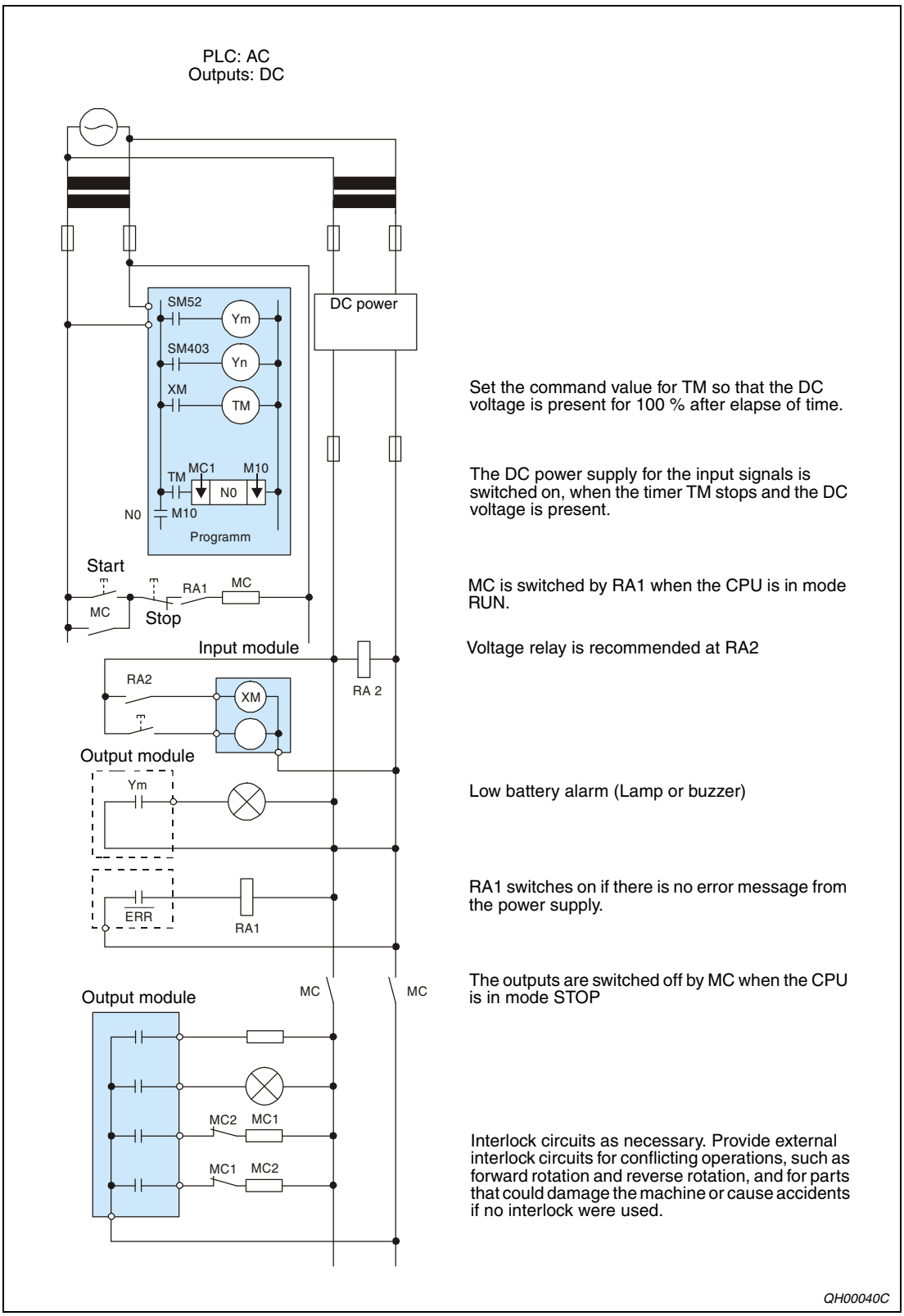


Fig. 9-2: *System design circuit example (when using $\overline{\text{ERR.}}$ terminal of power supply module)*

The power-ON procedure is as follows:

- Turn power on.
- Set CPU to RUN.
- When DC power is established, RA2 goes ON.
- Timer (TM) times out after the DC power reaches 100 %. (The TM set value must 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.) If a voltage relay is used at RA2, no timer (TM) is required in the program.
- Turn on the start switch.
- When the magnetic contactor (MC) comes on, the output equipment is powered and may be driven by the program.

Fail-safe measures against failure of the programmable controller

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 be maintained.

Though Mitsubishi programmable controllers 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, the fail-safe circuitry against failure of the programmable controller can be constructed as shown in the following figure.

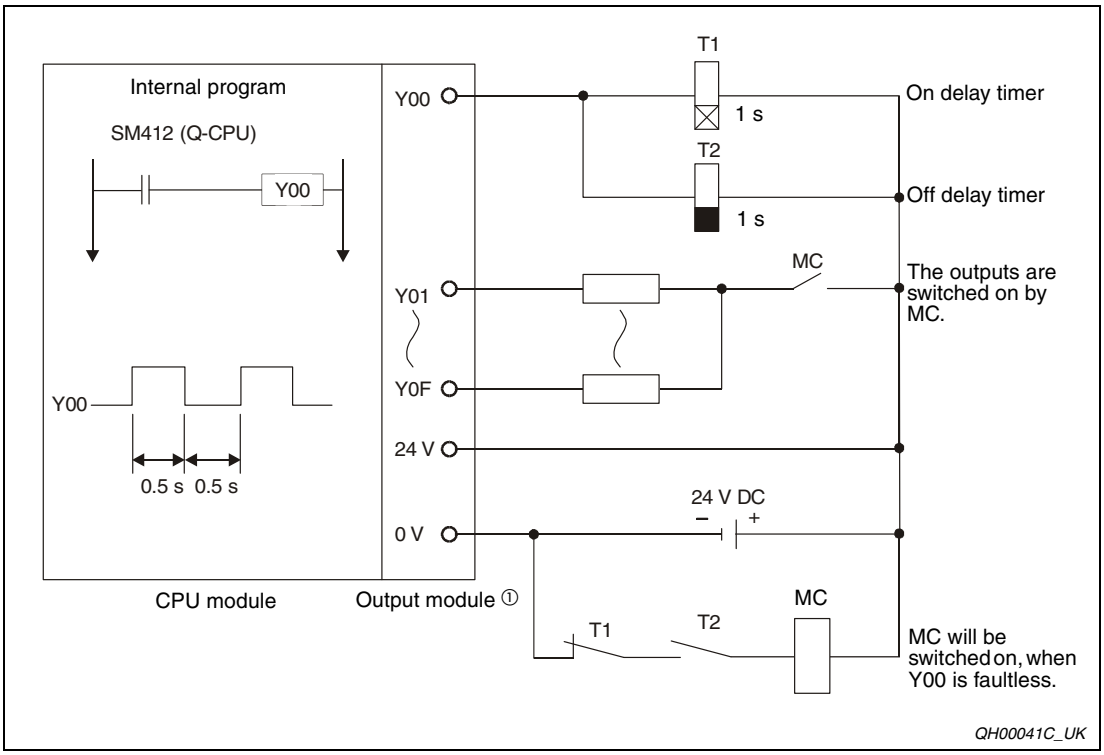


Fig. 9-3: *Fail-safe circuit example*

① Y00 will be switched on and off in intervals of 0.5 s by SM412. Therefore use a contactless output module with transistor outputs.

9.2 General specifications

Do not use or store the modules of MELSEC System Q in an environment as follows:

- Operating ambient temperature exceeding 0 to +55 °C
- Storage ambient temperature exceeding –20 bis +75 °C
- Operating ambient humidity exceeding 5 % bis 95 %
- Operating areas with air condensing by sudden temperature changes.
- Areas with flammable gas
- Areas with conductive dust (iron filings, oily smoke, dust, corrosive gas or organic solvent)
- Operating areas with direct solar irradiation
- Operating areas with high magnetic or high voltage fields
- Operating areas with high vibration impact or sound waves affecting the PLC

Keep a distance of minimum 25 cm to the PLC when using mobile phones.

9.3 Calculating heat generation of programmable controller

The ambient temperature inside the panel storing the programmable controller must be suppressed to an ambient temperature of 55 °C. The heat generated by the system should be lead off by ventilation devices.

Following figure shows the power consuming parts of the programmable controller:

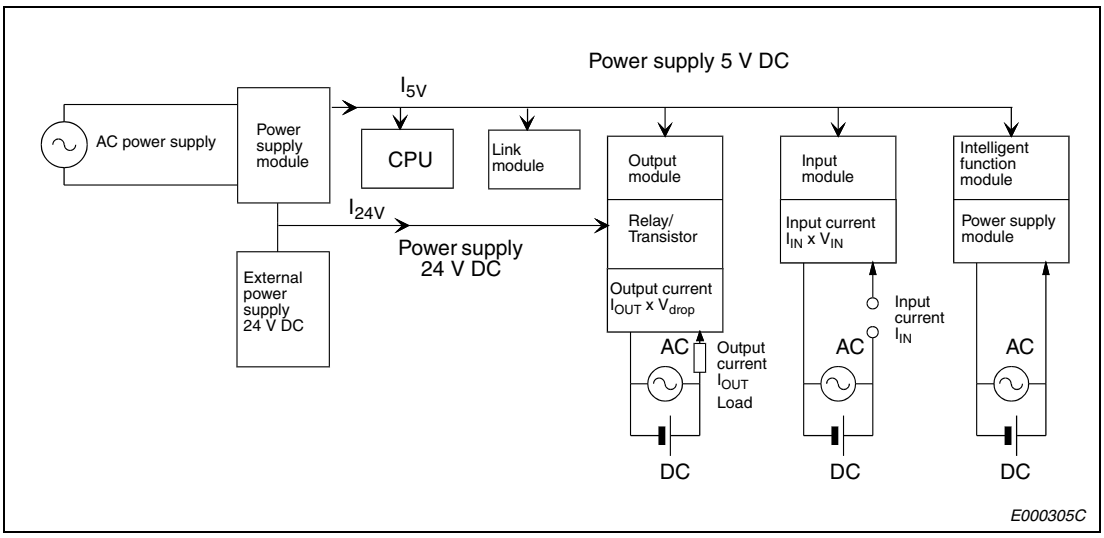


Fig. 9-4: *Calculation of the power consumption*

Power consumption of power supply module

The power conversion efficiency of the power supply module is approx. 70 %, while 30 % of the output power is consumed as heat. As a result, 3/7 of the output power is the power consumption.
The calculation formula is as follows:

$W_{PW} = 3/7\ (I_{5V} \times 5\ V)$ [W]

W_{PW}: Heat capacity of the power supply

I_{5V}: Current consumption of logic 5 V DC circuit of each module [A]

Total power consumption for 5 V DC logic circuits of all modules

The power consumption of the 5 V DC output circuit section of the power supply module is the power consumption of each module (including the current consumption of the base unit) multiplied by the 5 V power supply.

$W_{5V} = I_{5V} \times 5\ V$ [W]

A total of 24 V DC average power consumption of the output modules

The sum of all currents, flowing into the output moduls with all outputs switched on, multiplied by the voltage of the external power supply results in the total power consumption at 24 V DC .

$W_{24V} = I_{24V} \times 24\ V \times$ Simultaneous ON rate [W]

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

$W_{OUT} = I_{OUT} \times V_{drop} \times n \times O_S$ [W]

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

V_{drop}: Voltage drop in each output module

n: Number of outputs

O_S: Simultaneous ON rate (specifies how many outputs are switched on simultaneously, O_S = 1: all outputs simultaneously ON)

Average power consumption of the input section of the input module

$W_{IN} = I_{IN} \times V_{IN} \times n \times I_S$ [W]

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

V_{IN}: Input voltage (Voltage in actual use)

n: Number of input points

I_S: Simultaneous ON rate (specifies how many inputs are switched on simultaneously, I_S = 1: all inputs simultaneously ON)

Power consumption of the external power supply section of the intelligent function module

The calculation formula for the power consumption of intelligent function modules is as follows:

$W_S = I_{5V} \times 5\ V + I_{24V} \times 24\ V + I_{100V} \times 100\ V$ [W]

Overall power consumption of the programmable controller system

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

$T = W / (U \times A)$ [°C]

W: Power consumption of overall sequencer system

A: Surface area inside the panel (m^2)

U: 6, when the ambient temperature inside the panel is uniformed by a fan

4, when air inside the panel is not circulated

NOTES

If the temperature inside the panel has exceeded the specified range (55 °C), it is recommended to install a fan, a heat exchanger or chiller to the panel to lower the temperature.

Fans should always be equipped with appropriate dust filters and sufficient protection.

9.4 Mounting the base unit

- Keep the clearances shown in following figure between the top/bottom faces of the module and other structures or parts to ensure good ventilation and facilitate module replacement.

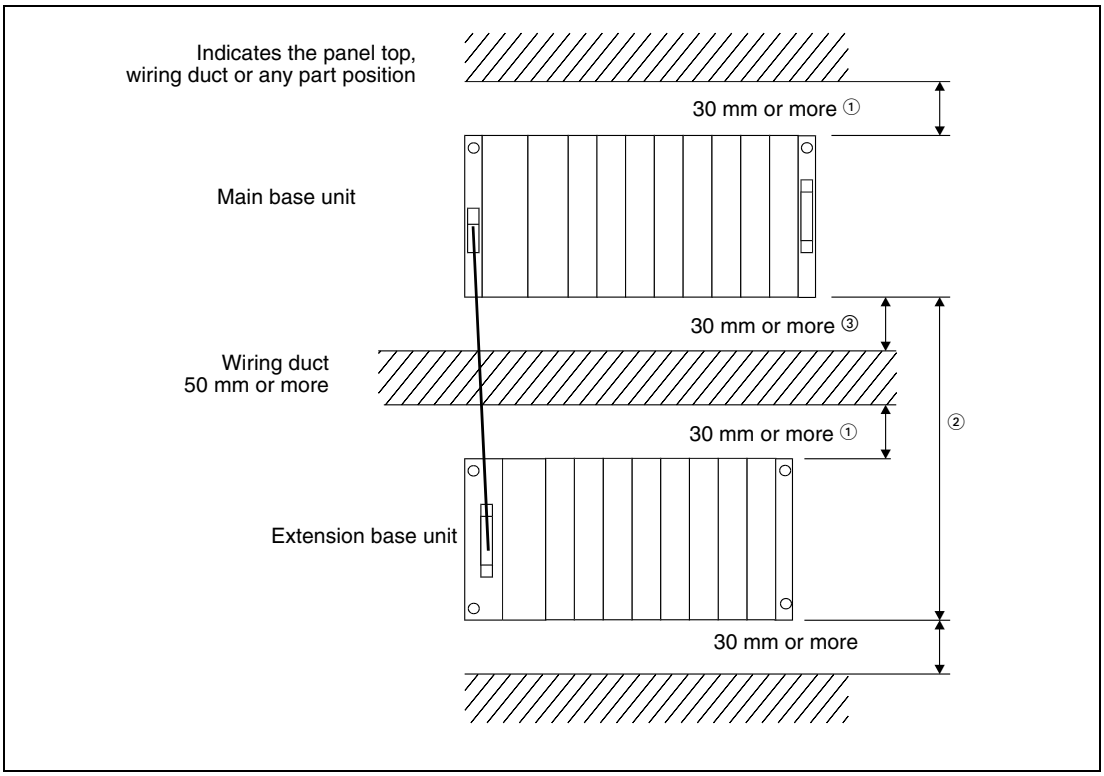


Fig. 9-5: *Module mounting position*

① For wiring duct with 50 mm or less height.
40 mm or more for other cases.
② Depending on length of extension cable.
③ 45 mm or more when the Q7BAT is mounted.

- Do not mount the devices vertical or flat because the ventilation is not sufficient in this case.

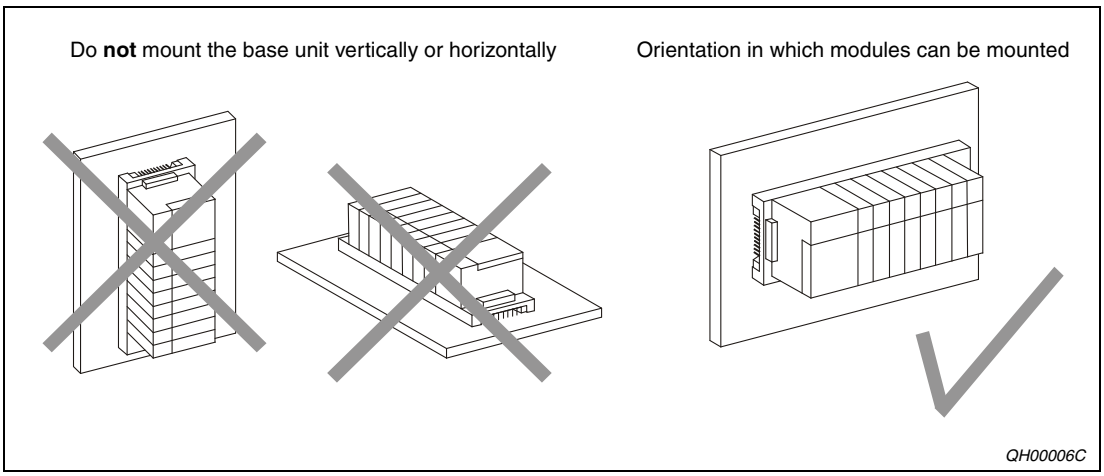


Fig. 9-6: *Module mounting orientation*

- 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.

- Avoid mounting base unit in proximity to vibration sources such as large magnetic contactors and no-fuse circuit breakers; mount these on a separate panel or at a distance.
- Install wiring ducts with sufficient dimensions.

  If the wiring duct is mounted above the PLC, the depth of the wiring duct should be maximum 50 mm, so that the ventilation is not affected.

  Keep enough distance to the controller that cables and modules can be easy replaced in future.

  If the wiring duct is mounted below the PLC, give enough space for the power supply input cables (100/230 V AC) and for the cables to the I/O modules.
- In order to avoid the effects of radiated noise and heat inside the cabinet, provide a clearance of minimum 100 mm between the PLC and devices that generate noise or heat (contactors and relays). The device could be mounted on the internal side of the cabinet. The required clearance of the device on the right and left side of the PLC is minimum 50 mm.

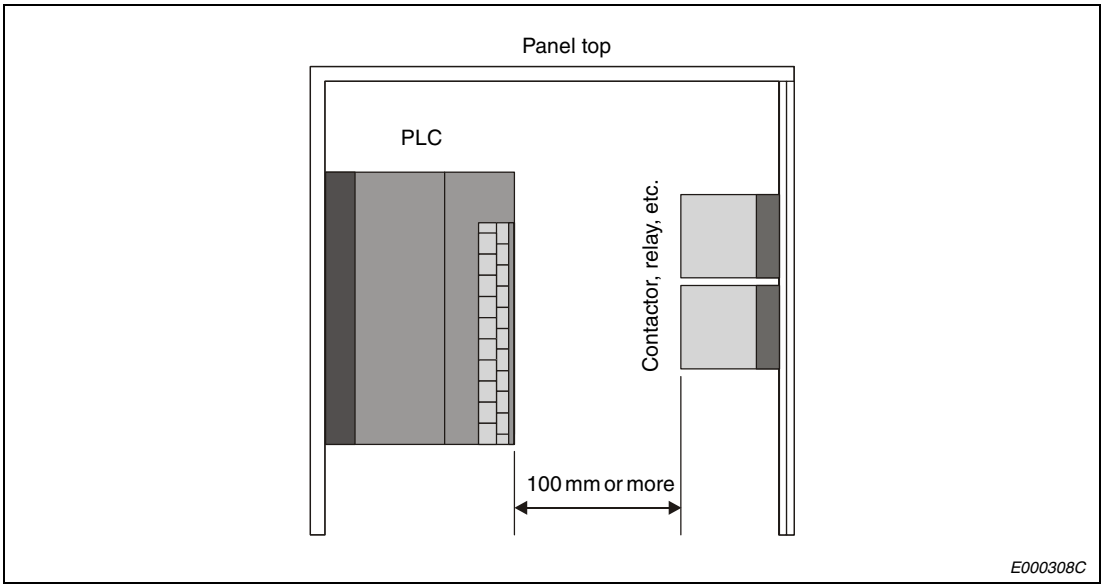


Fig. 9-7: *Distances from the other devices in the panel*

9.4.1 Direct mounting

The main base units can be mounted directly on the backside panel of the cabinet. The following tables show the distances of the mounting holes.

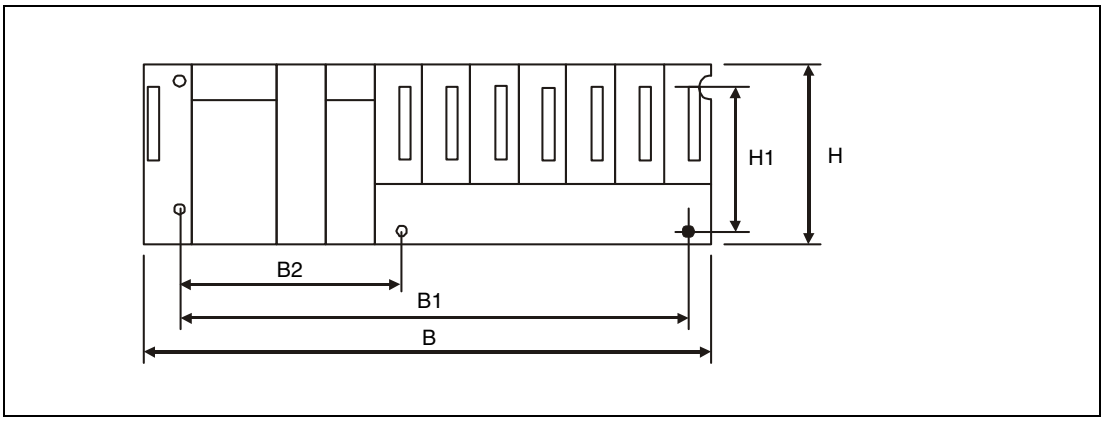


Fig. 9-8: *Base units external dimensions*

Value	External dimensions [mm]									
	Q33B	**Q35B**	**Q38B**	**Q312B**	**Q32SB**	**Q33SB**	**Q35SB**	**Q38DB**	**Q312DB**	**Q38RB**
B	189	245	328	439	114	142	194	328	439	439
B1	169	224.5	308	419	101	129	184.5	308	419	419
B2	—	—	170*	170*	—	—	—	170	170	170
H	98									
H1	80									

Tab. 9-1: *Main base units external dimensions*

* Base units with 4 or 5 base mounting holes are available. This value applies for base units with 5 base mounting holes only.

Value	External dimensions [mm]							
	Q52B	**Q55B**	**Q63B**	**Q65B**	**Q68B**	**Q612B**	**Q68RB**	**Q65WRB**
B	106	189	189	245	328	439	439	439
B1	83.5	167	167	222.5	306	417	417	417
B2	—	—	—	—	190*	190*	170	170
H	98							
H1	80							

Tab. 9-2: *Main base units external dimensions*

* Base units with 4 or 5 base mounting holes are available. This value applies for base units with 5 base mounting holes only.

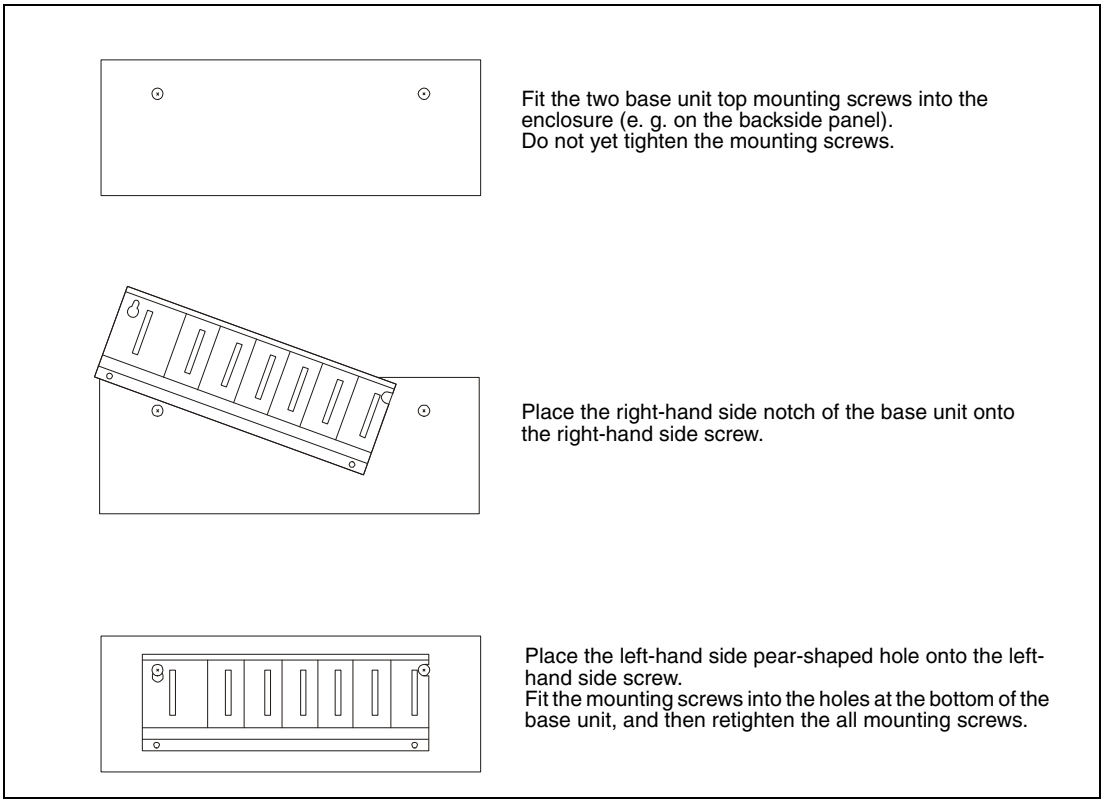


Fig. 9-9: *Installing a main base unit, or a Q00U(J)CPU*

NOTES

Install the main base unit with Q00UCPU or Q00UJCPU to the panel of a cabinet, with no module mounted in the rightmost slot.
Remove the base unit from the panel after removing the module from the rightmost slot.

The mounting screws (cross recessed head bind screw M4x12) provided with the slim type main base unit Q32DB, Q33SB and Q35SB differ from those provided with other types of the base unit.

9.4.2 Mounting a DIN rail

For mounting of main or extension base unit on a DIN rail with 35 mm width, use appropriate adapters.

Application	DIN rail mounting adapters		
	Q6DIN1	Q6DIN2	Q6DIN3
Main base unit	Q38B, Q38DB, Q38RB, Q312B, Q312DB	Q35B	Q33B, Q32SB, Q33SB, Q35SB
Extension base unit	Q68B, Q612B, Q68RB, Q65WRB	Q65B	Q52B, Q55B, Q63B

Tab. 9-3: *Adapters for mounting a DIN rail to the base unit*

DIN rail mounting

When using DIN rail, DIN rail mounting screws must be inserted in 200 mm distances or less in order to ensure that the rail has sufficient strength.

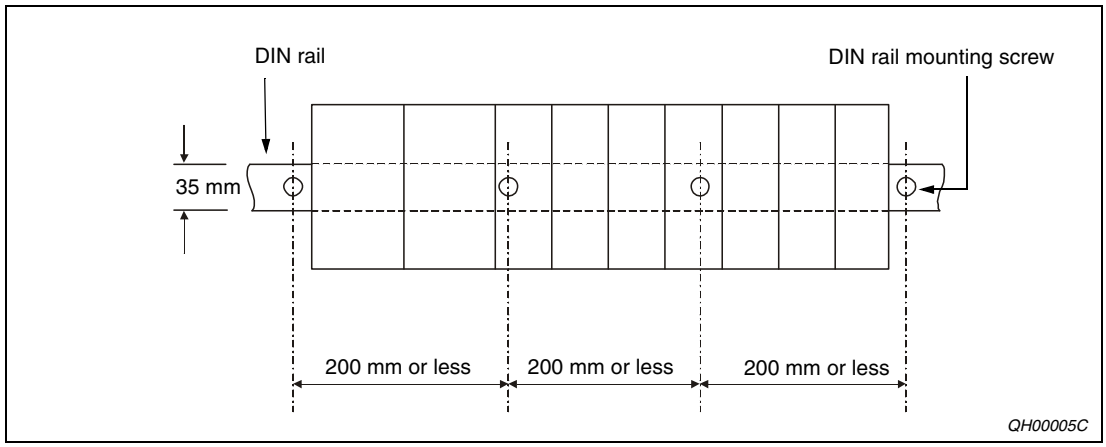


Fig. 9-10: *DIN rail mounting*

When installing the DIN rail in a frequent vibration and/or shock prone environment, insert the mounting screws in 200 mm intervals or less by the following method shown in the figures below.

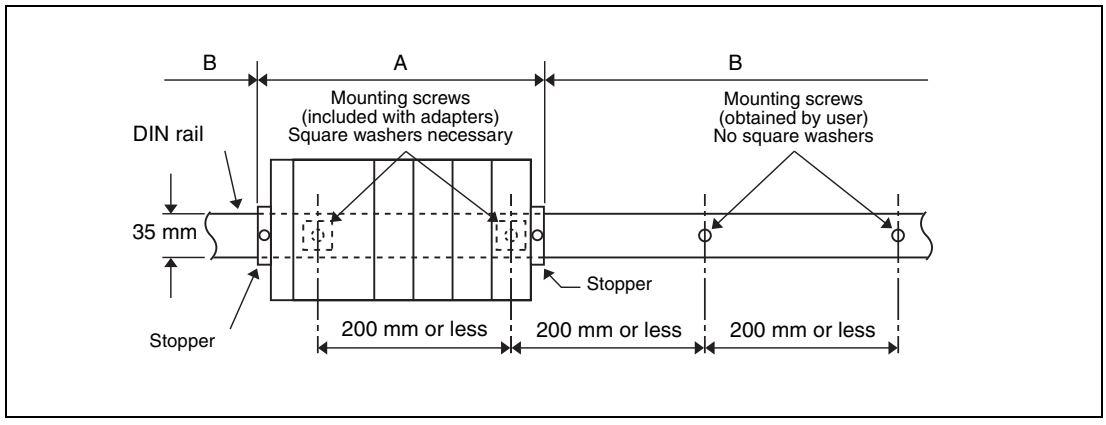


Fig. 9-11: *DIN rail mounting for Q00JCPU or Q00UJCPU and the base units Q33B, Q35B, Q65B, Q52B, Q55B, Q63B, Q32SB, Q33SB and Q35SB*

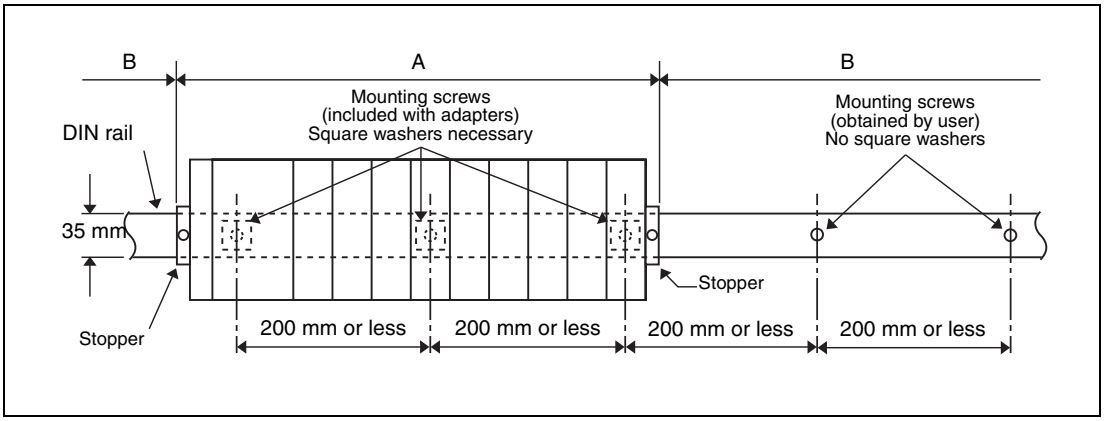


Fig. 9-12: *DIN rail mounting for the base units Q38B, Q312B, Q68B, Q612B, Q38RB, Q68RB, Q65WRB, Q38DB and Q312DB*

Screw the DIN rail in two places using the mounting screws and square washers included with the adapters in 'Position A' (bottom of base unit).

Screw the DIN rail with mounting screws (obtained by user) in 'Position B' (where the base unit is not installed).

The following shows where to position the square washers and the mounting screws included with adapters.

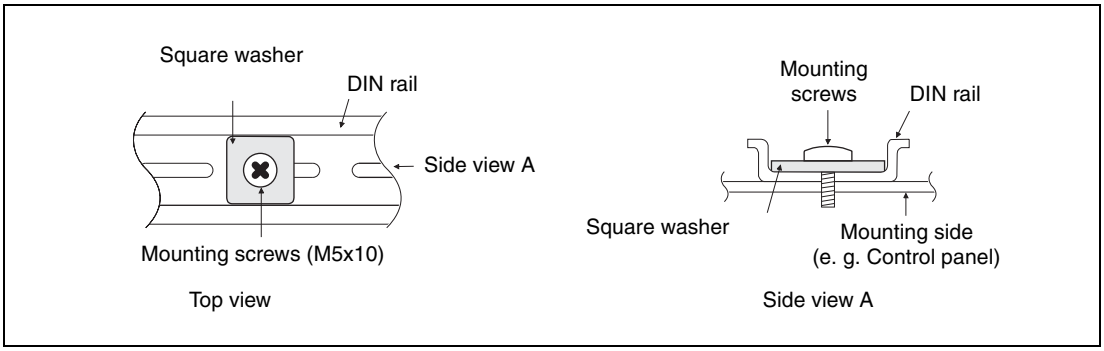


Fig. 9-13: *DIN rail mounting, when there is large vibration or impact*

NOTES

Use the DIN rail that is compatible with M5 size screws.

Use only one washer for each mounting screw. Use only the square washers supplied with the adapters.
If two or more washers are used together for one mounting screw, the screw may interfere with the base unit.

Make sure to align the square washer sides with the DIN rail.

Adapter installation method

The way to install the adapters for mounting a DIN rail to the base unit is given in following figure.

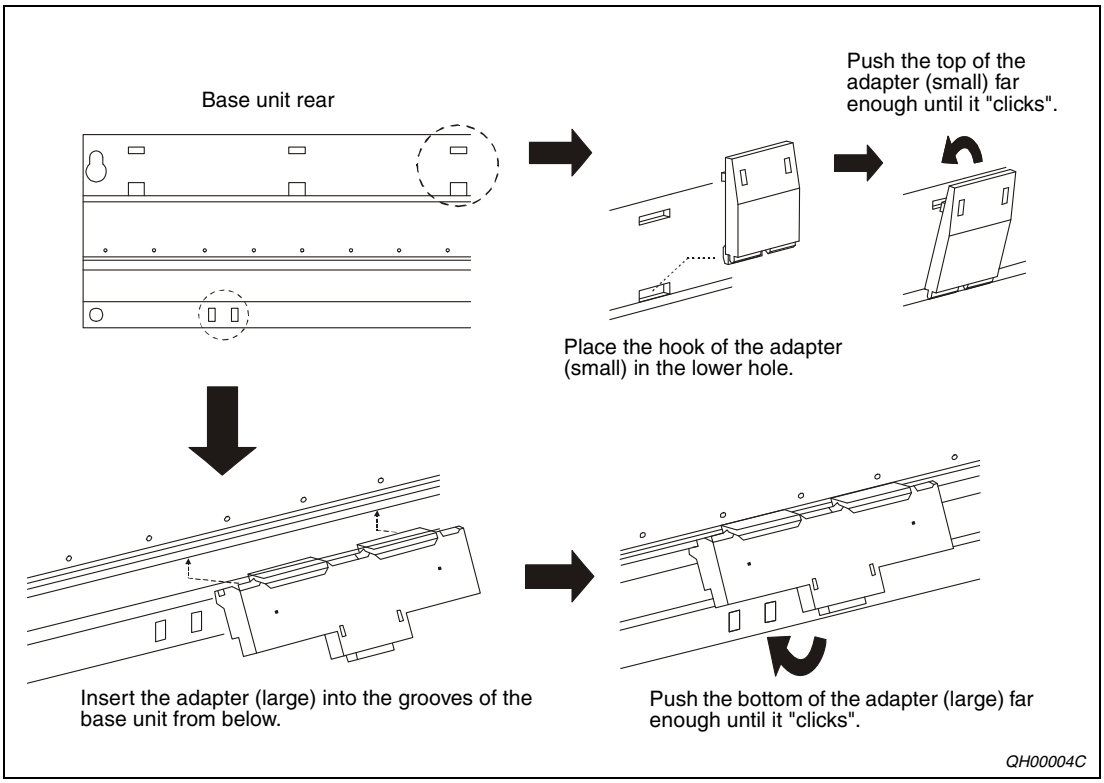
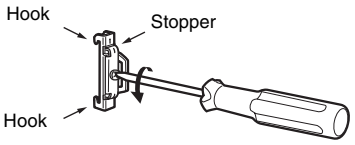


Fig. 9-14: *Adapter installation method*

Stopper mounting

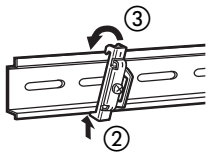
When using the DIN rail in frequent vibration and/or shock prone environment, use stoppers included with the DIN rail mounting adapter.

① Loosen the screw at the top of the stopper. (2 stoppers are needed)



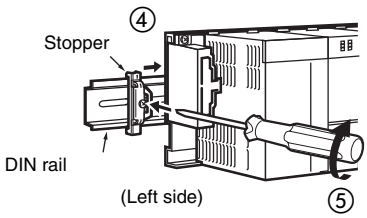
② Hitch the lower hook of the stopper to the bottom of the DIN rail. Install the stopper with the arrowhead side facing up.

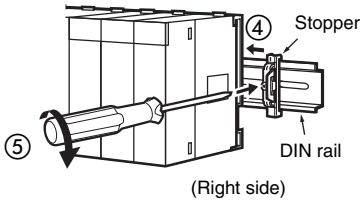
③ Hitch the upper hook of the stopper to the top of the DIN rail.



④ Slide the stopper to the end of the base unit so that they are fully in contact.

⑤ Tighten the screw of the stopper with a screwdriver. (Tightening torque 1.00 to 1.35 Nm).





⑥ Make sure that the left and right stoppers are fixed securely to the DIN rail.

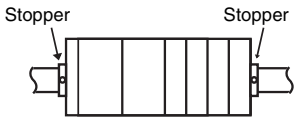


Fig. 9-15: *Stopper mounting procedure*

9.5 Installation and removal of module

CAUTION:

- ***Shut off the external power supply for the system in all phases before mounting or removing the module.***
- ***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.***

Installation

- Shut off the external power supply!
- Securely insert the module fixing projection into the module fixing hole so that the latch is not misaligned.
- Using the module fixing hole as a supporting point, push the module in the direction of arrow until it clicks.
- When using the programmable controller in an environment of frequent vibration or impact, secure the CPU module to the base unit using screws (module fixing screw M3x12, user-prepared).

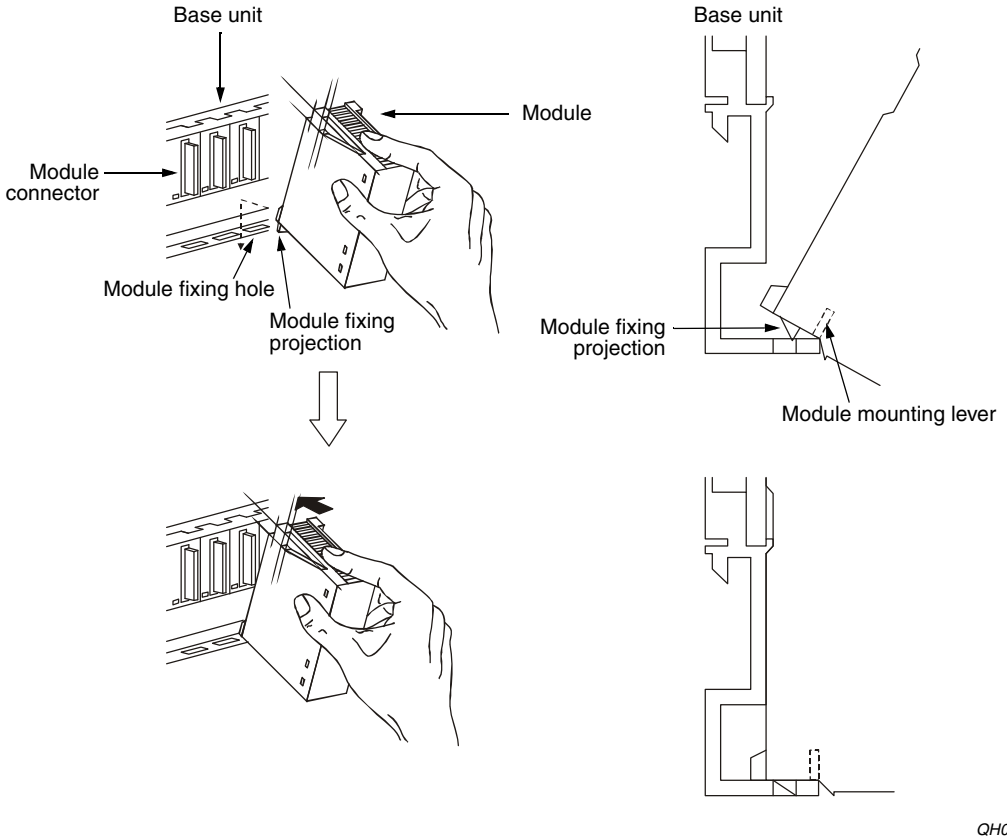


Fig. 9-16: *Module mounting procedure*

Removal

CAUTION:

- ***Shut off the external power supply for the system before removing the module.***
- ***When removing the module which is secured by module fixing screw, remove the module fixing screw first and then module fixing projection off the module fixing hole of the base unit. Failure to do so may damage the module fixing projection.***

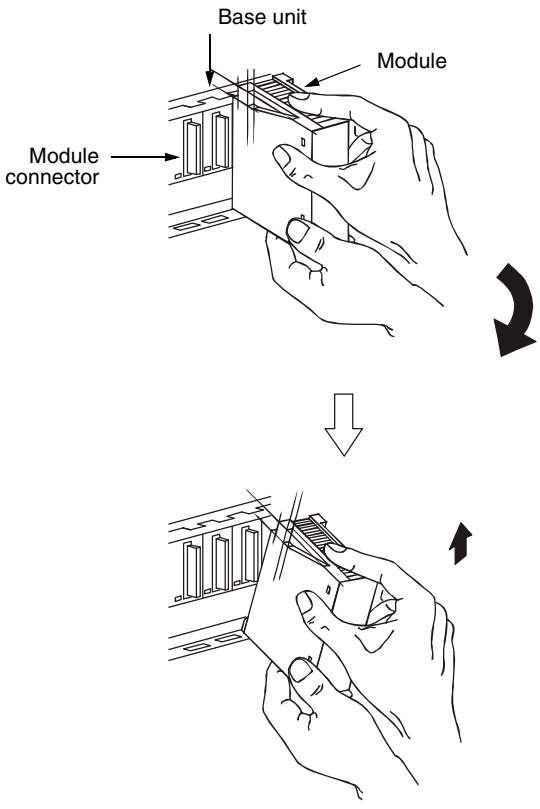


Fig. 9-17: *Module removal procedure*

9.6 Wiring

9.6.1 Wiring precautions

Wiring power supply lines

- Wire the power supply lines for programmable controller, I/O devices, and other equipment separately.

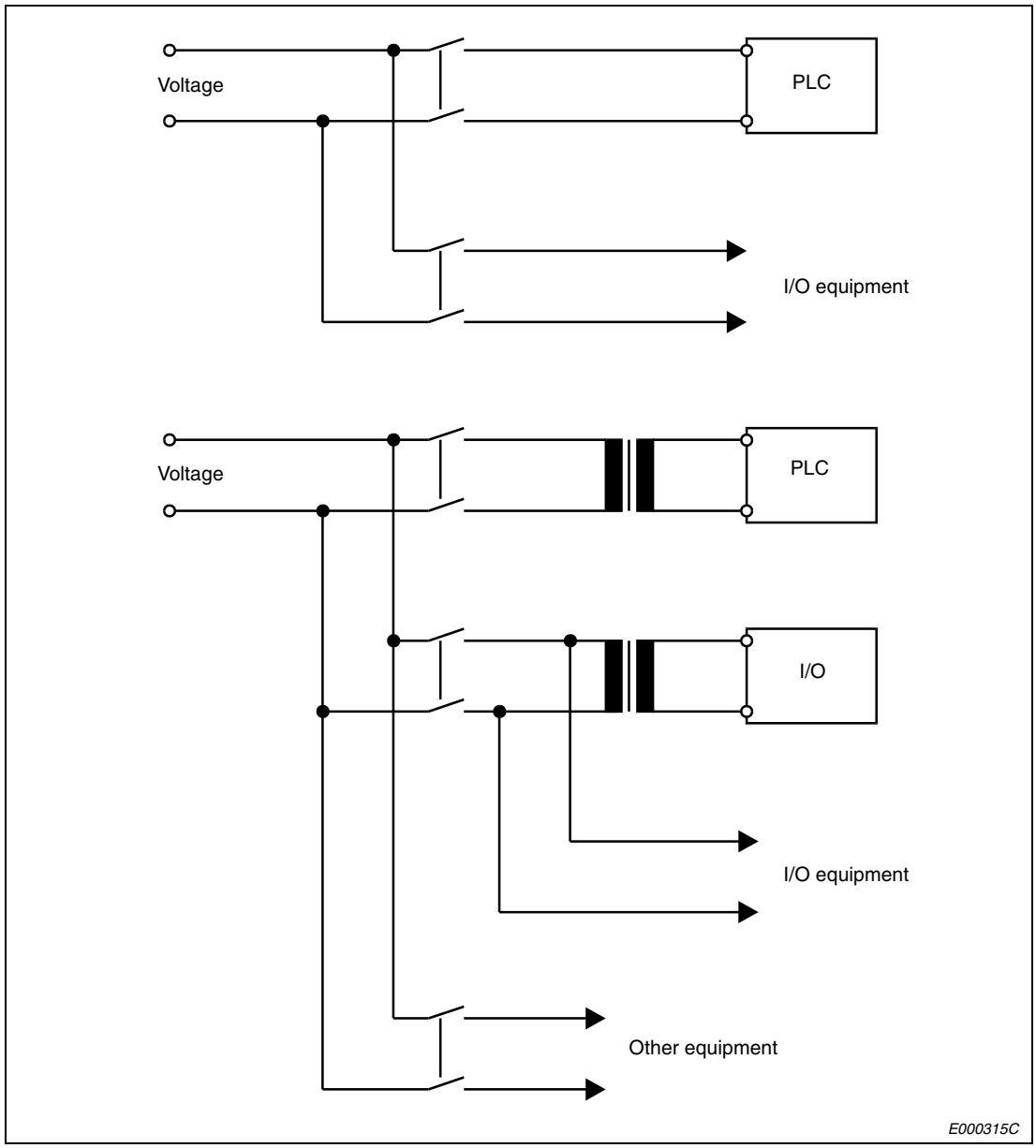


Fig. 9-18: *Separate power supplies for PLC and peripheral equipment*

- Power supply cables (110 V AC, 230 V AC) and DC cables should be bundled in separated strings. Bundling can be done by cable twisting or wire straps. Connect the modules with the shortest distance.
- To reduce the voltage drop to the minimum, use the thickest wires possible (max. 2 mm^2) for 110 V AC, 230 V AC and 24 V DC wires.
- Do not bundle the 110 V AC and 24 V DC wires with, or run them close to, the main circuit (high voltage, large current) and I/O signal lines (including common line). Reserve a distance of at least 100 mm from adjacent wires.
- As measures against surge (e.g. caused by lightning), connect a surge absorber for lightning:

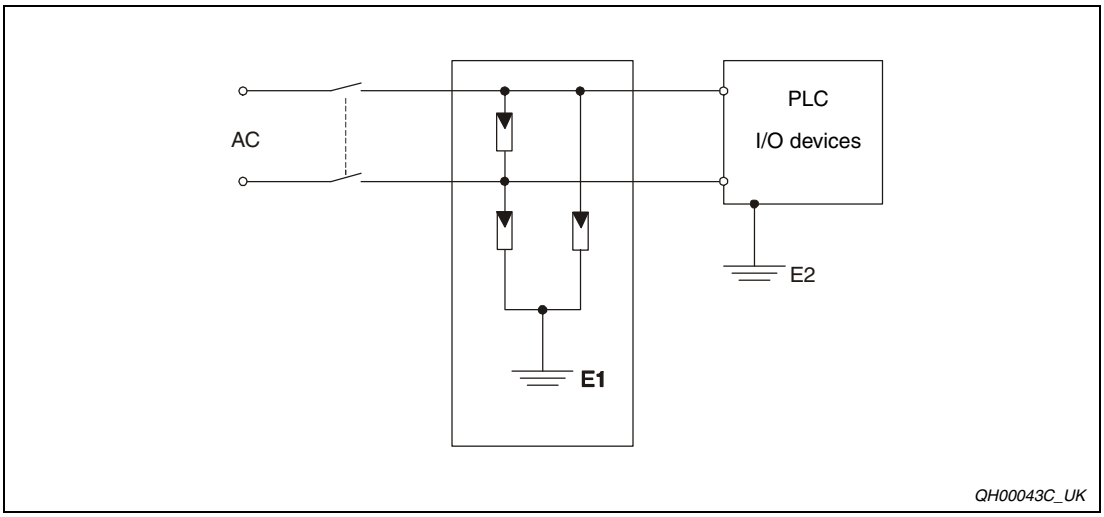


Fig. 9-19: *Connecting a lightning surge absorber*

CAUTION:

- ***Separate the ground of the surge absorber for lightning (E1) from that of the programmable controller (E2).***
- ***Select a surge absorber for lightning whose power supply voltage does not exceed the maximum allowable circuit voltage even at the time of maximum power supply voltage elevation.***

Wiring of I/O equipment

- The wires used for connection to the terminal block must be 0.3 to 0.75 mm^2 in core.
- Run the input and output lines away from each other.
- Do not lay I/O signal cables close to the main circuit and high-voltage power lines. Keep a safe distance of more than 100 mm from the above.
- When the input and output lines cannot be run away from the main circuit and power lines, use a batch-shielded cable. Normally the shield of the shielded cable must be grounded on the module side.

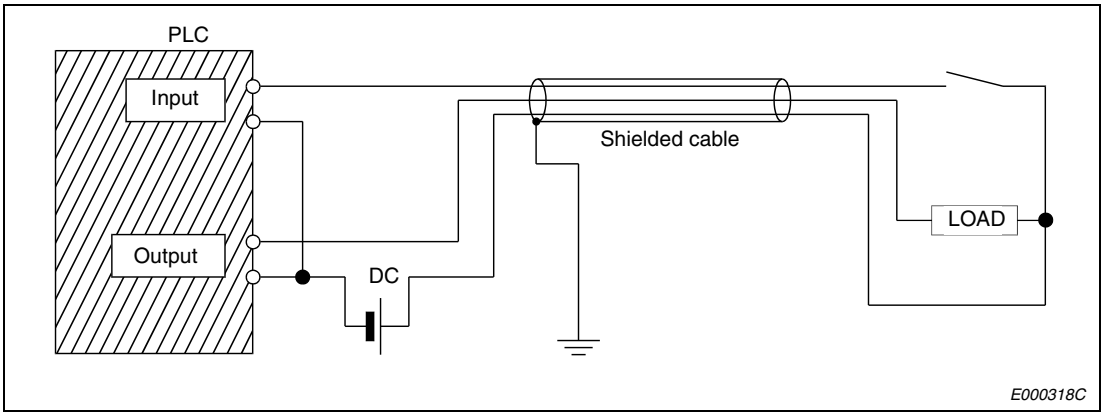


Fig. 9-20: *Wiring of I/O equipment*

- Where wiring runs through piping, ground the piping.
- Run the 24 V DC input line away from the 110 V AC and 230 V AC lines.

NOTE

Wiring of 200 m or longer will raise current leakage due to the line capacity, resulting in a fault.

Grounding

- Use a dedicated grounding wire as far as possible (see fig. 9-21, left example). Grounding is done according class 3 (grounding resistance 100 Ω or less).

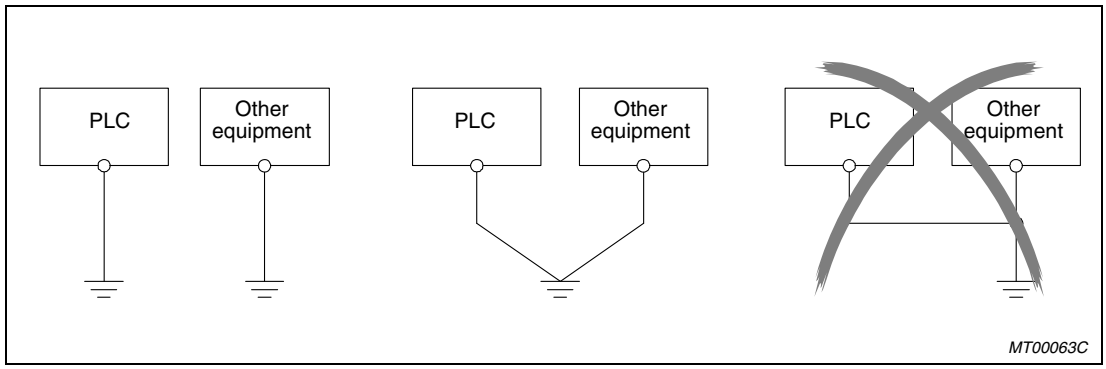


Fig. 9-21: *Grounding procedures*

- When a dedicated grounding cannot be provided, use common grounding as shown in the center of Fig. 9-21. Do not use the grounding as shown in the right example.
- If failures occur during operation due to grounding, cut the LG and FG terminals of the main base unit from ground.
- For grounding a cable, use the cable of 2 mm^2 or more. Position the ground-contact point as close as possible to the programmable controller (length of the grounding cable 30 cm or less).

Shielding

For the communication of a MELSEC system with peripheral equipment shielded data lines have to be used only. At best, the shielding is made of twisted copper. The density of the braiding determines the effectiveness of the shielding. Make sure to follow the bending instructions of the cable manufacturer, otherwise the shielding might fan out. Connect the shielding of the data line only at one side to ground. Do not solder any wires with the shielding.

Analogue signal transmission

Use 2-wire shielded cables for low frequency analogue transmission over short distances. Between sensor and receiver could occur potential differences on the reference conductor. Therefore use isolating components like transformers, opto couplers etc.

Digital signal transmission

Follow the specifications of the interface concerning transfer rate and transfer distance, for an error free digital signal transmission.

Connecting to the power supply module

CAUTION:

- ***Use the thickest possible (max. 2 mm^2) wires for the 110/230 V AC and 24 V DC power cables. Twist these wires starting at the connection terminals. To prevent short-circuit due to loosening screws, use the solderless terminals with insulation sleeves.***
- ***When LG and FG terminals are connected, ground the wires. Connect both terminals only with ground. If LG and FG terminals are connected without grounding the wires, the programmable controller may become susceptible to noise. Since the LG terminal is not isolated there is the danger of an electrical shock, when touching conducting parts or surfaces.***

The following figure shows the wiring example of lines such as power lines and grounding lines to the main base unit and extension base units. Please refer to the notes for wiring the power supplies in section 7.4.

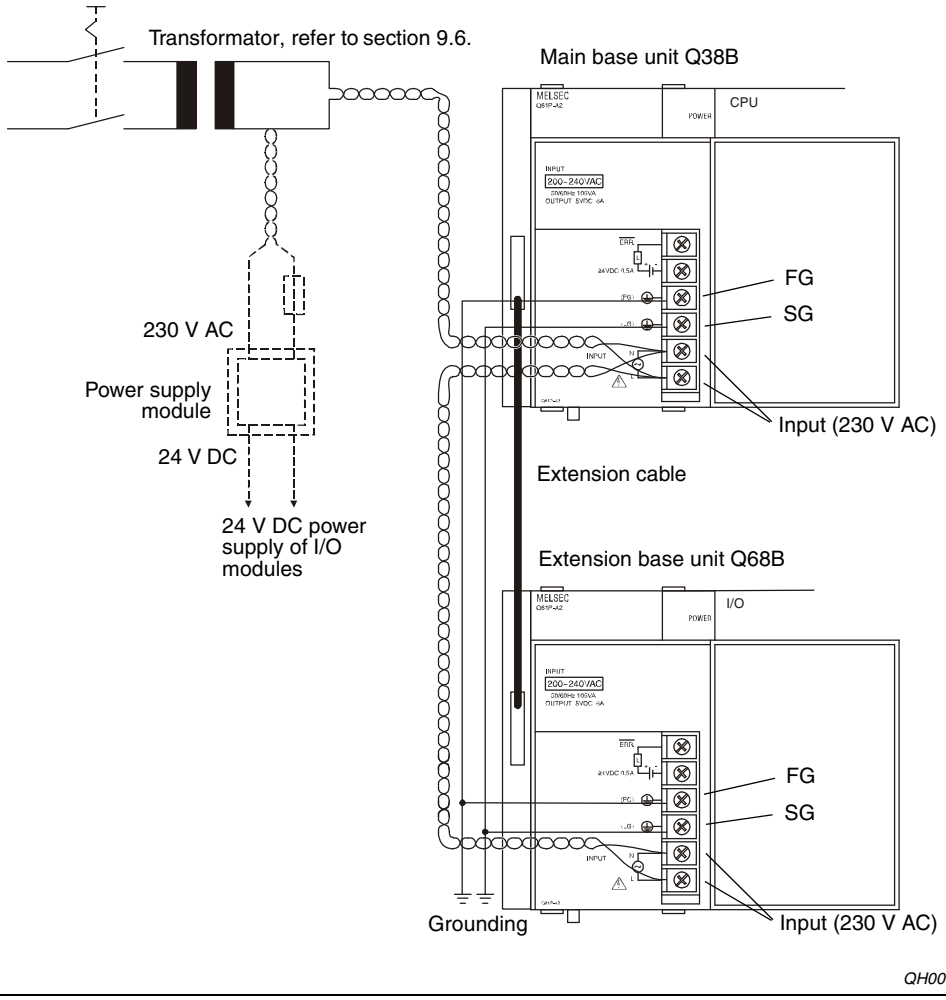


Fig. 9-22: *Single power supply system wiring example*

10 Maintenance and inspection

In order to use the programmable controller in normal and optimal condition at all times, this section describes items that must be maintained or inspected daily or at regular intervals.

10.1 Daily inspection

The items that must be inspected daily are listed in the following table:

Inspection item		Inspection	Judgment criteria	Measures
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	Retighten the screws.
Installation of I/O module		Check that the module is not dislocated and the unit fixing hook is engaged securely.	The module fixing hook must be engaged and installed securely.	Securely engage the module fixing hook.
Connecting conditions		Check for loose terminal screws.	Screws must not be loose.	Retighten the terminal screws.
		Check for distance between solderless terminals.	The proper clearance must be provided between solderless terminals.	Correct.
		Check that the cable connector is not loose.	Connections must not be loose.	Retighten the connector fixing screws.
Module indication LED	POWER LED	Check that the LED is on.	The LED must be on (green). (Error if the LED is off or on (red)).	refer to section 11.2.4
	RUN LED	Check that the LED is on in the RUN status.	The LED must be on. (Error if the LED is off/flickering.)	refer to sections 11.2.8 and 11.2.9
	ERR.LED	Check that the LED is off.	The LED must be off. (Error detected if the LED is on.)	refer to sections 11.2.10 and 11.2.11
	BAT. LED	Check that the LED is off.	The LED must be off. (Error if the LED is on.)	refer to section 11.2.12
	Input LED	Check that the LED turns on and off.	The LED must be on when the input power is turend on. The LED must be off when the input power is turned off. (Error if the LED does not turn on or turn off as indicated above.)	refer to section 11.4
	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 off when the output power is turned off. (Error if the LED does not turn on or turn off as indicated above.)	refer to section 11.2.15

Tab. 10-1: *Daily inspection*

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 has been relocated or modified, or wiring layout has been changed, perform this inspection.

Inspection item		Inspection	Judgment criteria	Measures
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 is relevant.
	Ambient humidity		5 to 95 % RH	
	Atmosphere		Corrosive gas must not be present.	
Power voltage		Measure the voltage between the terminals (power supply module)	85 to 132 V AC 170 to 264 V AC 15.6 to 31.2 V DC	Change the power supply or replace the transformer
Installation of modules	Looseness, rattling	Move the module to check for looseness and rattling.	The module must be installed securely.	Retighten the 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.
Connections	Looseness of terminal screws	Check for loose terminal screws.	Screws must not be loose.	Retighten the terminal screws.
	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.	Retighten the connector fixing screws.
Battery		Check the BAT. LED at the front side of the CPU module.	The LED must be off.	Replace the battery when the BAT. LED is on.
		Check the length of term after purchasing the battery.	Must not be used more than 5 years.	Replace the battery if it has been used more than 5 years (even if there is no voltage drop).
		Check status of SM51 and SM52	Must be turned off (refer to section 10.3.1)	Replace the battery when SM51 or SM52 is on. The special registers SD51 and SD52 indicate the specific battery of the memory of which voltage is lowered.
PLC diagnostics		Check the Error log.	The Error log must not be updated.	refer to section 11.3
Maximum scan time		Check the values of SD526 and SD527 using a programming device	Maximum scan time must be within the allowable range given in the specification of the system.	Specify factors that increase the scan time. (Check the operation status of the trigger signal that passes through a loop if loop positions exist in the sequence program.)

Tab. 10-2: *Periodic inspection*

10.3 Battery life and replacement procedure

The batteries installed in the CPU module and SRAM card are used for data retention of the program memory, standard RAM, and latch device during the power failure. Special relays SM51 and SM52 turn on due to the battery voltage drop. Even if the special relays turn on, the program and retained data are not deleted immediately (refer to section 10.3.1). But if the special relays are not observed, the contents of the buffered memory may be lost.

NOTE

After relay SM51 turns on, replace the battery as quickly as possible.
When the battery-low special relay SM52 turns on, immediately change the battery.

SM51 and SM52 turn on when the battery voltage of the CPU module or SRAM card is lowered. To identify the specific battery of the memory of which voltage is lowered, check the contents of the special registers SD51 and SD52.

	Special registers SD51 and SD52		
	Bit 2	Bit 1	Bit 0
Status indication for	Battery for SRAM card		Battery for CPU module

Tab. 10-3: *Bit pattern SD51 and SD52*

The cases for memory retention by the CPU module battery and the SRAM card battery are described below. The important points are:

– The CPU module battery **cannot** retain the SRAM card memory.

– The SRAM card battery cannot retain the CPU module memory.

Power supply module	Voltage of buffer battery for CPU	Voltage of buffer battery for SRAM memory card	Memory retention	
			CPU	SRAM card
On	Sufficient	Sufficient	●	●
		Too low	●	●
	Too low	Sufficient	●	●
		Too low	●	●
Off	Sufficient	Sufficient	●	●
		Too low	●	—
	Too low	Sufficient	—	●
		Too low	—	—

Tab. 10-4: *Memory retention*

● = retained

— = not retained

10.3.1 Battery life

Buffer battery for CPU

The battery life depends on the CPU type. From Q02CPU on, the battery life is also determined by the CPU version (serial number). Refer to section 4.6 for checking the CPU serial number.

NOTES

When the battery (Q6BAT) is not connected to the CPU module, its service life is five years. Replace the battery after this time.

Do not use the battery exceeding the guaranteed value of the battery life.

If the battery life for data buffering has expired the guaranteed time of the following table,
– store program and data into a ROM, so that the data don't get lost, if the PLC is powered down or the battery voltage is low,
– during the time given in the right column of the following table, save program and data on a PC, after special relay SM52 is set.

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

Extending the battery life with the universal model CPU

The universal model CPU has a pro-longing function to extend the battery life. When setting "switch 3" of the intelligent function module switch setting on the tab "I/O assignment", to the value 0001H, only the internal clock is buffered by the battery. All other data, which are normally buffered by the battery get lost during power shut off.

The current supplied by the battery for these CPU modules, what means the battery consumption, is divided in four categories:

Factors of battery consumption		Battery consumption category
Battery life-prolonging function	**Size of file register file in standard RAM (S_R)**	
Set	—	1
Not set	No file registers or 0 k words < $S_R \leq$ 128 k words	2
	128 k words < $S_R \leq$ 384 k words	3
	384 k words < S_R	4

Tab. 10-5: *Factors influencing the battery life time*

The following describes measures for reducing battery consumption:

– Enable the battery life-prolonging function.

– When storing a file register in standard the RAM, minimize the file register file.

– By performing the latch data backup function (to standard ROM).

If not powering on the programmable controller for a long period of time for shipment or other reason, back up the data to the standard ROM.

Battery Q6BAT

- Q00JCPU, Q00CPU and Q01CPU

CPU	Power-on time ratio ①	Battery life (Q6BAT)		
		Guaranteed value ②	Actual service value ③	After SM52 turned on④
Q00JCPU Q00CPU	0 %	26000 hours (2.96 years)	43800 hours (5 years)	710 hours (30 days)
	30 %	37142 hours (4.23 years)		
	50 %	43800 hours (5 years)		
	70 %			
	100 %			
Q01CPU	0 %	5600 hours (0.63 years)	25175 hours (2.87 years)	420 hours (18 days)
	30 %	8000 hours (0.91 years)	35964 hours (4.10 years)	
	50 %	11200 hours (1.27 years)	43800 hours (5 years)	
	70 %	18666 hours (2.13 years)		
	100 %	43800 hours (5 years)		

Tab. 10-6: *Battery (Q6BAT) lives of Q00JCPU, Q00CPU or Q01CPU*

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

② The guaranteed value represents a battery life at 70 °C, which is calculated based on the characteristic values of manufacturer-supplied memories (SRAM) and on the assumption of storage within the ambient temperature range of –25 °C to 75 °C (operating ambient temperature of 0 °C to 55 °C).

③ The actual service value (reference value) represents a battery life that is calculated based on the values measured at storage ambient temperature of 40 °C. This value is intended for reference only, as it varies with characteristics of the memory.

④ In the following status, the backup time after power off is 3 minutes:
– The battery connector is disconnected.
– The lead wire of the battery is broken.

● *Q02(H)-, Q06H-, Q12H- or Q25HCPU (first digits of serial No. is "05010..." or earlier)*

CPU	Power-on time ratio ①	Battery life (Q6BAT)		
		Guaranteed value ②	Actual service value ③	After SM52 turned on
Q02CPU	0 %	5433 hours (0.62 years)	43800 hours (5 years)	120 hours (5 days)
	30 %	7761 hours (0.88 years)		
	50 %	10866 hours (1.24 years)		
	70 %	18110 hours (2.06 years)		
	100 %	43800 hours (5 years)		
Q02HCPU Q06HCPU	0 %	2341 hours (0.26 years)	14550 hours (1.66 years)	120 hours (5 days)
	30 %	3344 hours (0.38 years)	20786 hours (2.37 years)	
	50 %	4682 hours (0.53 years)	29100 hours (3.32 years)	
	70 %	7803 hours (0.89 years)	43800 hours (5 years)	
	100 %	43800 hours (5 years)		
Q12HCPU Q25HCPU	0 %	1260 hours (0.14 years)	6096 hours (0.69 years)	48 hours (2 days)
	30 %	1800 hours (0.20 years)	8709 hours (0.99 years)	
	50 %	2520 hours (0.28 years)	12192 hours (1.39 years)	
	70 %	4200 hours (0.47 years)	20320 hours (2.31 years)	
	100 %	43800 hours (5 years)	43800 hours (5 years)	

Tab. 10-7: *Battery (Q6BAT) lives of Q02(H)-, Q06H-, Q12H- or Q25HCPU (first digits of serial No. is "05010..." or earlier)*

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

② At 70 °C.

③ At 40 °C.

- Q02(H)-, Q06H-, Q12H- or Q25HCPU (first digits of serial No. is "05011..." or later), Process CPU (Q□PHCPU) and Redundant CPU (Q□PRHCPU)

CPU	Power-on time ratio ①	Battery life (Q6BAT)		
		Guaranteed value ②	Actual service value ③	After SM52 turned on ④
Q02CPU	0 %	30000 hours (3.42 years)	43800 hours (5 years)	120 hours (5 days)
	30 %	42887 hours (4.89 years)		
	50 %	43800 hours (5 years)		
	70 %			
	100 %			
Q02HCPU Q06HCPU	0 %	2341 hours (0.26 years)	18364 hours (2.09 years)	120 hours (5 days)
	30 %	3344 hours (0.38 years)	26234 hours (2.99 years)	
	50 %	4682 hours (0.53 years)	36728 hours (4.19 years)	
	70 %	7803 hours (0.89 years)	43800 hours (5 years)	
	100 %	43800 hours (5 years)		
Q02PHCPU Q06PHCPU	0 %	1897 hours (0.21 years)	14229 hours (1.62 years)	96 hours (4 days)
	30 %	2710 hours (0.30 years)	20327 hours (2.32 years)	
	50 %	3794 hours (0.43 years)	28458 hours (3.25 years)	
	70 %	6323 hours (0.72 years)	43800 hours (5 years)	
	100 %	43800 hours (5 years)		
Q12HCPU Q25HCPU Q12PHCPU Q25PHCPU Q12PRHCPU Q25PRHCPU	0 %	1260 hours (0.14 years)	7755 hours (0.88 years)	48 hours (2 days)
	30 %	1800 hours (0.20 years)	11079 hours (1.26 years)	
	50 %	2520 hours (0.28 years)	15510 hours (1.77 years)	
	70 %	4200 hours (0.47 years)	28850 hours (2.95 years)	
	100 %	43800 hours (5 years)	43800 hours (5 years)	

Tab. 10-8: *Battery (Q6BAT) lives of High performance model QCPU (first digits of serial No. is "05011..." or later), Process CPU and Redundant CPU*

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

② The guaranteed value represents a battery life at 70 °C, which is calculated based on the characteristic values of manufacturer-supplied memories (SRAM) and on the assumption of storage within the ambient temperature range of –25 °C to 75 °C (operating ambient temperature of 0 °C to 55 °C).

③ The actual service value (reference value) represents a battery life that is calculated based on the values measured at storage ambient temperature of 40 °C. This value is intended for reference only, as it varies with characteristics of the memory.

④ In the following status, the backup time after power off is 3 minutes:
– The battery connector is disconnected.
– The lead wire of the battery is broken.

● Universal model QCPU

CPU	Power-on time ratio ①	Battery consumption category ②	Battery life (Q6BAT)		
			Guaranteed value ③	Actual service value ④	After SM52 turned on ⑤
Q00U(J)CPU Q01UCPU Q02UCPU Q03UD(E)CPU	0 %	1	30100 hours (3.44 years)	43800 hours (5 years)	600 hours (25 days)
	30 %		43000 hours (4.91 years)		
	50 %		43800 hours (5 years)		
	70 %				
	100 %				
	0 %	2	25300 hours (2.89 years)	43800 hours (5 years)	600 hours (25 days)
	30 %		36100 hours (4.12 years)		
	50 %		43800 hours (5 years)		
	70 %				
	100 %				
Q04UD(E)HCPU	0 %	1	30100 hours (3.44 years)	43800 hours (5 years)	600 hours (25 days)
	30 %		43000 hours (4.91 years)		
	50 %		43800 hours (5 years)		
	70 %				
	100 %				
	0 %	2	4300 hours (0.49 years)	32100 hours (3.66 years)	384 hours (16 days)
	30 %		6100 hours (0.70 years)	43800 hours (5 years)	
	50 %		8600 hours (0.98 years)		
	70 %		14300 hours (1.63 years)		
	100 %		43800 hours (5 years)		
Q06UD(E)HCPU	0 %	1	25300 hours (2.89 years)	43800 hours (5 years)	600 hours (25 days)
	30 %		36100 hours (4.12 years)		
	50 %		43800 hours (5 years)		
	70 %				
	100 %				
	0 %	2	4200 hours (0.48 years)	32100 hours (3.66 years)	384 hours (16 days)
	30 %		6000 hours (0.68 years)	43800 hours (5 years)	
	50 %		8400 hours (0.96 years)		
	70 %		14000 hours (1.60 years)		
	100 %		43800 hours (5 years)		
	0 %	3	2300 hours (0.26 years)	19200 hours (2.19 years)	192 hours (8 days)
	30 %		3200 hours (0.37 years)	27400 hours (3.13 years)	
	50 %		4600 hours (0.53 years)	38400 hours (4.38 years)	
	70 %		7600 hours (0.87 years)	43800 hours (5 years)	
	100 %		43800 hours (5 years)		

Tab. 10-9: *Battery (Q6BAT) lives of the Universal model QCPU*

CPU	Power-on time ratio ①	Battery consumption category ②	Battery life (Q6BAT)		
			Guaranteed value ③	Actual service value ④	After SM52 turned on ⑤
Q10UD(E)HCPU Q13UD(E)HCPU Q20UD(E)HCPU Q26UD(E)HCPU	0 %	1	22600 hours (2.58 years)	43800 hours (5 years)	600 hours (25 days)
	30 %		32200 hours (3.68 years)		
	50 %		43800 hours (5 years)		
	70 %				
	100 %				
	0 %	2	4100 hours (0.47 years)	26200 hours (2.99 years)	384 hours (16 days)
	30 %		5800 hours (0.66 years)	37400 hours (4.27 years)	
	50 %		8200 hours (0.94 years)	43800 hours (5 years)	
	70 %		13600 hours (1.55 years)		
	100 %		43800 hours (5 years)		
	0 %	3	2300 hours (0.26 years)	18600 hours (2.12 years)	192 hours (8 days)
	30 %		3200 hours (0.37 years)	26500 hours (3.03 years)	
	50 %		4600 hours (0.53 years)	37200 hours (4.25 years)	
	70 %		7600 hours (0.87 years)	43800 hours (5 years)	
	100 %		43800 hours (5 years)		
	0 %	4	1500 hours (0.17 years)	13800 hours (1.58 years)	144 hours (6 days)
	30 %		2100 hours (0.24 years)	19700 hours (2.25 years)	
	50 %		3000 hours (0.34 years)	27600 hours (3.15 years)	
	70 %		5000 hours (0.57 years)	43800 hours (5 years)	
	100 %		43800 hours (5 years)		

Tab. 10-9: *Battery (Q6BAT) lives of the Universal model QCPU*

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

② refer to Tab. 10-5

③ The guaranteed value represents a battery life at 70 °C, which is calculated based on the characteristic values of manufacturer-supplied memories (SRAM) and on the assumption of storage within the ambient temperature range of –25 °C to 75 °C (operating ambient temperature of 0 °C to 55 °C).

④ The actual service value (reference value) represents a battery life that is calculated based on the values measured at storage ambient temperature of 40 °C. This value is intended for reference only, as it varies with characteristics of the memory.

⑤ In the following status, the backup time after power off is 3 minutes:
– The battery connector is disconnected.
– The lead wire of the battery is broken.

Battery Q7BAT

NOTES

When the battery (Q7BAT) is not connected to the CPU module, its service life is five years. Replace the battery after this time.

Battery Q7BAT is not available in EU countries.

The battery Q7BAT is not available for the Basic model QCPU (00JCPU, Q00CPU and Q01CPU).

- Q02(H)-, Q06H-, Q12H- or Q25HCPU (first digits of serial No. is "05010..." or earlier)

CPU	Power-on time ratio ①	Battery life (Q7BAT)		
		Guaranteed value ②	Actual service value ③	After SM52 turned on
Q02CPU	0 %	13000 hours (1.48 years)	43800 hours (5 years)	240 hours (10 days)
	30 %	18571 hours (2.11 years)		
	50 %	26000 hours (2.96 years)		
	70 %	43333 hours (4.94 years)		
	100 %	43800 hours (5 years)		
Q02HCPU Q06HCPU	0 %	5000 hours (0.57 years)	38881 hours (4.43 years)	240 hours (10 days)
	30 %	7142 hours (0.81 years)	43800 hours (5 years)	
	50 %	10000 hours (1.14 years)		
	70 %	16666 hours (1.90 years)		
	100 %	43800 hours (5 years)		
Q12HCPU Q25HCPU	0 %	2900 hours (0.33 years)	16711 hours (1.90 years)	96 hours (4 days)
	30 %	4142 hours (0.47 years)	23873 hours (2.72 years)	
	50 %	5800 hours (0.66 years)	33422 hours (3.81 years)	
	70 %	9666 hours (1.10 years)	43800 hours (5 years)	
	100 %	43800 hours (5 years)		

Tab. 10-10:*Battery (Q7BAT) lives of Q02(H)-, Q06H-, Q12H- or Q25HCPU (first digits of serial No. is "05010..." or earlier)*

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

② At 70 °C.

③ At 40 °C.

- Q02(H)-, Q06H-, Q12H- or Q25HCPU (first digits of serial No. is "05011..." or later), Process CPU (Q□PHCPU) and Redundant CPU (Q□PRHCPU)

CPU	Power-on time ratio ①	Battery life (Q7BAT)		
		Guaranteed value ②	Actual service value ③	After SM52 turned on ④
Q02CPU	0 %	43800 hours (5 years)	43800 hours (5 years)	240 hours (10 days)
	30 %			
	50 %			
	70 %			
	100 %			
Q02HCPU Q06HCPU	0 %	5000 hours (0.57 years)	43800 hours (5 years)	240 hours (10 days)
	30 %	7142 hours (0.81 years)		
	50 %	10000 hours (1.14 years)		
	70 %	16666 hours (1.90 years)		
	100 %	43800 hours (5 years)		
Q02PHCPU Q06PHCPU	0 %	4051 hours (0.46 years)	38727 hours (4.42 years)	192 hours (8 days)
	30 %	5787 hours (0.66 years)	43800 hours (5 years)	
	50 %	8102 hours (0.92 years)		
	70 %	13503 hours (1.54 years)		
	100 %	43800 hours (5 years)		
Q12HCPU Q25HCPU Q12PHCPU Q25PHCPU Q12PRHCPU Q25PRHCPU	0 %	2900 hours (0.33 years)	21107 hours (2.40 years)	96 hours (4 days)
	30 %	4142 hours (0.47 years)	30153 hours (3.44 years)	
	50 %	5800 hours (0.66 years)	42214 hours (4.81 years)	
	70 %	9666 hours (1.10 years)	43800 hours (5 years)	
	100 %	43800 hours (5 years)		

Tab. 10-11:*Battery (Q7BAT) lives of High performance model QCPU (first digits of serial No. is "05011..." or later), Process CPU and Redundant CPU*

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

② The guaranteed value represents a battery life at 70 °C, which is calculated based on the characteristic values of manufacturer-supplied memories (SRAM) and on the assumption of storage within the ambient temperature range of –25 °C to 75 °C (operating ambient temperature of 0 °C to 55 °C).

③ The actual service value (reference value) represents a battery life that is calculated based on the values measured at storage ambient temperature of 40 °C. This value is intended for reference only, as it varies with characteristics of the memory.

④ In the following status, the backup time after power off is 3 minutes:
– The battery connector is disconnected.
– The lead wire of the battery is broken.

● Universal model QCPU

CPU	Power-on time ratio ①	Battery consumption category ②	Battery life (Q7BAT)		
			Guaranteed value ③	Actual service value ④	After SM52 turned on ⑤
Q00U(J)CPU Q01UCPU Q02UCPU Q03UD(E)CPU	0 %	1	43800 hours (5 years)	43800 hours (5 years)	600 hours (25 days)
	30 %				
	50 %				
	70 %				
	100 %				
	0 %	2	43800 hours (5 years)	43800 hours (5 years)	600 hours (25 days)
	30 %				
	50 %				
	70 %				
	100 %				
Q04UD(E)HCPU	0 %	1	43800 hours (5 years)	43800 hours (5 years)	600 hours (25 days)
	30 %				
	50 %				
	70 %				
	100 %				
	0 %	2	11700 hours (1.34 years)	43800 hours (5 years)	600 hours (25 days)
	30 %		16700 hours (1.91 years)		
	50 %		23400 hours (2.67 years)		
	70 %		39000 hours (4.45 years)		
	100 %		43800 hours (5 years)		
Q06UD(E)HCPU	0 %	1	43800 hours (5 years)	43800 hours (5 years)	600 hours (25 days)
	30 %				
	50 %				
	70 %				
	100 %				
	0 %	2	11400 hours (1.30 years)	43800 hours (5 years)	600 hours (25 days)
	30 %		16200 hours (1.85 years)		
	50 %		22800 hours (2.60 years)		
	70 %		38000 hours (4.34 years)		
	100 %		43800 hours (5 years)		
	0 %	3	5000 hours (0.57 years)	43800 hours (5 years)	600 hours (25 days)
	30 %		7100 hours (0.81 years)		
	50 %		10000 hours (1.14 years)		
	70 %		16600 hours (1.89 years)		
	100 %		43800 hours (5 years)		

Tab. 10-12:*Battery (Q7BAT) lives of the Universal model QCPU*

CPU	Power-on time ratio ①	Battery consumption category ②	Battery life (Q7BAT)		
			Guaranteed value ③	Actual service value ④	After SM52 turned on ⑤
Q10UD(E)HCPU Q13UD(E)HCPU Q20UD(E)HCPU Q26UD(E)HCPU	0 %	1	43800 hours (5 years)	43800 hours (5 years)	600 hours (25 days)
	30 %				
	50 %				
	70 %				
	100 %				
	0 %	2	11100 hours (1.27 years)	43800 hours (5 years)	600 hours (25 days)
	30 %		15800 hours (1.80 years)		
	50 %		22000 hours (2.53 years)		
	70 %		37000 hours (4.22 years)		
	100 %		43800 hours (5 years)		
	0 %	3	5000 hours (0.57 years)	43800 hours (5 years)	600 hours (25 days)
	30 %		7100 hours (0.81 years)		
	50 %		10000 hours (1.14 years)		
	70 %		16600 hours (1.89 years)		
	100 %		43800 hours (5 years)		
	0 %	4	3700 hours (0.42 years)	36100 hours (4.12 years)	432 hours (18 days)
	30 %		5200 hours (0.59 years)	43800 hours (5 years)	
	50 %		7400 hours (0.84 years)		
	70 %		12300 hours (1.40 years)		
	100 %		43800 hours (5 years)		

Tab. 10-12:*Battery (Q7BAT) lives of the Universal model QCPU*

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

② refer to Tab. 10-5

③ The guaranteed value represents a battery life at 70 °C, which is calculated based on the characteristic values of manufacturer-supplied memories (SRAM) and on the assumption of storage within the ambient temperature range of –25 °C to 75 °C (operating ambient temperature of 0 °C to 55 °C).

④ The actual service value (reference value) represents a battery life that is calculated based on the values measured at storage ambient temperature of 40 °C. This value is intended for reference only, as it varies with characteristics of the memory.

⑤ In the following status, the backup time after power off is 3 minutes:
– The battery connector is disconnected.
– The lead wire of the battery is broken.

SRAM card battery

NOTES

Do not use the battery exceeding the guaranteed value of the battery life.

If the battery life for data buffering has expired the guaranteed time of the following table,
– store program and data into a ROM, so that the data don't get lost, if the PLC is powered down or the battery voltage is low,
– during the time given in the right column of the following table, save program and data on a PC, after special relay SM52 is set.

Note that the SRAM card battery is consumed even while the programmable controller is powered ON with the CPU module battery connected.

When the battery-low special relay SM52 turned on, immediately change the battery. Even if an alarm has not yet occurred, it is recommended to replace the battery periodically according to the operating condition.

The SRAM card is not available for the Basic model QCPU.

● Q2MEM-BAT

The life time of the battery Q2MEM-BAT depends on the used memory board and on the time, the CPU is switched ON. Additionally it depends on the serial number (version) of the CPU.

SRAM card	Power-on time ratio ①	Battery life		
		Guaranteed value	Actual service value	After SM51 turned on
Q2MEM-1MBS Q2MEM-2MBS	0 %	690 hours (28 days)	6336 hours (0.72 years)	8 hours
	100 %	11784 hours (1.34 years)	13872 hours (1.58 years)	8 hours

Tab. 10-13:*Battery life (Q2MEM-BAT) when the SRAM card is installed in CPU modules with the serial No. (first digits) is "04011" or earlier*

SRAM card	Power-on time ratio ①	Battery life		
		Guaranteed value	Actual service value ②	After SM52 turned on
Q2MEM-1MBS (Manufacturing control No. A)	0 %	690 hours (28 days)	6336 hours (0.72 years)	8 hours
	100 %	11784 hours (1.34 years)	13872 hours (1.58 years)	
Q2MEM-1MBS (Manufacturing control No. B) Q2MEM-2MBS	0 %	2400 hours (0.27 years)	23660 hours (2.7 years)	20 hours
	30 %	2880 hours (0.32 years)	31540 hours (3.6 years)	
	50 %	4320 hours (0.49 years)	39420 hours (4.5 years)	
	70 %	6480 hours (0.73 years)	43800 hours (5 years)	
	100 %	43800 hours (5 years)	43800 hours (5 years)	50 hours

Tab. 10-14:*Battery life (Q2MEM-BAT) when the SRAM card is installed in CPU modules with the serial No. (first digits) is "04012" or later*

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

② The actual value may vary depending on ambient temperature.

The manufacturer control number of the SRAM card is written on the label on the back of the SRAM card. When character string including the manufacturer control number is 4 digits, the third digit from the leftmost is the manufacturer control number.

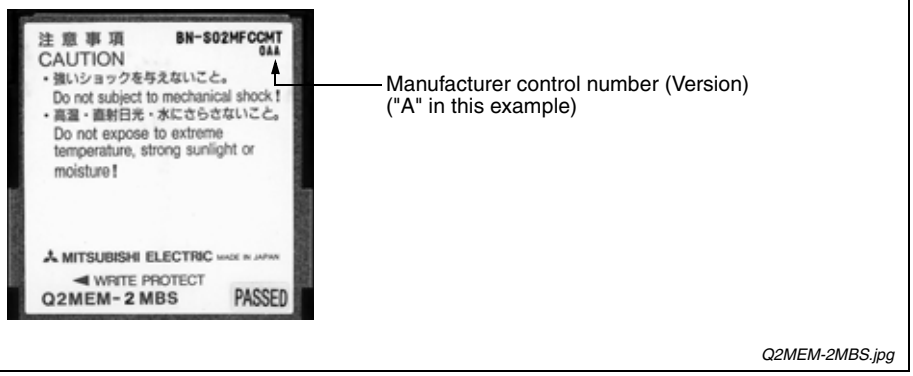


Fig. 10-1: *Indication of version of SRAM card*

- Q3MEM-BAT

SRAM card	Power-on time ratio ①	Battery life		
		Guaranteed value	Actual service value ②	After SM52 turned on
Q3MEM-4MBS	0 %	43800 hours (5 years)	43800 hours (5 years)	50 hours
	30 %			
	50 %			
	70 %			
	100 %			
Q2MEM-1MBS (Manufacturing control No. B) Q2MEM-2MBS	0 %	36300 hours (4.1 years)	43800 hours (5 years)	50 hours
	30 %	43800 hours (5 years)		
	50 %			
	70 %			
	100 %			

Tab. 10-15:*Battery life (Q3MEM-BAT)*

10.3.2 Replacement procedure of the CPU module battery

The battery of the CPU types Q00J, Q00 and Q01 are mounted on the front side of the module. All other CPU types have a case on the bottom side of the CPU (also refer to section 5.2.2).

The programmable controller power must be on for 10 minutes or longer before dismounting the battery, so that the capacitor is sufficiently charged for backing up the memory data during battery replacement.

NOTES

Data in the memory are backed up for 3 minutes max. by a capacitor even after the battery is removed. The replacement of the battery should be done during this time.

Back up the data in the CPU module by a PC before starting replacement.

When replacing a battery of a Redundant CPU, back up the memory data such as programs by the memory copy from the control system to the standby system.
Do a manual system switching by the programming software GX Developer or GX IEC Developer and replace the CPU battery of the former control system afterwards.
For the memory copy from control system to standby system and system switching function, refer to the User's Manual of the Redundant System.

After replacing a battery, write the date for next battery replacement on the sticker on the back side of the front cover. Write the proper date by checking the battery life.

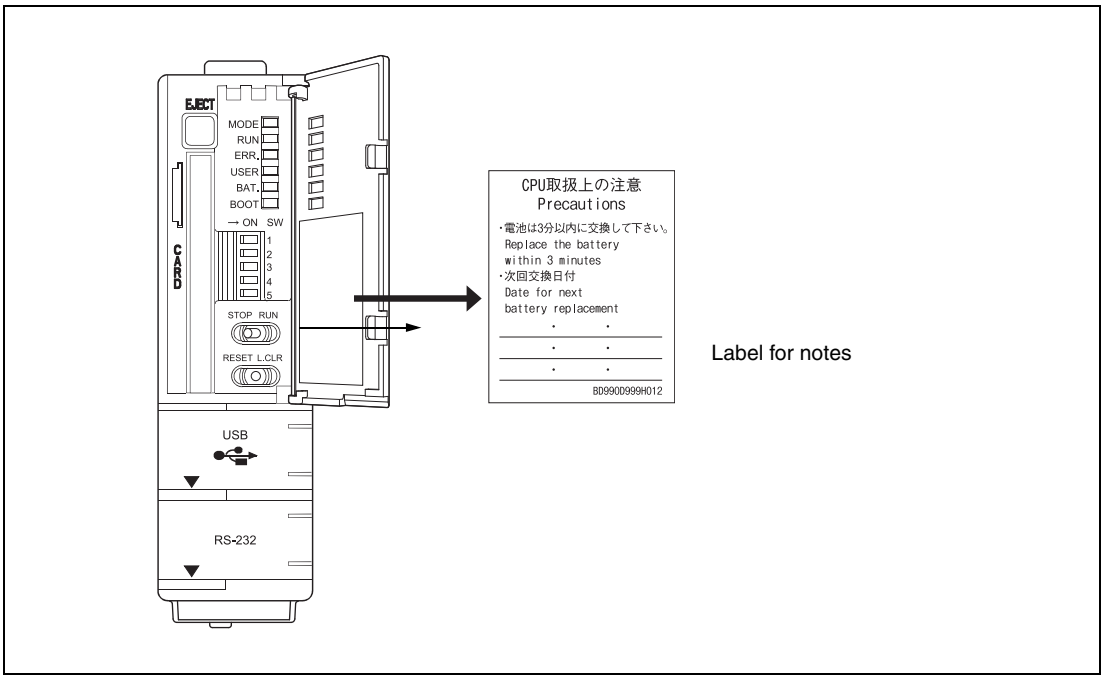


Fig. 10-2: *Label for notes of the date for next battery replacement on the back side of the front cover*

Replacement procedure of the Q6BAT battery

① Turn off the programmable controller power supply.

② Remove the CPU module from the base unit.

③ Open the battery cover of the CPU

④ Disconnect the battery connector.

⑤ Remove the old battery from its holder.

⑥ Insert a new battery into the holder in the correct direction.

⑦ Connect the lead to the connector.

⑧ Insert the battery holder into the CPU module (not for Q00JCPU, Q00CPU and Q01CPU).

⑨ Install the CPU module into the base unit.

⑩ Turn on the programmable controller power supply.

⑪ Monitor SM51 to verify on/off.

If the special relay is still set, indicating with SD52 a low CPU battery voltage, retry the replacement. Check the battery voltage. If it is too low for the memory card, the battery must be replaced (refer to section 10.3.3).

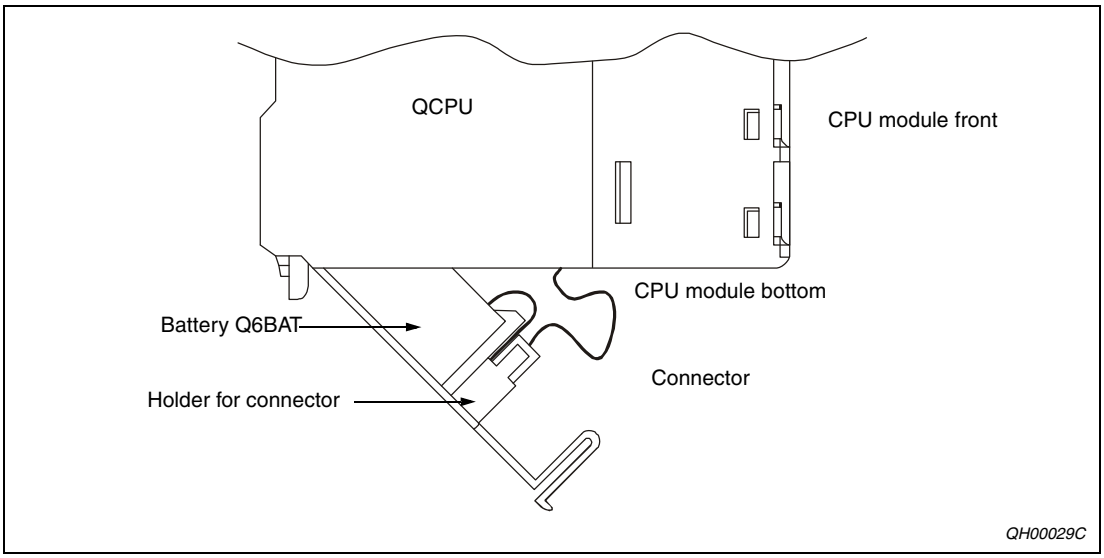


Fig. 10-3: *Location of battery Q6BAT*

Replacement procedure of the Q7BAT battery or replacement of a Q6BAT by Q7BAT

NOTE Battery Q7BAT is not available in EU countries.

① Turn off the programmable controller power supply.

② Remove the CPU module from the base unit.

③ If the battery Q6BAT is used, open the battery case of the CPU. When a battery Q7BAT is installed, remove the battery holder at the bottom of the CPU module.

④ Disconnect the battery connector.

⑤ If the Q6BAT should be replaced by Q7BAT, remove the battery Q6BAT and the cover of the battery case.

When a Q7BAT is to be replaced by a Q7BAT, disengage the catch on one side of the battery holder to disassemble the holder into two, and remove the old battery. Insert the new Q7BAT into the holder in the correct direction, and reassemble the battery holder so that the battery cable comes out of the hole in the holder connection.

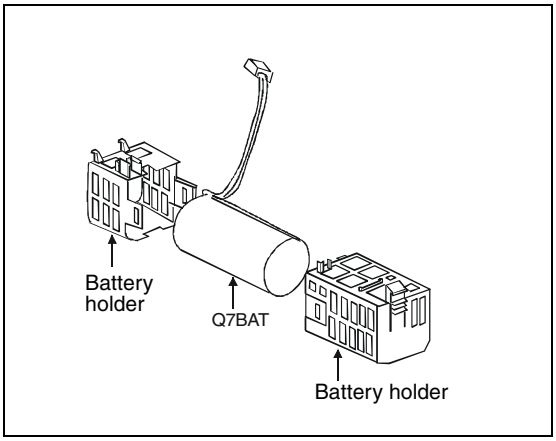


Fig. 10-4:
Disengage the catch on one side of the battery holder to disassemble the holder into two.

⑥ Connect the Q7BAT to the battery connector of the CPU module, and set it into the connector holder of the battery holder.

⑦ Set the battery holder to the CPU module.

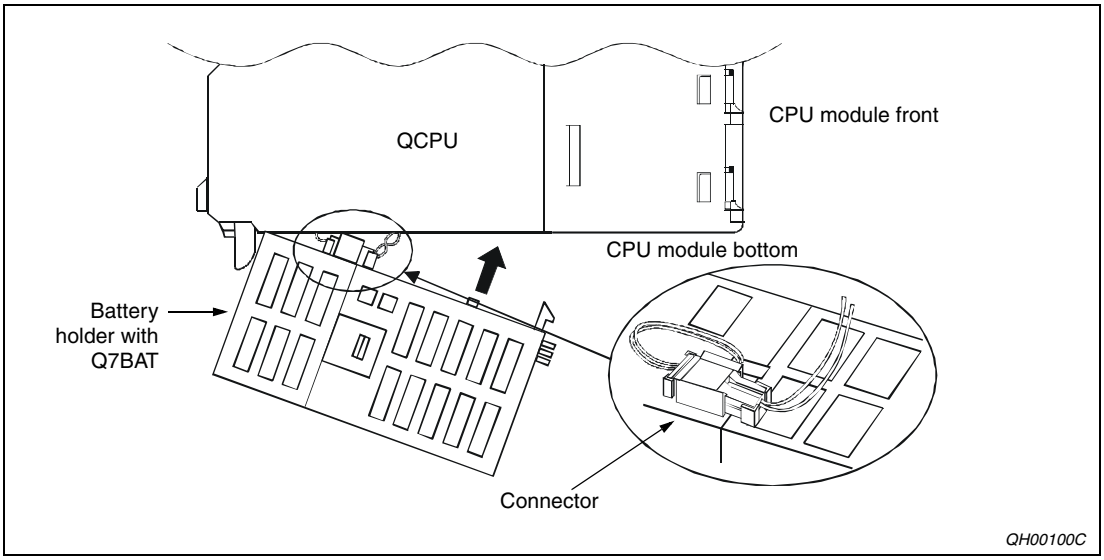


Fig. 10-5: *Location of battery Q7BAT at the bottom of the CPU module*

⑧ Install the CPU module into the base unit.

⑨ Turn on the programmable controller power supply.

⑩ Monitor SM51 to verify on/off.

If the special relay is still set, indicating with SD52 a low CPU battery voltage, retry the replacement. Check the battery voltage. If it is too low for the memory card, the battery must be replaced (refer to next section 10.3.3).

10.3.3 SRAM card CPU module battery replacement procedure

NOTES

Before replacing battery back up the SRAM card data using a programming device.

The battery replacement at the CPU must be done with power supply ON. Observe all safety precaution when working with power supply switched on:

When replacing the battery with the programmable controller power supply off, proceed as follows:
- Back up the SRAM card data using a programming device.
- Remove the memory card and replace the battery.
- Insert the memory card into the CPU.
- Write the backed up data from the programming device to the memory card.

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.

Replacement procedure of SRAM card battery Q2MEM-1MBS and Q2MEM-2MBS

① Open the front cover while the programmable controller power supply is on.

② With a flat-blade screwdriver, etc., remove the battery holder locking switch from the LOCK position (also refer to section 5.2.3).

③ Remove the battery holder from the SRAM card.

④ Remove the old battery from its holder.

⑤ Insert a new battery into the holder in the correct direction.

⑥ Insert the battery holder to the memory card and check that the battery holder fixing switch is set to the LOCK position.

⑦ Monitor SM52 to verify on/off. If the special relay is still set, indicating with SD52 a low CPU battery voltage, retry the replacement.

The following figure shows some of the steps for replacing the battery.

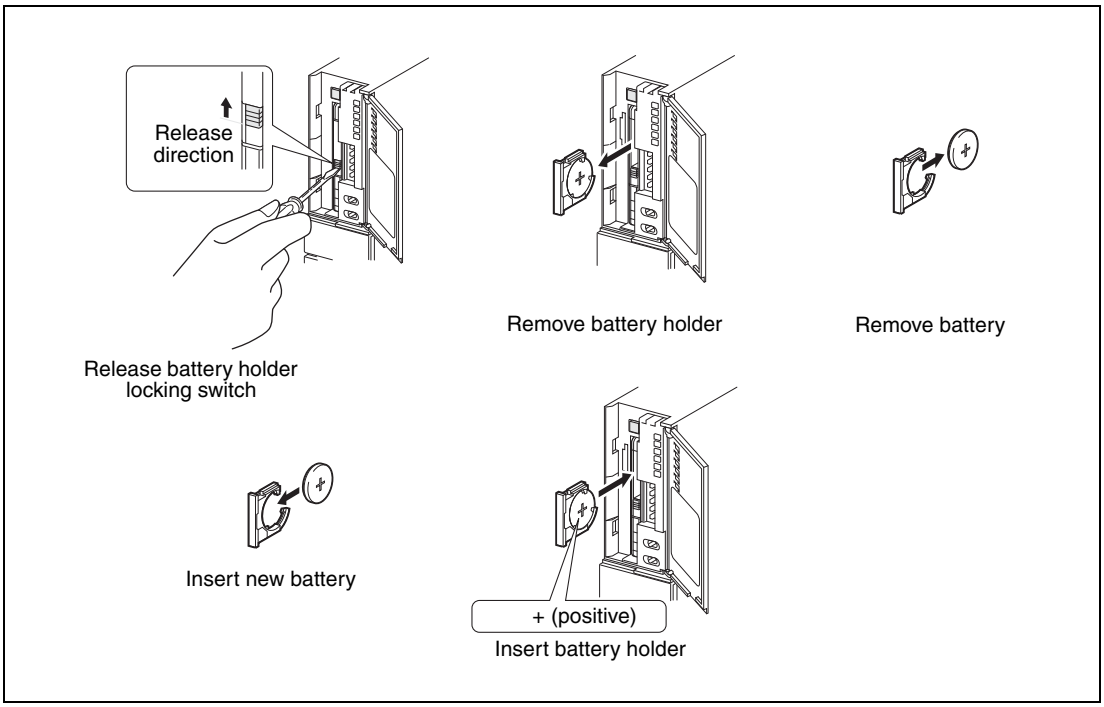
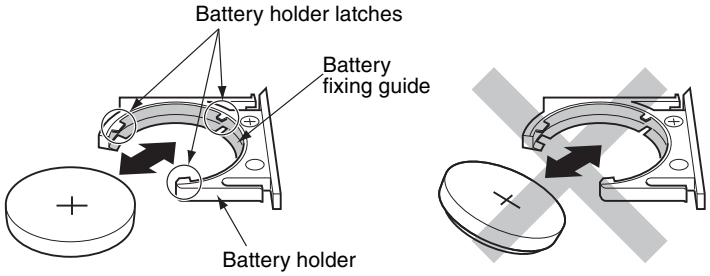


Fig. 10-6: *Replacing SRAM card batteries Q2MEM-1MBS and Q2MEM-2MBS*

NOTE

Insert or remove the battery in the horizontal direction along the battery holder fixing guide. Failure to do so may damage the latches of the battery holder.



Replacement procedure of SRAM card battery Q3MEM-4MBS and Q3MEM-8MBS

① Remove a memory card protective cover of the CPU module at power-on status of the programmable controller (refer to section 5.1.3).

② With a flat-blade screwdriver, etc., remove the battery holder locking switch from the LOCK position (also refer to section 5.2.3).

③ Remove the battery holder from the SRAM card.

④ Remove the old battery from its holder.

⑤ Insert a new battery into the holder in the correct direction.

⑥ Insert the battery holder into the SRAM card.

⑦ Set the battery holder fixing switch to the LOCK position.

⑧ Set the memory card protective cover on the CPU module.

⑨ Monitor SM52 to verify on/off. If the special relay is still set, indicating with SD52 a low CPU battery voltage, retry the replacement.

The following figure shows some of the steps for replacing the buffer battery,

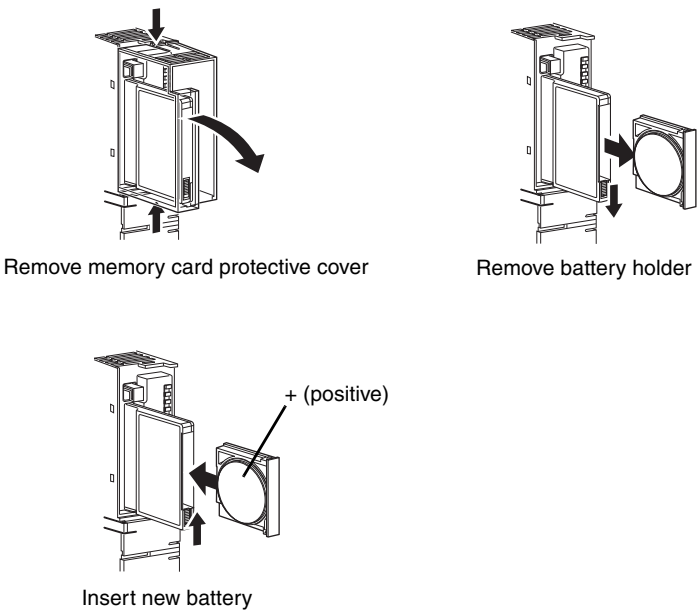


Fig. 10-7: *Replacing SRAM card batteries Q3MEM-4MBS and Q3MEM-8MBS*

10.4 Resuming operation of CPU after storage

The content of the memory is kept by the battery, even if the CPU or memory card is stored or if the power supply of the PLC hasn't been switched on over a long time. Refer tosection 10.3.1 for the life time of the batteries. (The power-on time ratio is 0 %, when the power supply is switched off or during storage.)

Data may be lost,

– if the CPU or memory card is stored witout battery.

– if a battery is installed, but the battery voltage falls under the minimum value during storage.

Buffer battery of the CPU

If the CPU battery is missing or discharged, format the following memory areas by the programming software GX Developer or GX IEC Developer, before operating the CPU:

– Program memory

– Standard RAM.

To format a program memory during boot operation, select the "Clear program memory" checkbox in the **Boot file** tab of the PLC parameter dialog box.

Buffer battery of the SRAM memory card

If the SRAM memory card battery is missing or discharged, format the memory card, before operating the CPU too.

NOTES

Data in the CPU standard ROM and in Flash and ATA memory cards don't need battery buffering. The data will not be lost even after demounting or at battery failure.

When using the function of storing latch data into the standard ROM with the universal model CPU PLC, these data will not be lost even after demounting or at battery failure.

Save all data from the CPU and from the memory card by the programming software GX Developer or GX IEC Developer, before storage or shutting off the power supply of the PLC.

When the programmable controller is powered on or the CPU module is reset, the CPU module initializes all of the following data if an error is detected:
– Program memory data
– Standard RAM data
– Error history
– Latch data (latch relay (L), devices in latch setting range set in the parameter, special relay SM900 to SM999, special register SD900 to SD900)
– Sampling trace data

11 Troubleshooting

This chapter describes errors that may occur during system operation, how to locate the errors, and measures against the errors.

11.1 Troubleshooting basics

In order to increase the reliability of the system, resuming the system operation promptly after correcting a problem is one of the important factors as well as using reliable device. To promptly start up the system, the trouble cause must be located and eliminated correctly.
The basic three points to be followed in the troubleshooting are as follows:

Visual inspection

- Behavior of the programmable controller and other connected devices (in STOP mode or in operation)
- Applicability of the power supply
- States of input and output devices
- Installation states of the power supply module, CPU module, I/O module, intelligent function module, and extension cables
- Wiring (Cables including input and output cables)
- Display status of all indicators such as "POWER", "RUN", "ERR.", and "I/O" LEDs
- Setting status of all switches such as the number of extension base units and data retention time during power failure

After checking above points, connect a programming device and monitor the operating status and programs of the programmable controller.

Error checking

Check how the error status changes by operating the following to the programmable controller.

- Set the mode switch to STOP.
- Clear the Latch area with the L.CLR switch or with the programming device.
- Power on and off.*

* Resetting and powering off clears the error codes stored in the completion status area for the dedicated instruction and the buffer memory states of intelligent function modules. Before resetting or powering off, backup the error codes and buffer memory states that are relevant to the error.

Narrowing down the scope for identifying trouble cause

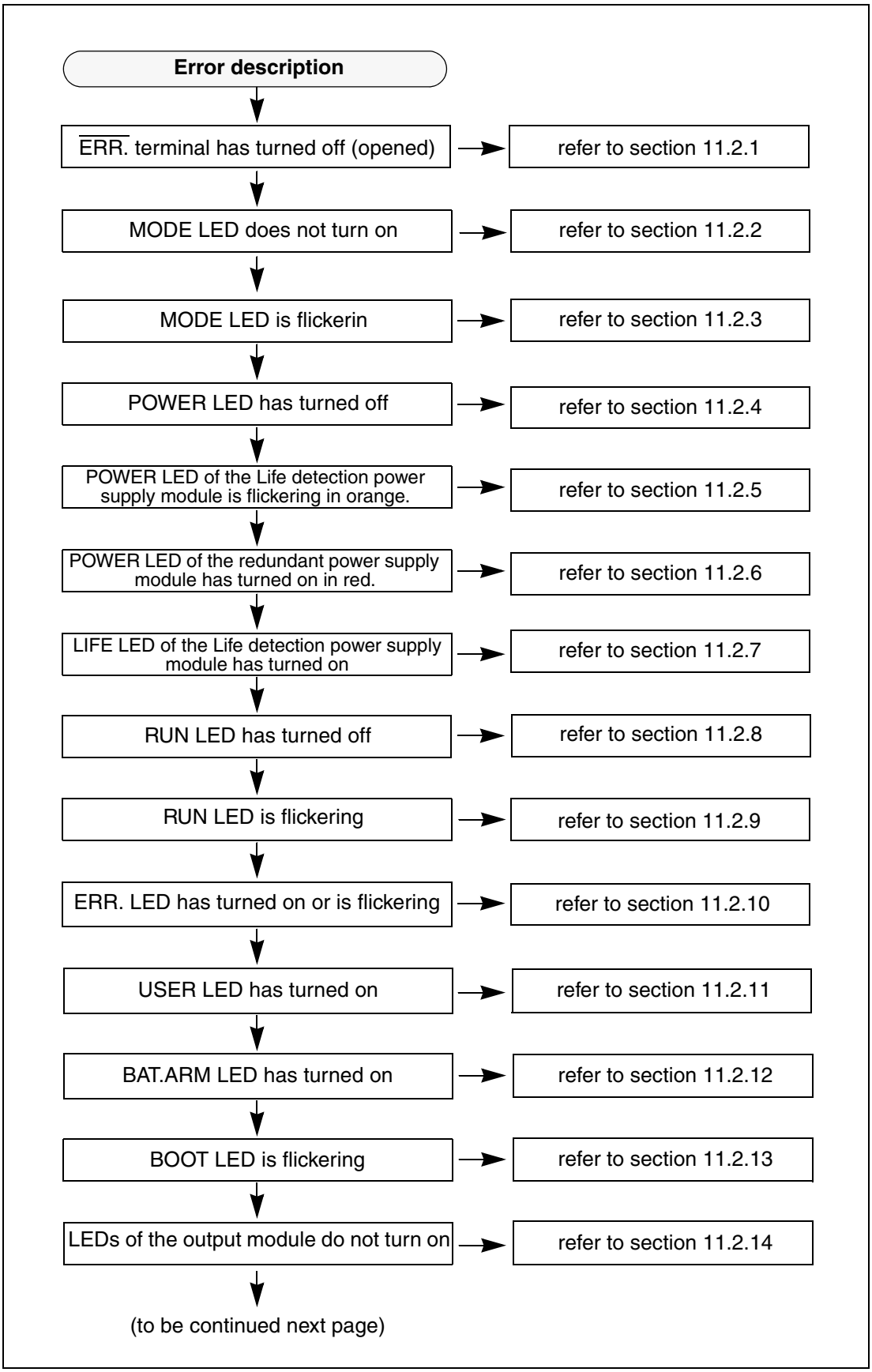
Estimate the troubled part in accordance with above items (visual inspection, error checking). Trouble causes could occur in:

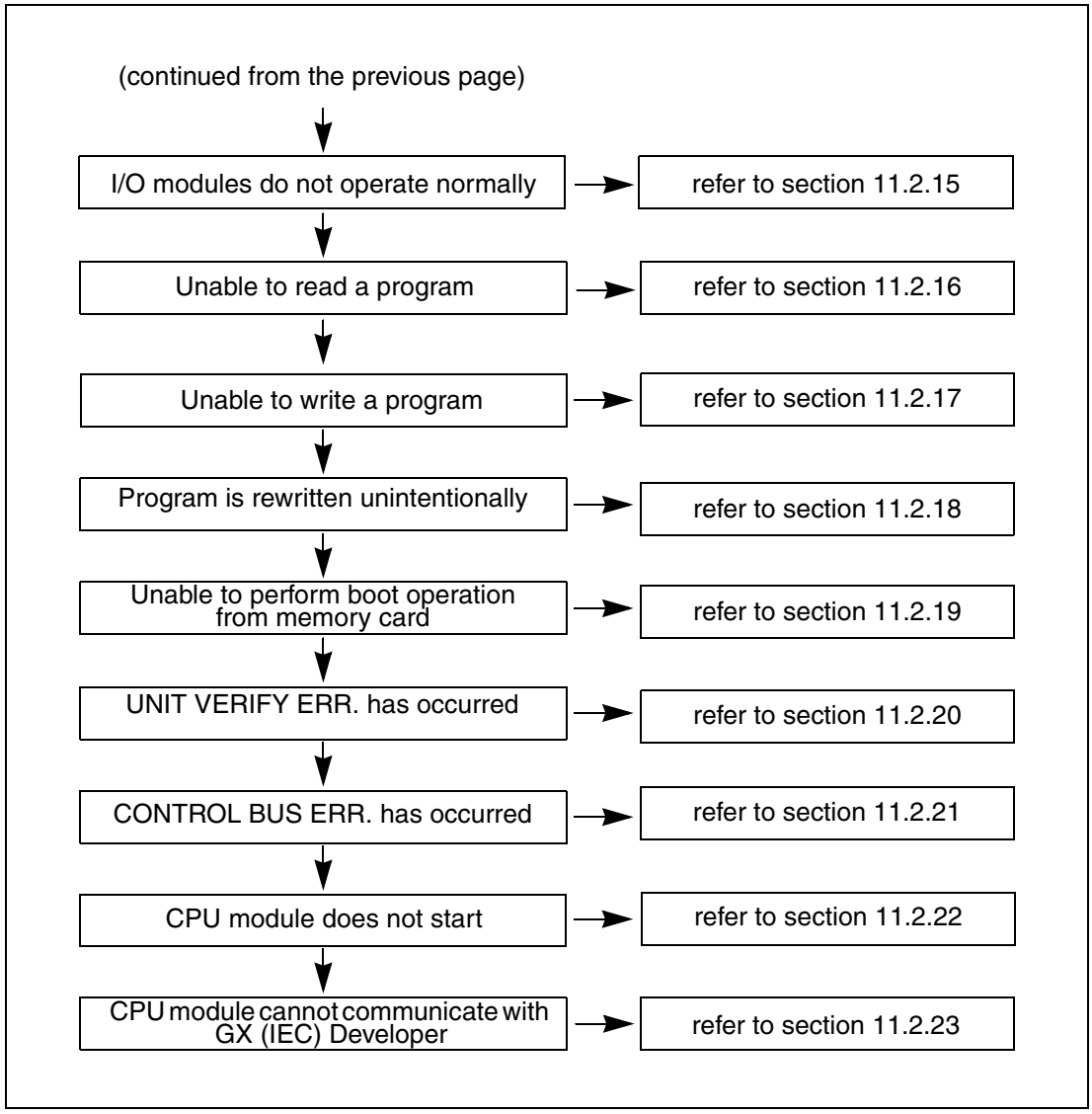
- Programmable controller or external devices
- I/O module or others
- Sequence program

The troubleshooting flowcharts on following pages provide more help for identifying trouble causes.

11.2 Troubleshooting

Troubleshooting flowchart




(continued from the previous page)
I/O modules do not operate normally
refer to section 11.2.15
Unable to read a program
refer to section 11.2.16
Unable to write a program
refer to section 11.2.17
Program is rewritten unintentionally
refer to section 11.2.18
Unable to perform boot operation from memory card
refer to section 11.2.19
UNIT VERIFY ERR. has occurred
refer to section 11.2.20
CONTROL BUS ERR. has occurred
refer to section 11.2.21
CPU module does not start
refer to section 11.2.22
CPU module cannot communicate with GX (IEC) Developer
refer to section 11.2.23

11.2.1 $\overline{\text{ERR.}}$ terminal (negative logic) has turned off (opened)

The $\overline{\text{ERR.}}$ contact (error output) of the power supplies is closed in normal operation (refer to sections 7.3 and 7.4).

- If the $\overline{\text{ERR.}}$ terminal has turned off (opened), check first: How is the ERR. LED of the CPU module? If the ERR. LED is flickering (CPU module is in stop error), check error details and take action according to the details (refer to section 11.2.10).
- If the ERR. LED of the CPU is not flickering, check the following:
  Is power supplied? Is the power supply voltage proper?
  If not, supply power of proper voltage.
- If the power supply voltage is proper, check the MODE LED of the CPU*. If it's on (green), the corresponding power supply module is faulty (replace it with a normal power supply module).

  * Q00J-, Q00- or Q01CPU do not have a MODE LED. In this case continue troubleshooting with the next point.
- If the MODE LED is off, remove the corresponding power supply module, and mount it to the normal base unit. (Do not mount any modules other than the power supply module.)

  If the POWER LED of the power supply module is on (red), the corresponding power supply module is faulty (replace it with a normal power supply module).
- If the POWER LED of the power supply module turned on (green), mount the corresponding power supply module to the original system again, and remove all modules other than the power supply module from the base unit.

  If the POWER LED of the power supply module is off, the base unit that includes the corresponding power supply module is faulty and must be replaced.
- If the POWER LED of the power supply module is on (green), (when mounted to the original system again), check the sum of internal current consumptions of the modules that comprise the system.
  - If the total current exceeds the rated current consumption of one power supply module, Reexamine the system configuration to make the total current less than the rated current consumption of one power supply module.
  - If the total current does not exceed the rated current consumption of one power supply module, a hardware fault may have occurred in one of the modules. Execute operation checks in due order, starting with the minimum system. For the module that does not operate, please contact your local Mitsubishi service center or representative, explaining a detailed description of the problem.

NOTE

If a CPU module stop error occurs during use of two redundant power supply modules, the error is output from the $\overline{\text{ERR.}}$ terminals of the two redundant power supply modules. (Both $\overline{\text{ERR.}}$ terminals are opened.)

Errors that can be detected by the $\overline{\text{ERR.}}$ terminal

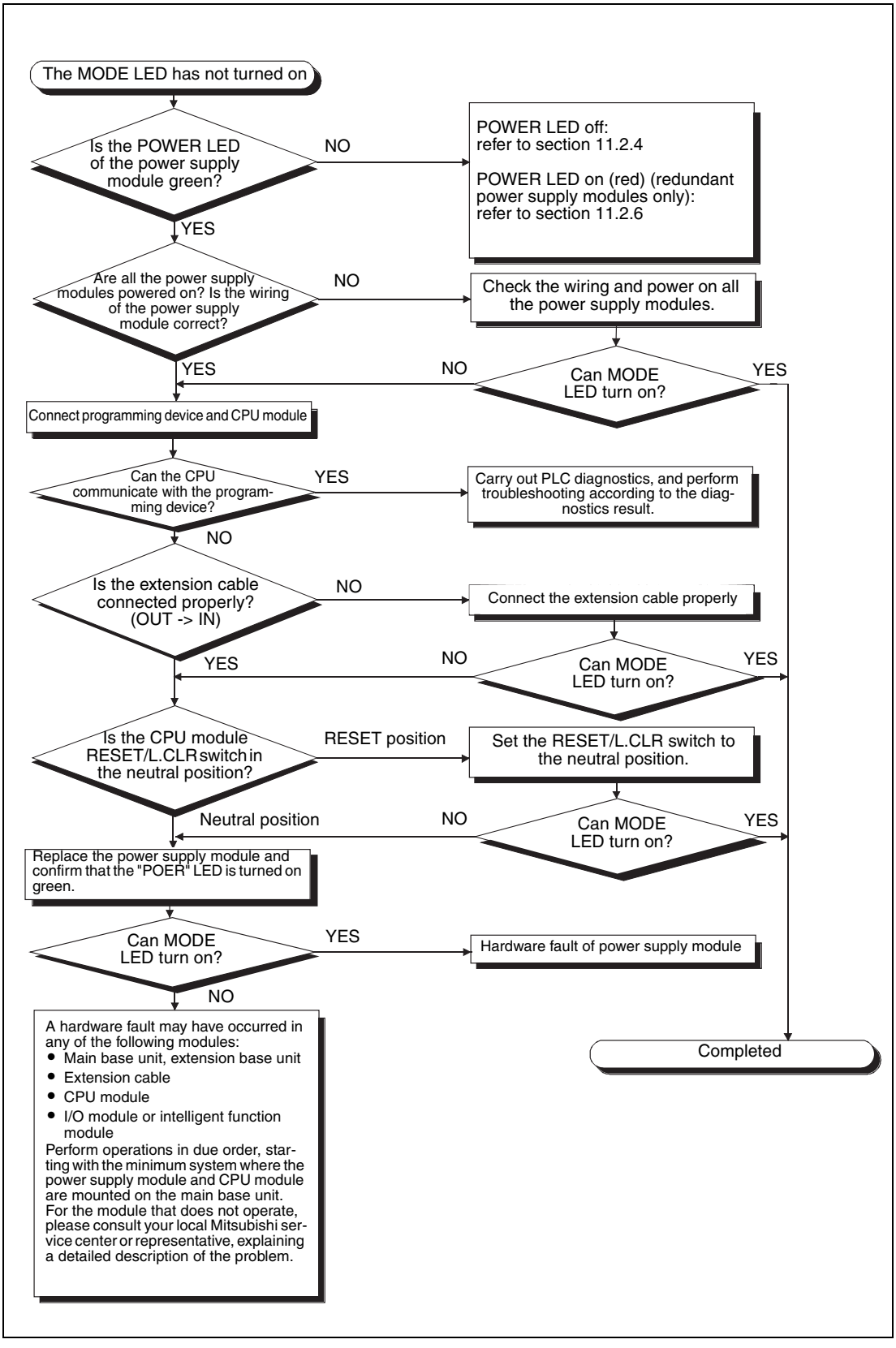
Power supply module used on		Detected errors		
		Basic model QCPU * High performance model QCPU Universal model QCPU*	Process CPU	Redundant CPU
Main base unit	Q33B Q35B Q38B Q312B Q38DB Q312DB	• AC power not input • Power supply module fuse blown • CPU module stop error • CPU RESET		
	Q32SB Q33SB Q35SB	• AC power not input • Power supply module fuse blown • CPU module stop error • CPU RESET	(Cannot be combined)	
	Q38RB	• Power supply module failure • AC power not input • Power supply module fuse blown • CPU module stop error • CPU RESET		
Extension base unit	Q63B Q65B Q68B Q612B	Errors cannot be detected (always off)		(Cannot be added)
	Q68RB (two power supply modules used)	• Power supply module failure • AC power not input • Power supply module fuse blown		

Tab. 11-1: *Errors that can be detected by the $\overline{\text{ERR.}}$ terminal*

* Excluding the Q00JCPU and Q00UJCPU (without $\overline{\text{ERR.}}$ terminal)

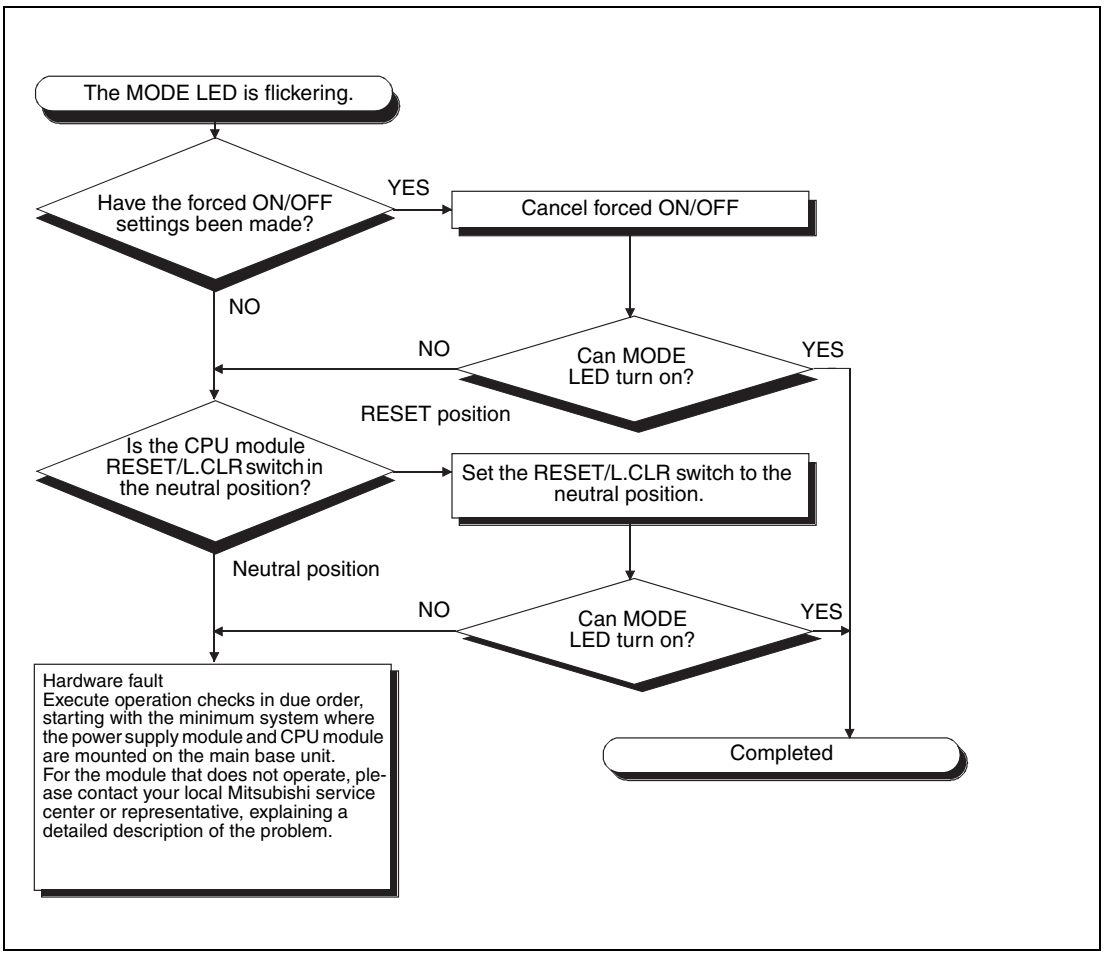
11.2.2 The MODE LED does not turn on

Refer to the following flowchart when the MODE LED of the CPU module does not turn on at programmable controller power-on.

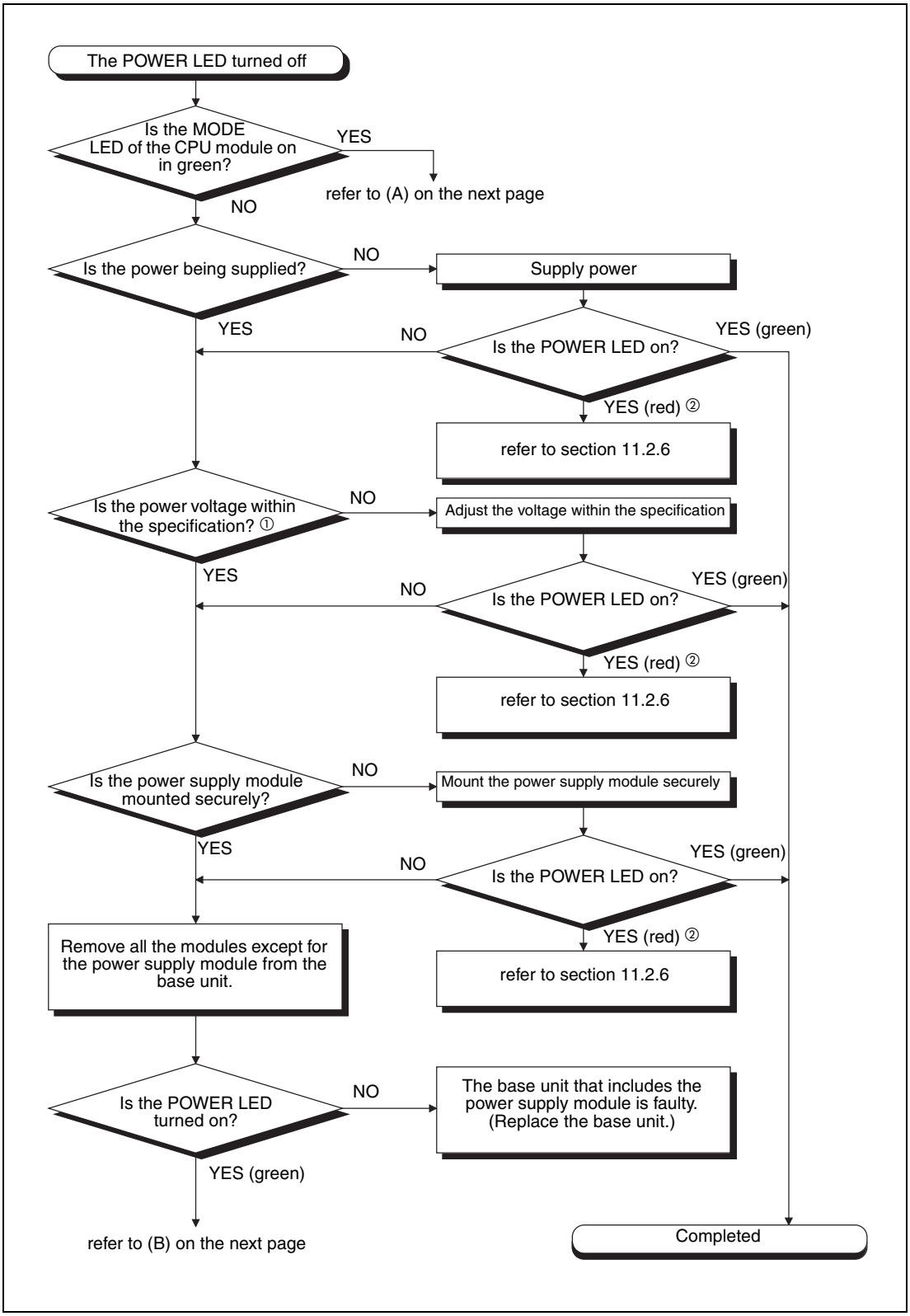


11.2.3 When the MODE LED is flickering

Refer to the following flowchart when the MODE LED of the CPU module flickers at programmable controller poweron, at operation start or during operation.

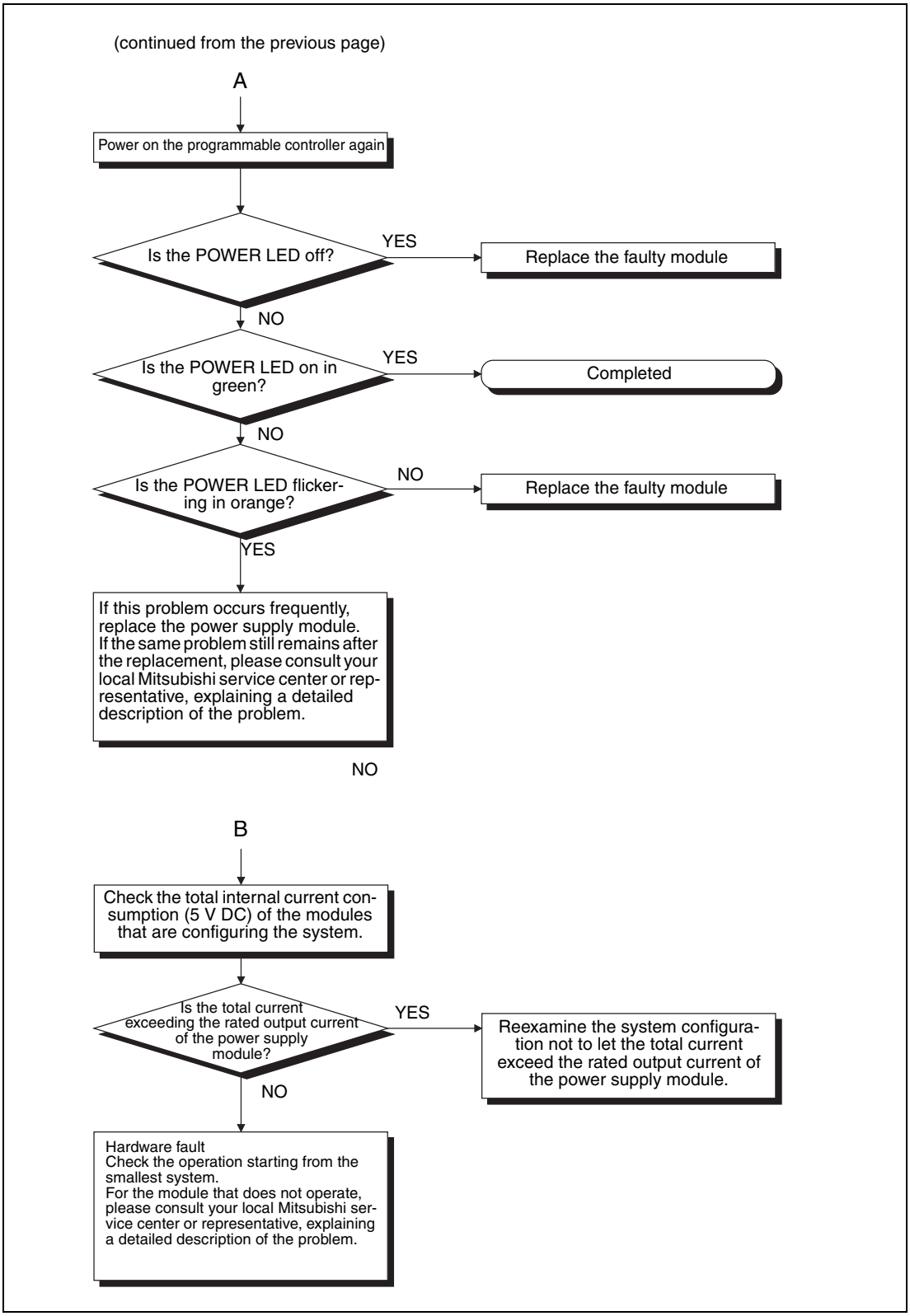


11.2.4 When the POWER LED has turned off



① Specified voltage range:
Rated input voltage 100–120 V AC: 85 to 132 V AC,
Rated input voltage 200–240 V AC: 170 to 264 V AC,
Rated input voltage 24 V DC: 15.6 to 31.2 V DC

② Applicable only to the redundant power supply module


(continued from the previous page)
A
Power on the programmable controller again
Is the POWER LED off?
YES
Replace the faulty module
NO
Is the POWER LED on in green?
YES
Completed
NO
Is the POWER LED flickering in orange?
NO
Replace the faulty module
YES
If this problem occurs frequently, replace the power supply module. If the same problem still remains after the replacement, please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
NO
B
Check the total internal current consumption (5 V DC) of the modules that are configuring the system.
Is the total current exceeding the rated output current of the power supply module?
YES
Reexamine the system configuration not to let the total current exceed the rated output current of the power supply module.
NO
Hardware fault
Check the operation starting from the smallest system.
For the module that does not operate, please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

11.2.5 When the POWER LED is flickering in orange

When the POWER LED of the Life detection power supply module Q61P-D flickers in orange at power-on or during operation of the programmable controller, power on the programmable controller again.

- If the POWER LED is flickering again, the corresponding power supply module is faulty and must be replaced.
- If the POWER LED is on in green after powering on, there is no error.
- If the POWER LED is off after powering on, refer to the flowchart for when the POWER LED turned off in section 11.2.4.

11.2.6 When the POWER LED has turned on in red

- When the POWER LED of the redundant power supply module has turned on in red at power-on or during operation of the programmable controller, remove the corresponding redundant power supply module, and mount it onto the normal redundant base unit. (At this time, do not mount any modules other than the redundant power supply module.)

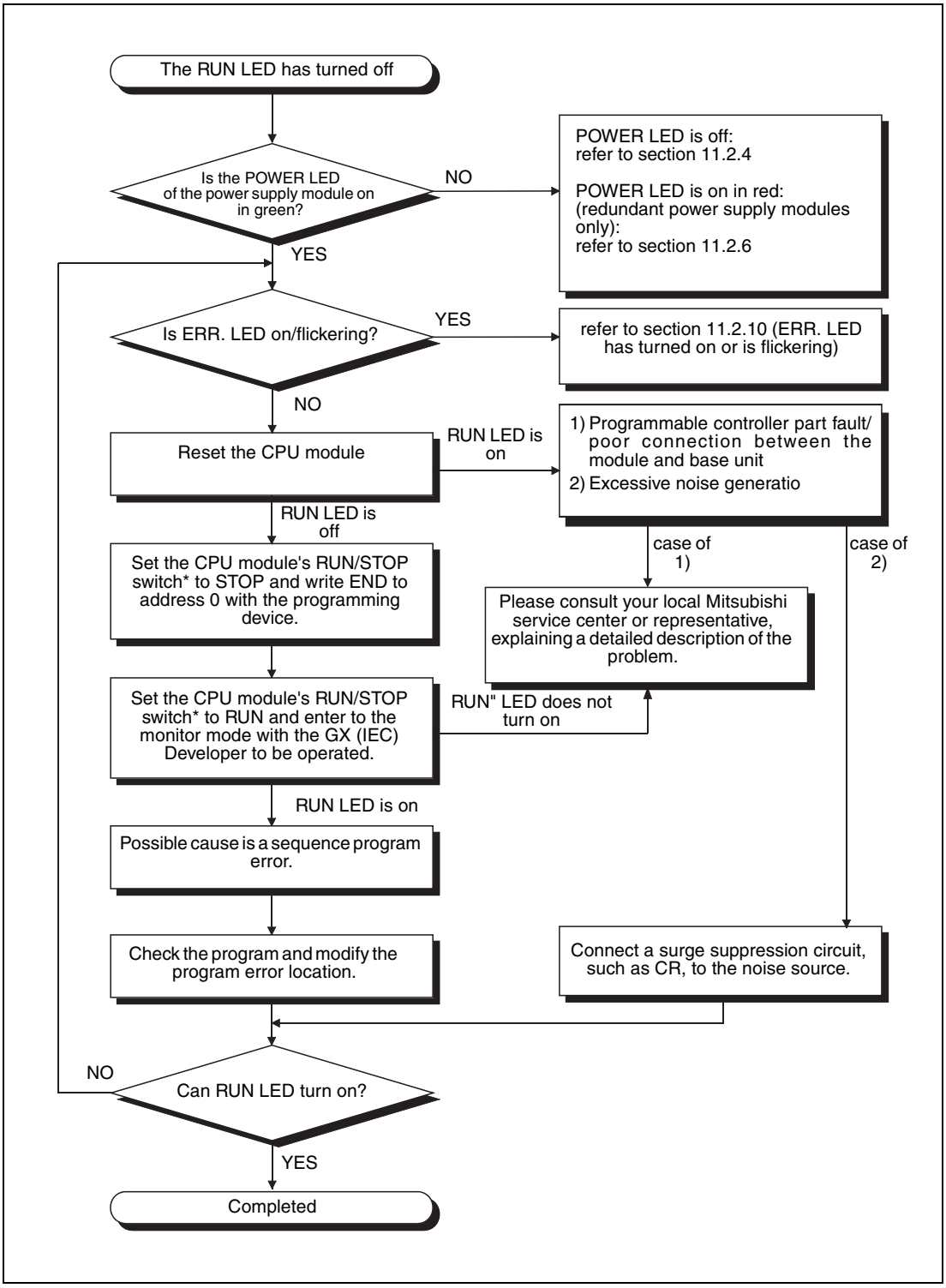
  If the POWER LED of the redundant power supply module is off or on in red, the corresponding redundant power supply module is faulty. (Replace it with a normal one.)
- If the POWER LED of the redundant power supply module is on in green, return the corresponding redundant power supply module to the original system, and remove all modules other than the redundant power supply module from the redundant base unit.

  If the POWER LED of the redundant power supply module is off, the redundant base unit that includes the corresponding redundant power supply module is faulty. (Replace it with a normal redundant base unit.)
- If the POWER LED of the redundant power supply module is on in green (when returned to the original system), check the sum of internal current consumptions of the modules that comprise the system.
  - If the total current exceeds the rated output current of the power supply module, reexamine the system configuration to make the total current less than the rated current consumption of one redundant power supply module.
  - If the total current does not exceed the rated output current of the power supply module, a hardware fault may have occurred in one of the modules. Execute operation checks in due order, starting with the minimum system. For the module that does not operate, please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

11.2.7 When the LIFE LED has turned off or turned on in red/is flickering in red

When the LIFE LED of the Life detection power supply module Q61P-D turned off or turned on in red/is flickering in red at power-on or during operation of the programmable controller, refer to section 7.2.3 for possible causes.

11.2.8 When the RUN LED has turned off



* For the Basic model QCPU, use the RUN/STOP/RESET switch for operation.

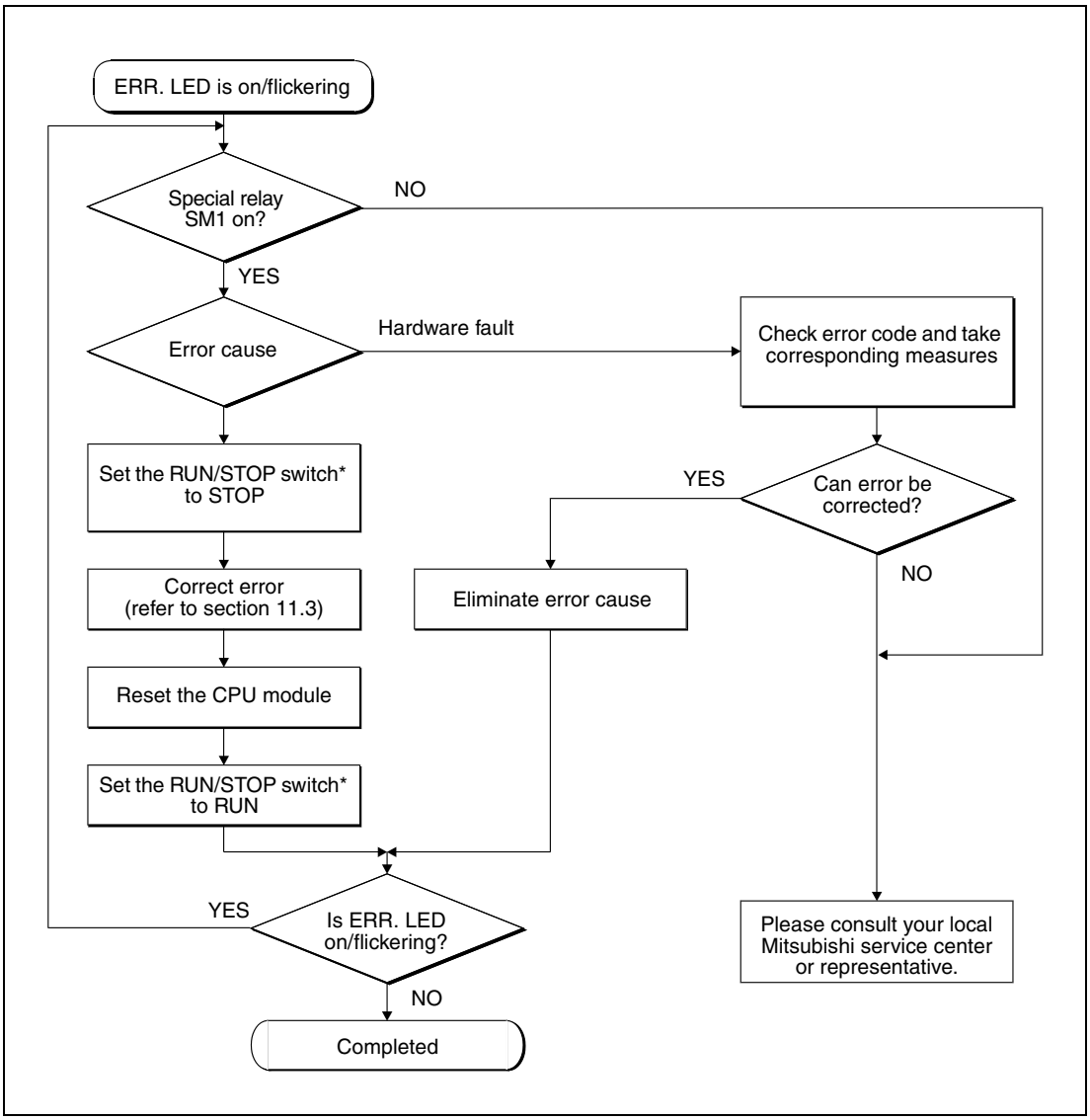
11.2.9 When the RUN LED is flickering

When the programs or parameters are written into the CPU module during the STOP status and then the RUN/STOP switch* is set from STOP to RUN, the RUN LED of the CPU module flickers. Although this status does not mean the CPU module error, the CPU module stops the operation.

Reset the CPU after changing the program or parameters in STOP mode. Afterwards select the RUN mode by setting the RUN/STOP switch* to RUN.

If the CPU should restart without reset, after changing the program or parameters in STOP mode, set the RUN/STOP switch* from STOP to RUN, afterwards to STOP and then again to RUN.

11.2.10 When the ERR. LED has turned on or is flickering



* For the Basic model QCPU, use the RUN/STOP/RESET switch for operation.

11.2.11 When the USER LED has turned on

The USER LED turns on when an error is detected by the CHK instruction or the annunciator (F) turns on. Monitor the corresponding special relays in the monitor mode of a programming device (CHK instruction = SM80, SD80; annunciator F = SM62, SD62 to SD79).

The USER LED can be turned off by:
• Resetting with the RESET/L.CLR switch or
• Executing the LEDR instruction in the sequence program.

NOTE

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 in process.
When the RESET/L.CLR switch is further tilted to L.CLR while the USER LED flickering, the USER LED turns off and terminates the latch clear processing.

11.2.12 When the BAT.ARM LED has turned on

The BAT.ARM LED turns on when a low battery capacity (CPU module battery or SRAM card battery) is detected.

Monitor the special relays and special registers (SM51, SM52, SD51 and SD52) in the monitor mode of a programming device.

After checking, replace the battery with a new one, and reset the CPU module or run the LEDR instruction, and the BAT.ARM LED will turn off.

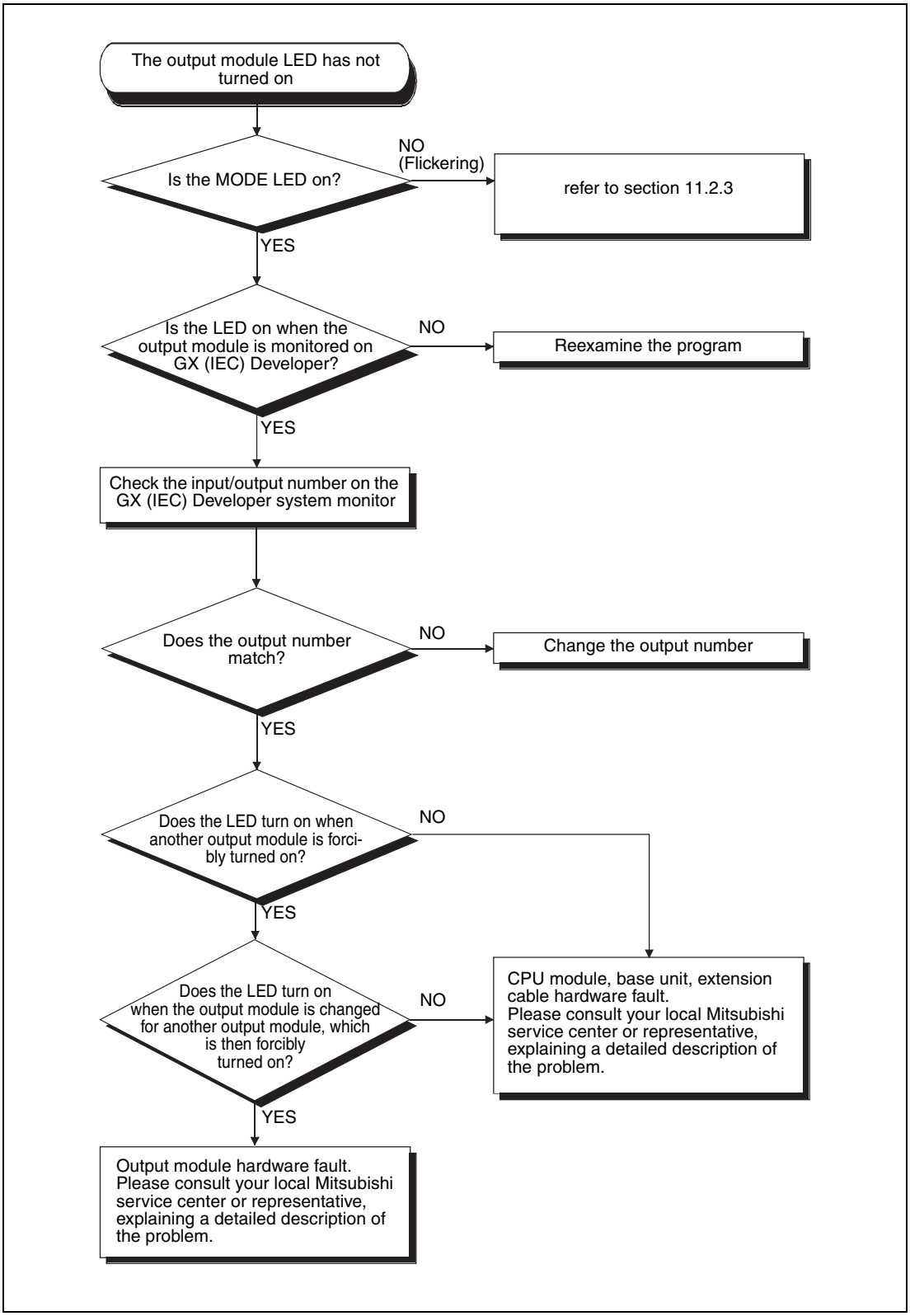
11.2.13 When the BOOT LED is flickering

- When the BOOT LED of the CPU module flickers at programmable controller power-on, at operation start, or during operation, power off the programmable controller.
- Remove the memory card.
- Move the DIP switches SW2 and SW3 of the CPU module to ON (refer to section 4.4.2).
- Power on the programmable controller.

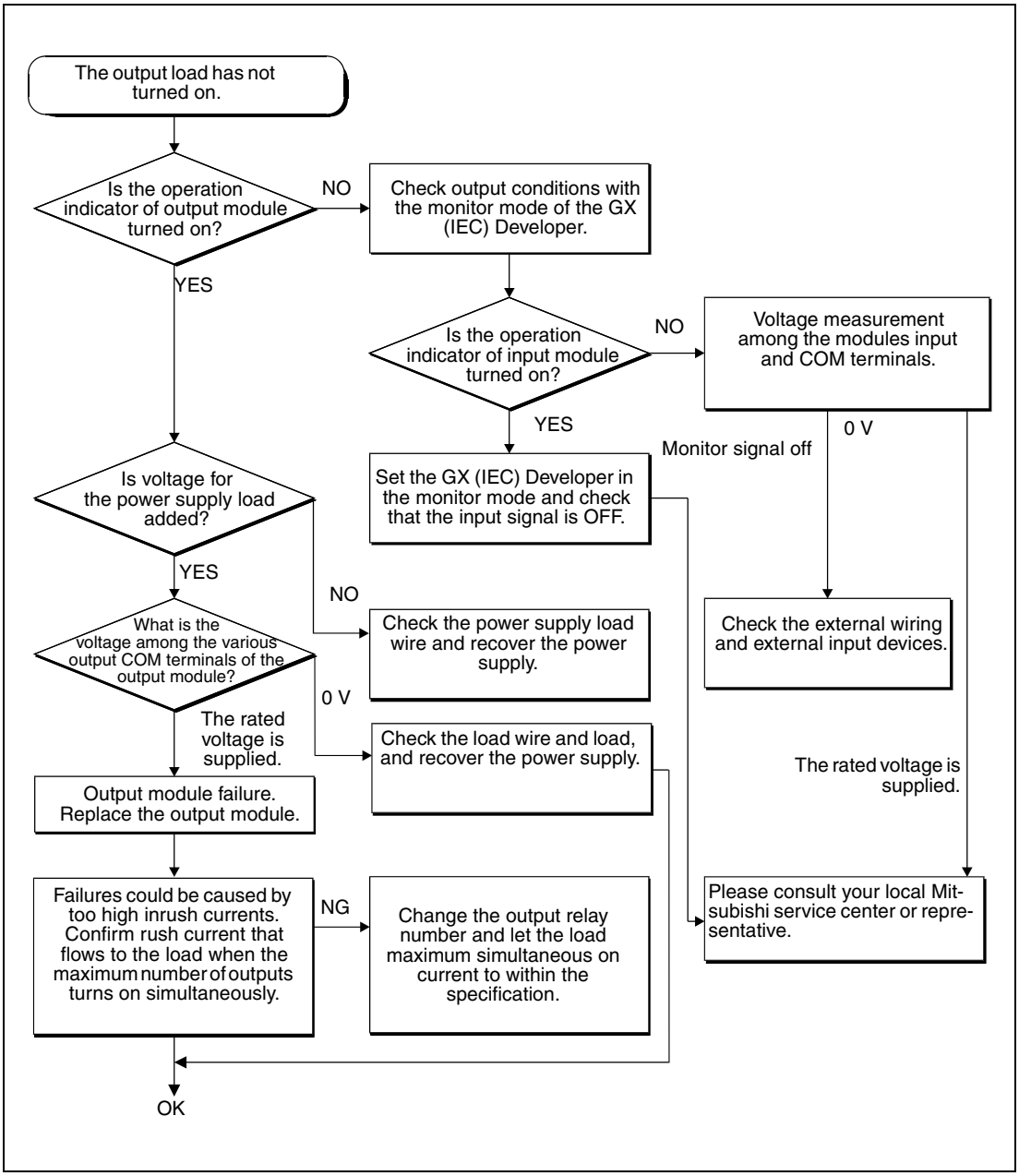
If the BOOT LED turns on, the automatic write from memory card to standard ROM is completed. Perform boot operation from standard ROM.

If the BOOT LED does not turn on, a hardware fault may have occurred in the CPU module. Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

11.2.14 When the LEDs of the output module do not turn on

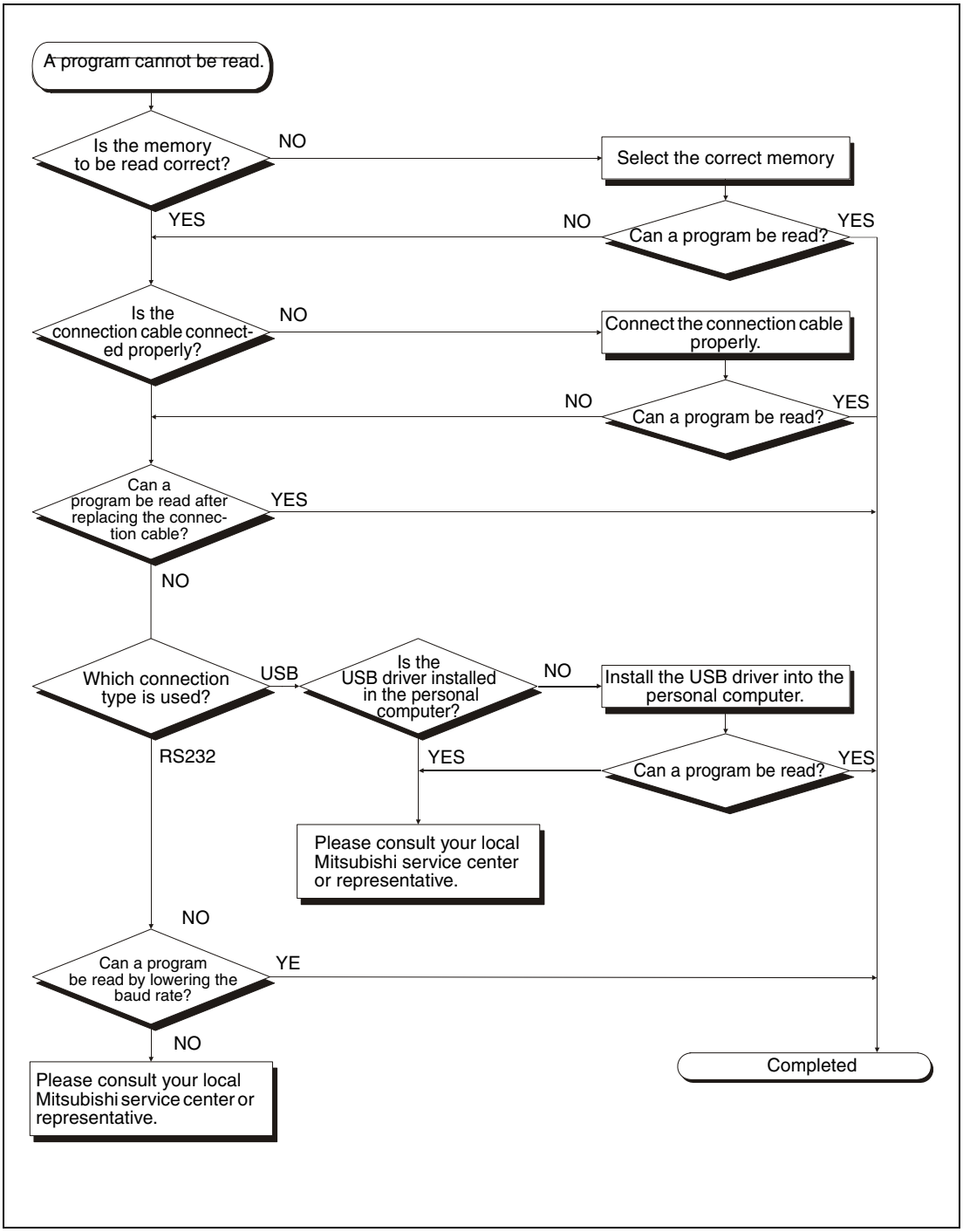


11.2.15 When output load of the output module does not turn on

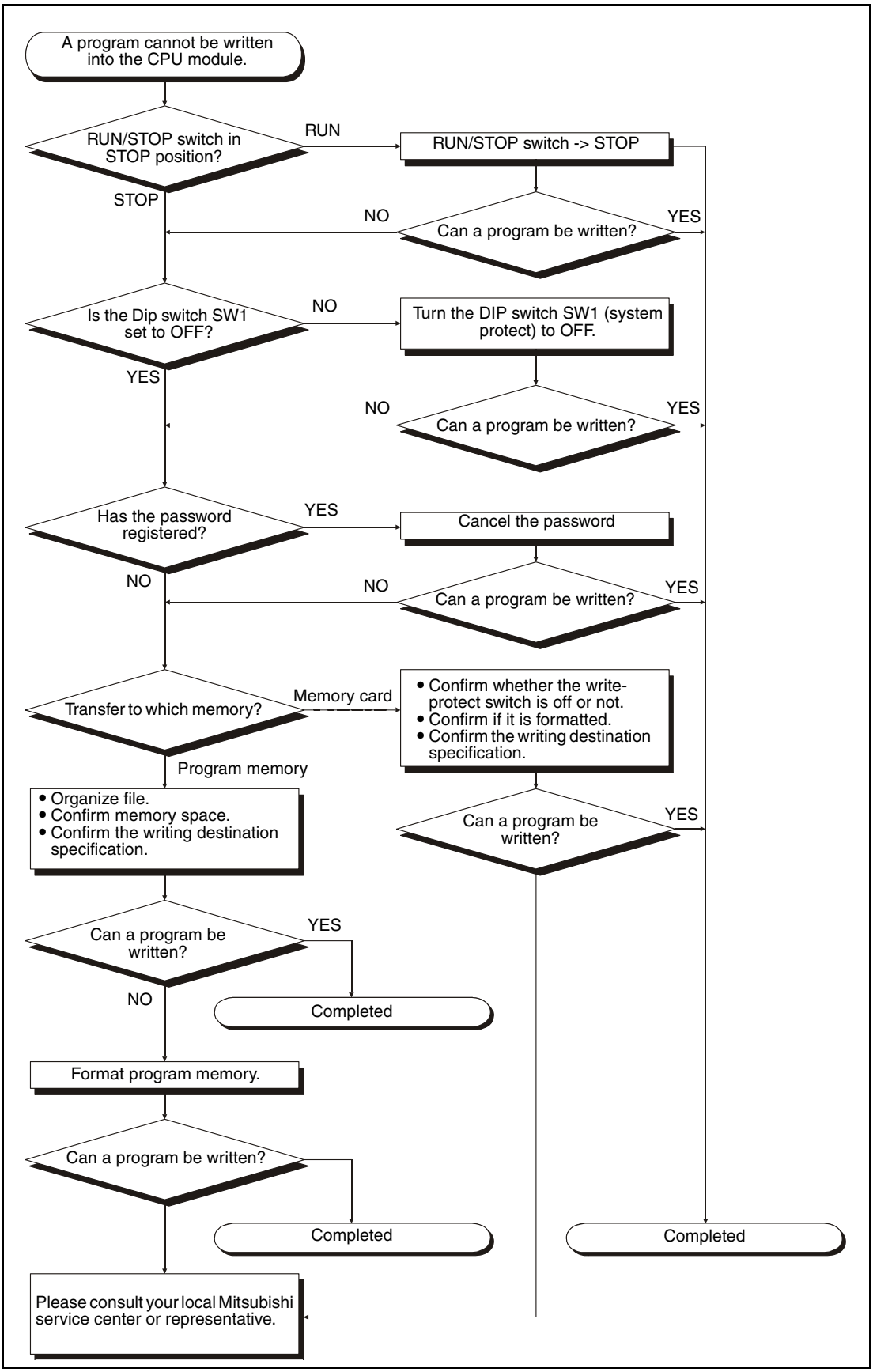


NOTE For the trouble in which input signal to the input module does not turn off: refer to section 11.4.

11.2.16 When unable to read a program



11.2.17 When unable to write a program into the CPU module



11.2.18 When program is rewritten unintentionally

When a program is unintentionally rewritten at power-on or reset of the programmable controller, check special relay SM660.

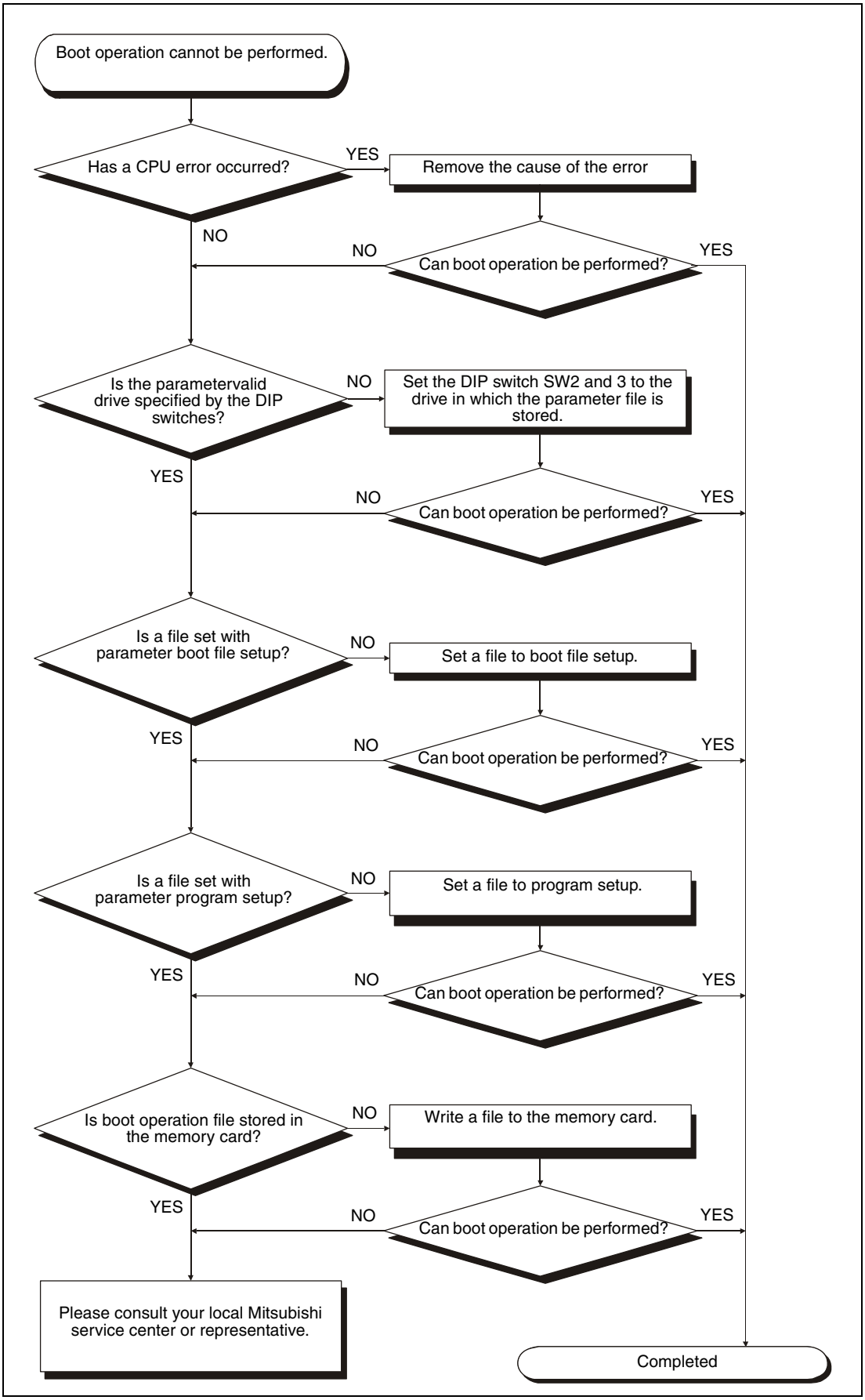
- When SM660 is OFF ("Program memory execution"): A hardware fault may have occurred. Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
- When SM660 is ON ("During boot operation"): After formatting the program memory that is performing boot operation from the standard ROM, write data to the standard ROM.

  Invalidate the "Perform boot from standard ROM" check box in the boot file setting of the PLC parameter dialog box. Write the parameters and sequence program to the program memory.

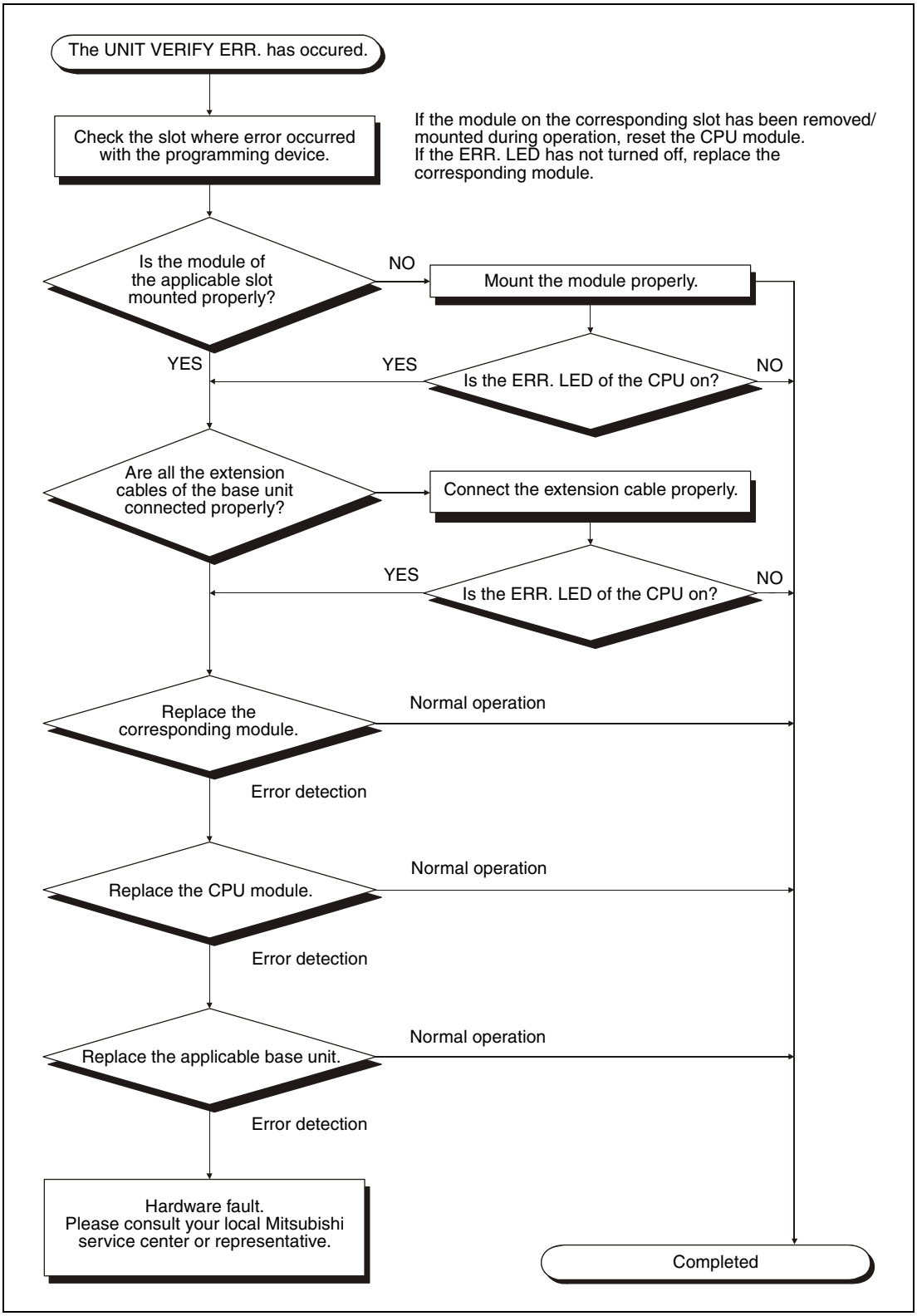
  Power on the programmable controller/perform reset operation.
  If the program is rewritten a hardware fault may have occurred. Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

  If the program is not rewritten, troubleshooting is completed.

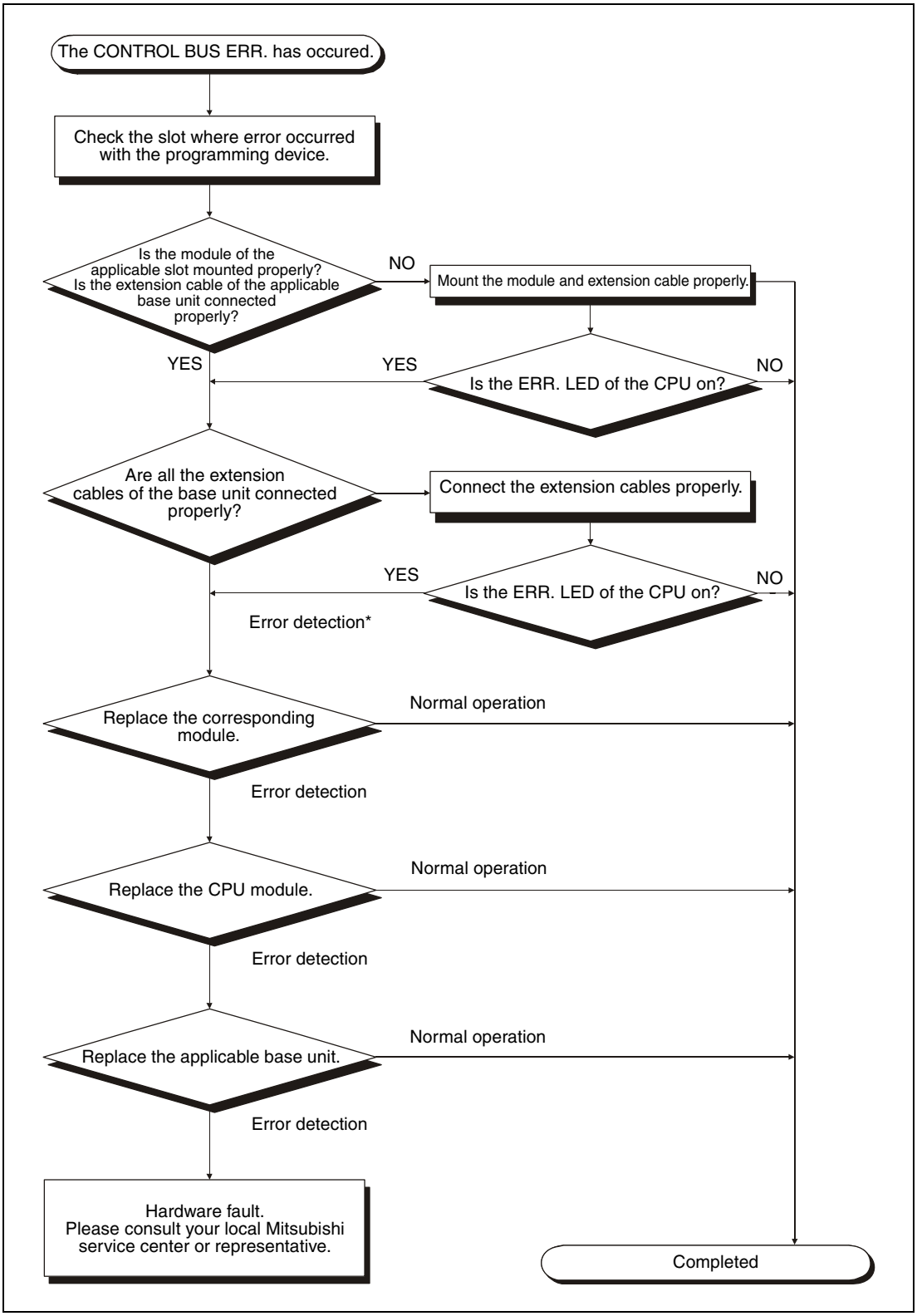
11.2.19 When unable to perform boot operation from the memory card



11.2.20 When "UNIT VERIFY ERR." has occurred



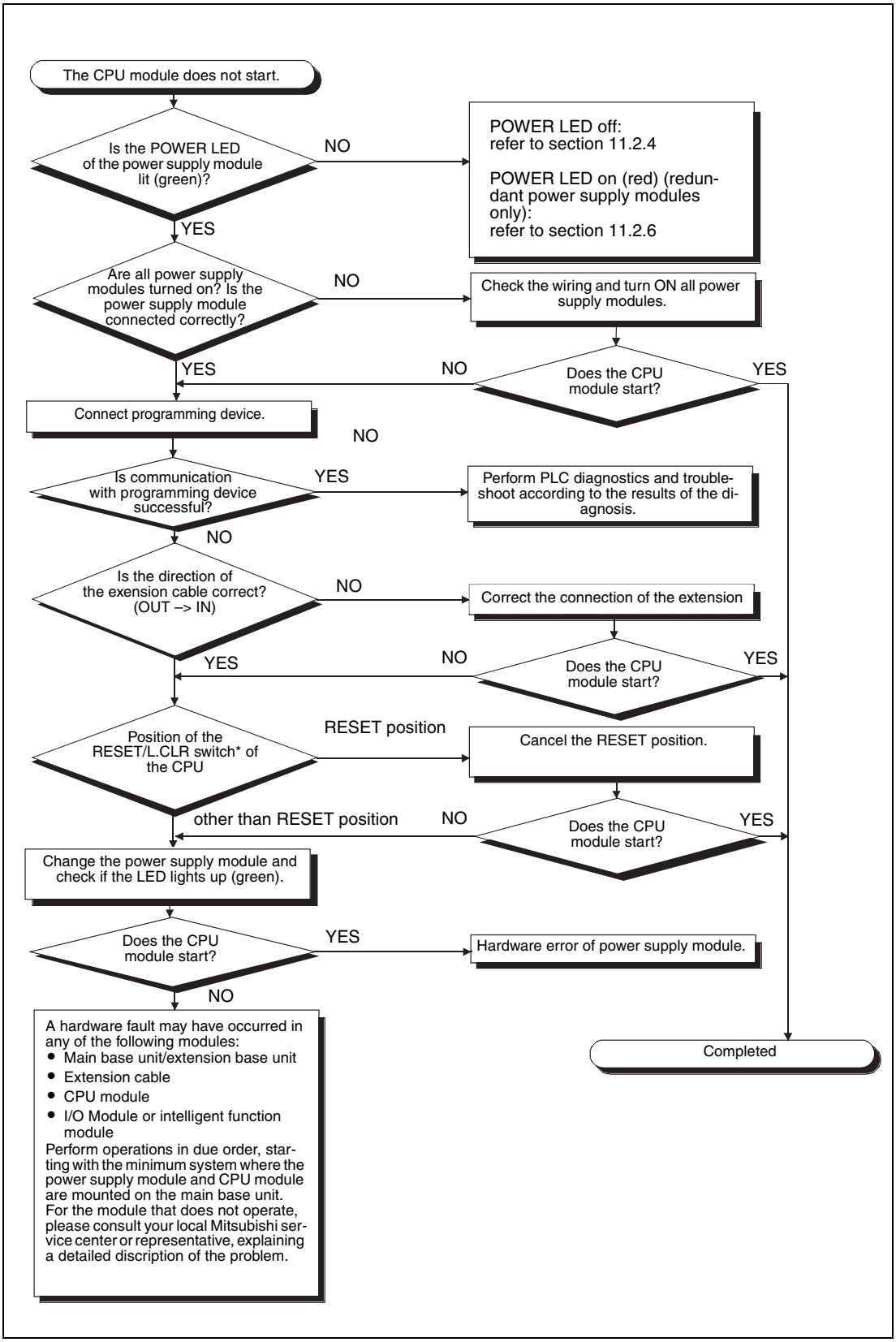
11.2.21 When "CONTROL BUS ERR." has occurred



* May be the failure could be caused by electromagnetic noise. Refer to the notes concerning the wiring in section 9.6.

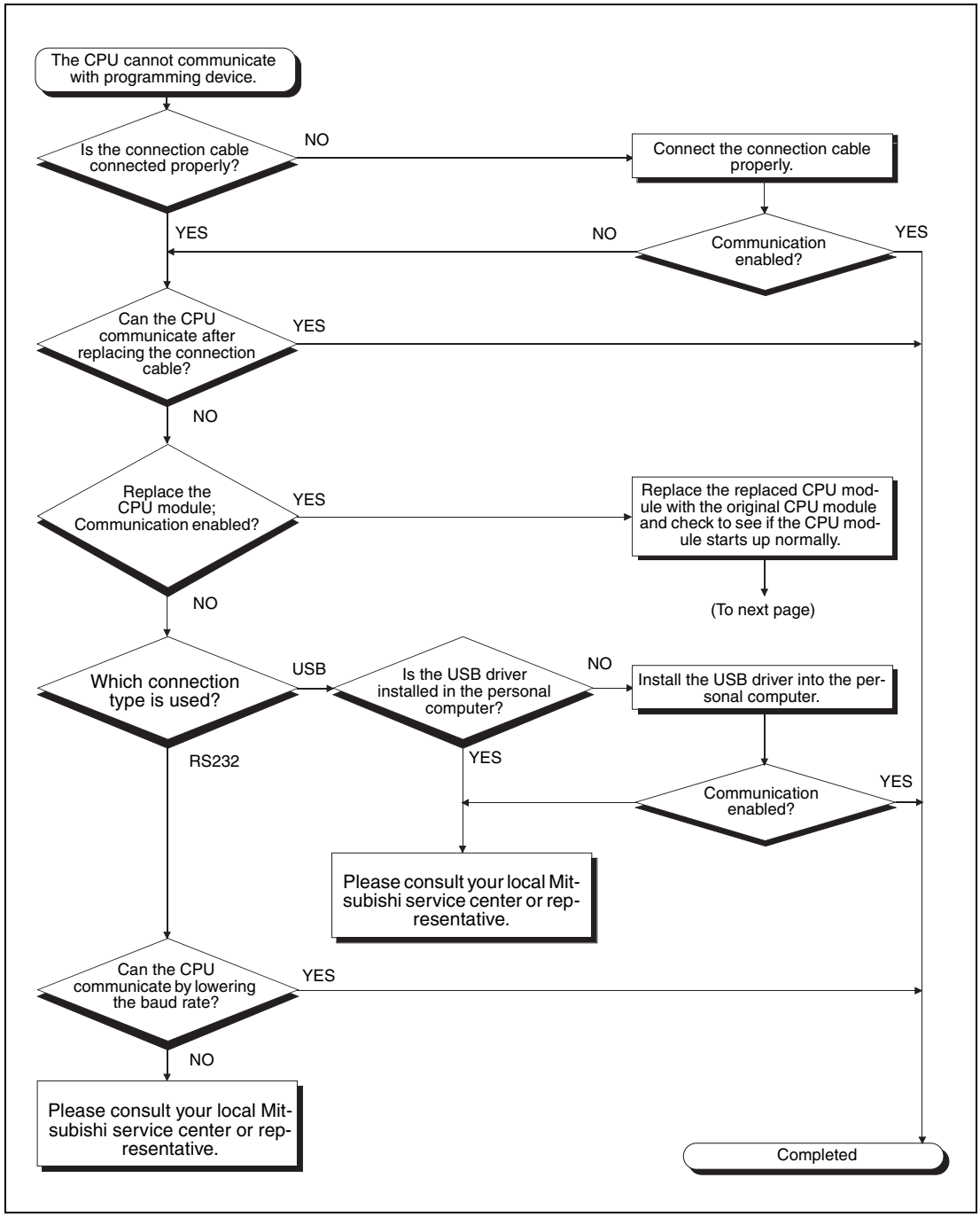
11.2.22 When the CPU module does not start

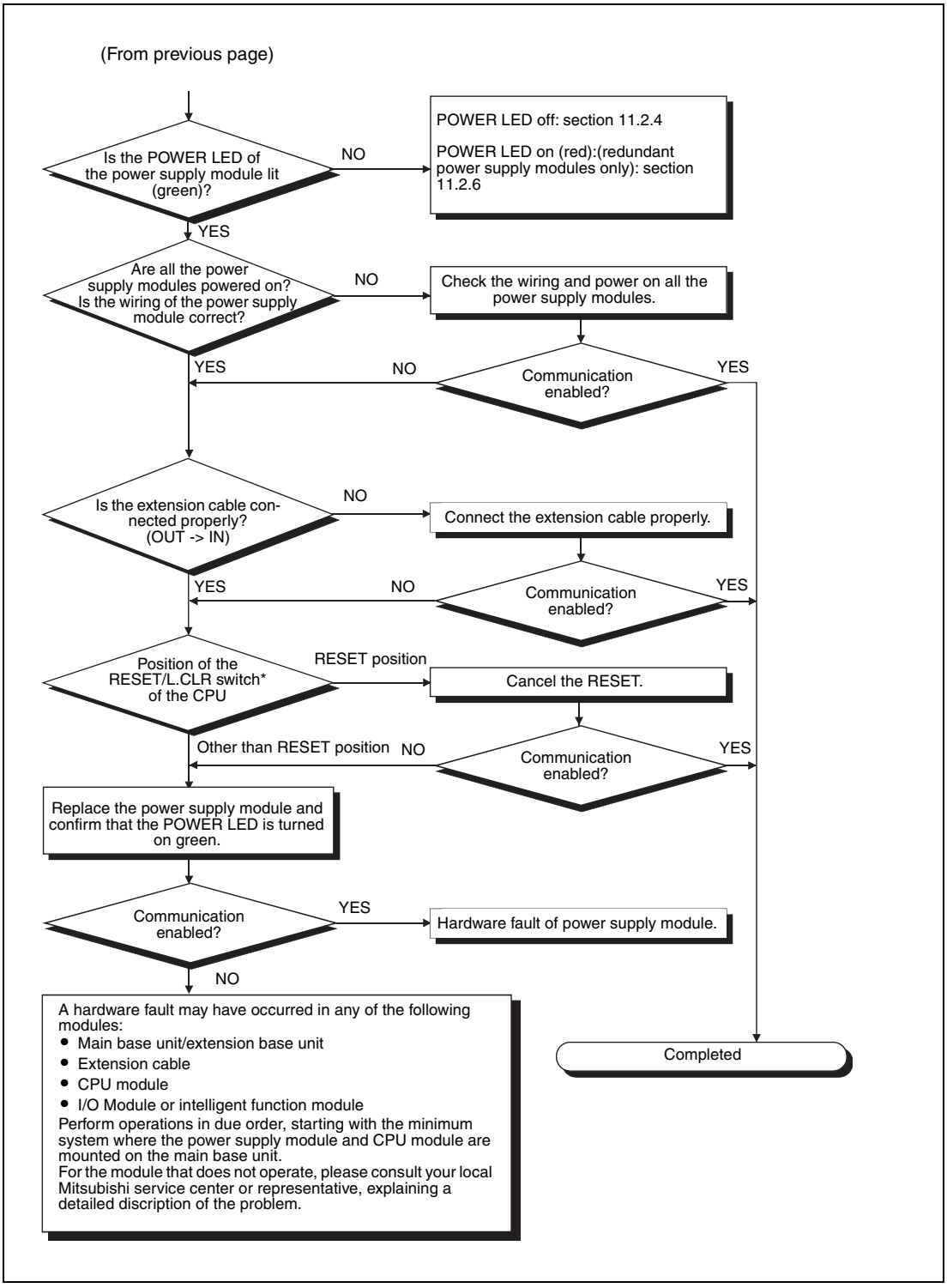
Refer to the following flowchart when the CPU module does not start upon power-on.



* For the Basic model QCPU, check the RUN/STOP/RESET switch of CPU module

11.2.23 When the CPU cannot communicate with GX Developer/GX IEC Developer





* For the Basic model QCPU, check the RUN/STOP/RESET switch of CPU module

11.3 Error code list

The LED on the front side of the CPU indicates an error, recognised by the self diagnostics function of the CPU during transition to RUN mode or during PLC operation. At the same time an error code is saved into special register SD0, which can be displayed together with the appropriate error message by the error diagnostics function of the programming software GX Developer or GX IEC Developer.

The special registers SD5 to SD15 contain general information and the special registers SD16 to SD26 the specific information about the error (refer to column "Error contents and cause" in the error code lists of sections 11.3.1 to 11.3.7).

The sign "●" in the last column of the error code list indicates, that the error code is valid for all CPU types of MELSEC System Q. If a CPU type is mentioned there, this means, that the error code is only valid for this special CPU type.

– Qn(H) = High performance model QCPU Q02-, Q02H-, Q06H-, Q12H- and Q25HCPU
– QnPH = Process CPU module Q02PH-, Q06PH-, Q12PH- and Q25PHCPU
– QnPRH = Redundant CPU module Q12PRH- and Q25PRHCPU
– QnU = Universal model QCPU

The relation between the error detection pattern, error detection location and error code is shown in the following table.

Error detection pattern	Error detection location	Error code	Reference
Detection by the self diagnostics function of CPU module	CPU module	1000 to 1299 ①	Sections 11.3.1 to 11.3.7
		1300 to 10000 ②	
Detection at communication with CPU module	CPU module	4000H to 4FFFH	The CPU module returns the error code to the request source.
	Serial communication module	7000H to 7FFFH	Manual of corresponding module
	CC-Link module	B000H to BFFFH	
	ETHERNET module	C000H to CFFFH	
	CC-Link IE controller network	E000H to EFFFH	
	MELSECNET/H network module	F000H to FFFFH	

Tab. 11-2: *Error codes*

① Major error: errors that may cause the CPU module to stop the operation.

② Minor or moderate error: Errors that may allow the CPU module to continue the operation, e.g., battery error or errors that may cause the CPU module to stop the operation, e.g., WDT error. For determination of the error level (i.e. whether the operation can be continued or stopped) refer to column "CPU status" in the error code lists of sections 11.3.1 to 11.3.7).

11.3.1 Error code list (1000 to 1999)

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
1000	**MAIN CPU DOWN** Runaway or failure of CPU module or failure of main CPU – Malfunctioning due to noise or other reason – Hardware fault ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	– Take noise reduction measures. – Reset the CPU module and RUN it again. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●
1001	**MAIN CPU DOWN** Runaway or failure of CPU module or failure of main CPU – Malfunctioning due to noise or other reason – Hardware fault – Universal model QCPU only: Accessed to outlying devices with the device range checks disabled (SM237 = 1). This error occurs only when BMOV, FMOV, and DFMOV instructions are executed. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	– Take noise reduction measures. – Reset the CPU module and RUN it again. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative. – Universal model QCPU only: Check the devices specified by BMOV, FMOV, and DFMOV instructions and correct the device settings.	OFF	Flicker	Stop	●
1002 1003 1004	**MAIN CPU DOWN** Runaway or failure of CPU module or failure of main CPU – Malfunctioning due to noise or other reason – Hardware fault ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	– Take noise reduction measures. – Reset the CPU module and RUN it again. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●
1005	**MAIN CPU DOWN** Runaway or failure of CPU module or failure of main CPU – Malfunctioning due to noise or other reason – Hardware fault ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	– Take noise reduction measures. – Reset the CPU module and RUN it again. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●
1006						●
1007						Qn(H) QnPH QnPRH
1008						
1009	**MAIN CPU DOWN** A failure is detected on the power supply module, CPU module, main base unit, extension base unit or extension cable. When using the redundant base unit, the redundant power supply module failure in both systems and/or the redundant base unit failure are detected. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	Reset the CPU module and RUN it again. If the same error is detected again, it is considered that the power supply module, CPU module, main base unit, extension base unit or extension cable is faulty. Replace the defective component. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) Qn(H) (first 5 digits of serial No. is 04101 or later) QnPH QnPRH QnU

Tab. 11-3: *Error code list (1000 to 1999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
1010	**END NOT EXECUTE** Entire program was executed without the execution of an END instruction. – When the END instruction is executed it is read as another instruction code, e.g. due to noise. – The END instruction has been changed to another instruction code somehow. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** When an END instruction executed	– Take noise reduction measures. – Reset the CPU module and RUN it again. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●
1020	**SFCP. END ERROR** The SFC program cannot be normally terminated due to noise or other reason. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** When SFC program is executed	– Take noise reduction measures. – Reset the CPU module and RUN it again. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) QnPH QnU
1035	**MAIN CPU DOWN** Runaway or failure of CPU module or failure of main CPU – Malfunctioning due to noise or other reason – Hardware fault ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	– Take noise reduction measures. – Reset the CPU module and RUN it again. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnU
1101	**RAM ERROR** The sequence program storing program memory in the CPU module is faulty. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At Reset/ When an END instruction executed	– Take noise reduction measures. – Reset the CPU module and RUN it again. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●
1102	**RAM ERROR** – The work area RAM in the CPU module is faulty. – The standard RAM and extended RAM in the CPU module are faulty. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At Reset/ When an END instruction executed		OFF	Flicker	Stop	

Tab. 11-3: *Error code list (1000 to 1999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
1103	**RAM ERROR** The device memory in the CPU module is faulty. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Take noise reduction measures. – When indexing is performed, check the value of index register to see if it is within the device range. – Reset the CPU module and RUN it again. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●
	RAM ERROR – The device memory in the CPU module is faulty. – The device out of range is accessed due to indexing, and the device for system is overwritten. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset/When an END instruction executed					Qn(H) (first 5 digits of serial No. is 08032 or later) QnPH (first 5 digits of serial No. is 08032 or later) QnPRH (first 5 digits of serial No. is 09012 or later)
1104	**RAM ERROR** The address RAM in the CPU module is faulty. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Take noise reduction measures. – Reset the CPU module and RUN it again. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●
1105	**RAM ERROR** The CPU memory in the CPU module is faulty. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** **AT POWER ON/ AT RESET**	– Take noise reduction measures. – Reset the CPU module and RUN it again. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Q00J Q00 Q01 QnU
	RAM ERROR The CPU shared memory in the CPU module is faulty. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset					Qn(H) (first 5 digits of serial No. is 04101 or later) QnPH QnPRH QnU
1106	**RAM ERROR** – The battery is dead. – The program memory in the CPU module is faulty. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** STOP –> RUN/When an END instruction executed	– Check the battery to see if it is dead or not. If dead, replace the battery. – Take noise reduction measures. – Format the program memory, write all files to the PLC, then reset the CPU module and RUN it again. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Qn(H) QnPH (first 5 digits of serial No. is 07032 or later) QnPRH

Tab. 11-3: *Error code list (1000 to 1999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
1107 1108	**RAM ERROR** The work area RAM in the CPU module is faulty. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	This suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnPRH
1109	**RAM ERROR** The work area RAM in the CPU module is faulty. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always					Qn(H) (first 5 digits of serial No. is 08032 or later) QnPH (first 5 digits of serial No. is 08032 or later) QnPRH (first 5 digits of serial No. is 09012 or later)
1110	**TRK. CIR. ERROR** A fault was detected by the initial check of the tracking hardware. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	This suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnPRH
1111	**TRK. CIR. ERROR** A tracking hardware fault was detected. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset					
1112 1113	**TRK. CIR. ERROR** A tracking hardware fault was detected during running. – The tracking cable was disconnected and reinserted without the standby system being powered off or reset. – The tracking cable is not secured by the connector fixing screws. – The error occurred at a startup since the redundant system startup procedure was not followed. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** During running	– Start after checking that the tracking cable is connected. If the same error is displayed again, the cause is the hardware fault of the tracking cable or CPU module. Contact your local Mitsubishi representative. – Confirm the redundant system startup procedure, and execute a startup again. For details, refer to the manual of the redundant system.	OFF	Flicker	Stop	QnPRH
1115	**TRK. CIR. ERROR** A fault was detected by the initial check of the tracking hardware. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	This suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnPRH

Tab. 11-3: *Error code list (1000 to 1999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
1116	**TRK. CIR. ERROR** A tracking hardware fault was detected during running. – The tracking cable was disconnected and reinserted without the standby system being powered off or reset. – The tracking cable is not secured by the connector fixing screws. – The error occurred at a startup since the redundant system startup procedure was not followed. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** During running	– Start after checking that the tracking cable is connected. If the same error is displayed again, the cause is the hardware fault of the tracking cable or CPU module. Contact your local Mitsubishi representative. – Confirm the redundant system startup procedure, and execute a startup again. For details, refer to the manual of the redundant system.	OFF	Flicker	Stop	QnPRH
1150	**RAM ERROR** The memory of the CPU module in the Multiple CPU high speed transmission area is faulty. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Take noise reduction measures. – Reset the CPU module and RUN it again. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnU (except Q00UJ-, Q00U-, Q01U- and Q02UCPU)
1160	**RAM ERROR** The program memory in the CPU module is overwritten. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At program execution	– Take noise reduction measures. – Format the program memory, write all files to the PLC, then reset the CPU module, and RUN it again. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●
1161	**RAM ERROR** The data of the device memory built in the CPU module is overwritten. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At program execution	– Take noise reduction measures. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.				
1162	**RAM ERROR** The error of the data held by the battery in the CPU module is detected. (It occurs when the automatic format is not set.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Take noise reduction measures. – Change the CPU main body or SRAM card battery. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.				
1164	**RAM ERROR** The destruction of the data stored in the standard RAM is detected. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Take noise reduction measures. If the same error is displayed again, this suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Q10UD(E)H-, Q13UD(E)H-, Q20UD(E)H-, Q26UD(E)HCPU

Tab. 11-3: *Error code list (1000 to 1999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
1200	**OPE. CIRCUIT ERR.** The operation circuit for index modification in the CPU module does not operate normally. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	This suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●
1201	**OPE. CIRCUIT ERR.** The hardware (logic) in the CPU module does not operate normally. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset					
1202	**OPE. CIRCUIT ERR.** The operation circuit for sequence processing in the CPU module does not operate normally. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset					
1203	**OPE. CIRCUIT ERR.** The operation circuit for index modification in the CPU module does not operate normally. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** When an END instruction executed	This suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnPRH
1204	**OPE. CIRCUIT ERR.** The hardware (logic) in the CPU module does not operate normally. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** When an END instruction executed					
1205	**OPE. CIRCUIT ERR.** The operation circuit for sequence processing in the CPU module does not operate normally. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** When an END instruction executed					
1300	**FUSE BREAK OFF** There is an output module with a blown fuse. ■ **Collateral information** • Common Information: Module No.(Slot No.); For Remote I/O network: Network No./Station No. • Individual Information: — ■ **Diagnostic Timing** Always	– Check FUSE LED of the output modules and replace the module whose LED is lit. (The module with a blown fuse can also be identified using GX (IEC) Developer. Check the special registers SD1300 to SD1331 to see if the bit corresponding to the module is "1".) – When a GOT is bus-connected to the main base unit or extension base unit, check the connection status of the extension cable and the earth status of the GOT.	OFF/ON	Flicker/ ON	Stop/ Continue (CPU operation can be set in the parameters at error occurrence)	Qn(H) QnPH QnPRH QnU
		Check ERR. LED of the output modules and replace the module whose LED is lit. (The module with a blown fuse can also be identified using GX (IEC) Developer. Check the special registers SD130 to SD137 to see if the bit corresponding to the module is "1".)				Q00J/Q00/Q01

Tab. 11-3: *Error code list (1000 to 1999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
1310	**I/O INT ERROR** An interruption has occurred although there is no interrupt module. ■ **Collateral information** • Common Information: – • Individual Information: — ■ **Diagnostic Timing** During interrupt	Any of the mounted modules is experiencing a hardware fault. Therefore, check the mounted modules and change the faulty module. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●
1311	**I/O INT ERROR** An interrupt request from other than the interrupt module was detected. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** During interrupt	Take action so that an interrupt will not be issued from other than the interrupt module.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) QnU
	I/O INT ERROR An interrupt request from the module where interrupt pointer setting has not been made in the PLC parameter dialog box was detected. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** During interrupt	– Correct the interrupt pointer setting in the PLC system setting of the PLC parameter dialog box. – Take measures so that an interrupt is not issued from the module where the interrupt pointer setting in the PLC system setting of the PLC parameter dialog box has not been made. Correct the interrupt setting of the network parameter. Correct the interrupt setting of the intelligent function module buffer memory. Correct the basic program of the QD51.				Q00J/Q00/Q01 (Version A) QnPRH QnU
1320 1321	**LAN CTRL.DOWN** The H/W self-diagnostics detected a LAN controller failure. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	This suggests a CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnU (with Built-in Ethernet port)
1401	**SP. UNIT DOWN** – There was no response from the intelligent function module/special function module in the initial processing. – The size of the buffer memory of the intelligent function module/special function module is invalid. – An unsupported module is mounted. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset/When intelligent function module is accessed	– When the unsupported module is mounted, remove it. – When the corresponding module is supported, this suggests a hardware fault of the intelligent function module/special function module, CPU module and/or base unit. Contact your local Mitsubishi representative.	OFF/ON	Flicker/ ON	Stop/ Continue (can be selected for each intelligent function module by the parameters)	●
1402	**SP. UNIT DOWN** The intelligent function module/special function module was accessed in the program, but there was no response. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: Program error location ■ **Diagnostic Timing** When an intelligent function module access instruction is executed	This suggests a hardware fault of the intelligent function module/special function module, CPU module and/or base unit. Contact your local Mitsubishi representative.				

Tab. 11-3: *Error code list (1000 to 1999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
1403	**SP. UNIT DOWN** An unsupported module is mounted. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** When an END instruction is executed	– When the unsupported module is mounted, remove it. – When the corresponding module is supported, this suggests a hardware fault of the intelligent function module/special function module, CPU module and/or base unit. Contact your local Mitsubishi representative. Contact your local Mitsubishi representative.	OFF/ON	Flicker/ ON	Stop/ Continue (can be selected for each intelligent function module by the parameters)	●
	SP. UNIT DOWN – There was no response from the intelligent function module/special function module when the END instruction is executed. – An error is detected at the intelligent function module/special function module. – The I/O module (intelligent function module/ special function module) is nearly removed, completely removed, or mounted during running. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** Always	The CPU module, base module and/or the intelligent function module/special function module that was accessed is experiencing a hardware fault. Contact your local Mitsubishi representative.				
1411	**CONTROL-BUS ERR.** When performing a parameter I/O allocation the intelligent function module/special function module could not be accessed during initial communications. (On error occurring, the head I/O number of the corresponding intelligent function module/special function module is stored in the common information.) ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Reset the CPU module and RUN it again. If the same error is displayed again, the intelligent function module/special function module, CPU module or base unit is faulty. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●
1412	**CONTROL-BUS ERR.** The FROM/TO instruction is not executable, due to a control bus error with the intelligent function module/special function module. (On error occurring, the program error location is stored in the individual information.) ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: Program error location ■ **Diagnostic Timing** During execution of FROM/TO instruction set	Reset the CPU module and RUN it again. If the same error is displayed again, the intelligent function module/special function module, CPU module or base unit is faulty. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●
1413	**CONTROL-BUS ERR.** In a multiple CPU system, a CPU module incompatible with the multiple CPU system is mounted. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	– Remove the CPU module incompatible with the multiple CPU system from the main base unit, or replace the CPU module with a CPU module compatible with the multiple CPU system. – The intelligent function module, CPU module or base unit is faulty. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH
	CONTROL-BUS ERR. An error is detected on the system bus. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	Reset the CPU module and RUN it again. If the same error is displayed again, the intelligent function module, CPU module or base unit is faulty. Contact your local Mitsubishi representative.				●

Tab. 11-3: *Error code list (1000 to 1999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corre-sponding CPU
			RUN	ERR.		
1414	**CONTROL-BUS ERR.** – Fault of a loaded module was detected. – In a multiple CPU system, a CPU module incompatible with the multiple CPU system is mounted. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** Always	– Remove the CPU module incompatible with the multiple CPU system from the main base unit, or replace the CPU module with a CPU module compatible with the multiple CPU system. – Reset the CPU module and RUN it again. If the same error is displayed again, the intelligent function module, CPU module or base unit is faulty. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH QnU
	CONTROL-BUS ERR. An error is detected on the system bus. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** Always	Reset the CPU module and RUN it again. If the same error is displayed again, the intelligent function module, CPU module or base unit is faulty. Contact your local Mitsubishi representative.				Q00J/Q00/Q01 (Function version is B or later) Qn(H) QnPH QnPRH QnU
1415	**CONTROL-BUS ERR.** Fault of the main or extension base unit was detected. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** When an END instruction executed	Reset the CPU module and RUN it again. If the same error is displayed again, the intelligent function module, CPU module or base unit is faulty. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Q00J/Q00/Q01 Qn(H) (Function version is B or later) QnPH QnPRH QnU
	CONTROL-BUS ERR. Fault of the main or extension base unit was detected. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset/When an END instruction executed					Qn(H) (first 5 digits of serial No. is 08032 or later) QnPH (first 5 digits of serial No. is 08032 or later)
1416	**CONTROL-BUS ERR.** System bus fault was detected at power-on or reset. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Reset the CPU module and RUN it again. If the same error is displayed again, the intelligent function module, CPU module or base unit is faulty. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH QnU
	CONTROL-BUS ERR. In a multiple CPU system, a bus fault was detected at power-on or reset. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset					Q00/Q01 (Function version is B or later) QnU
1417	**CONTROL-BUS ERR.** A reset signal error was detected on the system bus. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	Reset the CPU module and RUN it again. If the same error is displayed again, the intelligent function module, CPU module or base unit is faulty. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnPRH

Tab. 11-3: *Error code list (1000 to 1999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
1418	**CONTROL-BUS ERR.** In the redundant system, at power-on/reset or switching system, the control system cannot access the extension base unit since it failed to acquire the access right. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset/At Switching execution	Reset the CPU module and RUN it again. If the same error is displayed again, the CPU module, the Q6□WRB, or hardware of extension cable is faulty. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnPRH (first 5 digits of serial No. is 09012 or later)
1430	**MULTI-C.BUS ERR.** The error of host CPU is detected in the Multiple CPU high speed bus. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Reset the CPU module and RUN it again. If the same error is displayed again, the CPU module has hardware failure. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnU (except Q00UJ-, Q00U-, Q01U- and Q02UCPU)
1431	**MULTI-C.BUS ERR.** The communication error with other CPU is detected in the Multiple CPU high speed bus. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Take noise reduction measures. – Reset the CPU module and RUN it again. If the same error is displayed again, the CPU module has hardware failure. Contact your local Mitsubishi representative.				
1432	**MULTI-C.BUS ERR.** The communication time out with other CPU is detected in the Multiple CPU high speed bus. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Reset the CPU module and RUN it again. If the same error is displayed again, the CPU module has hardware failure. Contact your local Mitsubishi representative.				
1433 1434 1435	**MULTI-C.BUS ERR.** The communication error with other CPU is detected in the Multiple CPU high speed bus. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** Always	– Take noise reduction measures. – Check the main base unit mounting status of the CPU module. – Reset the CPU module and RUN it again. If the same error is displayed again, the CPU module has hardware failure. Contact your local Mitsubishi representative.				
1436	**MULTI-C.BUS ERR.** The error of the Multiple CPU high speed main base unit is detected. (The error of the Multiple CPU high speed bus is detected.)	Reset the CPU module and RUN it again. If the same error is displayed again, the CPU module has hardware failure. Contact your local Mitsubishi representative.				
1437	■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Take noise reduction measures. – Check the main base unit mounting status of the CPU module. – Reset the CPU module and RUN it again. If the same error is displayed again, the CPU module has hardware failure. Contact your local Mitsubishi representative.				
1439	**MULTI-C.BUS ERR.** An error of the multiple CPU high speed main base unit was detected. (An error of the multiple CPU high speed bus was detected.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Reset the CPU module and RUN it again. If the same error is displayed again, the CPU module has hardware failure. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnU (except Q00UJ-, Q00U-, Q01U- and Q02UCPU)

Tab. 11-3: *Error code list (1000 to 1999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
1500	**AC DOWN** A momentary power supply interruption has occurred. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	Check the power supply.	ON	OFF	Continue	●
1510	**SINGLE PS. DOWN** Die Versorgungsspannung eines redundanten Netzteils auf einem redundanten Baugruppenträger ist eingebrochen. ■ **Collateral information** • Common Information: Base No. / Nr. des Netzteils • Individual Information: — ■ **Diagnostic Timing** Always	Check the power supplied to the redundant power supply modules mounted on the redundant base unit.	ON	ON	Continue	Qn(H) (first 5 digits of serial No. is 04101 or later) QnPH (first 5 digits of serial No. is 04101 or later) QnPRH QnU (except Q00UJ-, Q00U- and Q01UCPU)
1520	**SINGLE PS. ERROR** Ein redundantes Netzteils auf einem redundanten Baugruppenträger ist defekt. ■ **Collateral information** • Common Information: Base No. / Nr. des Netzteils • Individual Information: — ■ **Diagnostic Timing** Always	Hardware fault of the redundant power supply module. Contact your local Mitsubishi representative.				
1600	**BATTERY ERROR** – The battery voltage in the CPU module has dropped below stipulated level. – The lead connector of the CPU module battery is not connected. ■ **Collateral information** • Common Information: Drive Name • Individual Information: — ■ **Diagnostic Timing** Always	– Change the battery. – If the battery is for program memory, standard RAM or for the back-up power function, install a lead connector. – Check the lead connector of the CPU module for looseness. Firmly engage the connector if it is loose. NOTE: When this error occurs, the BAT. LED of the CPU module is lit too.	ON	OFF	Continue	●
1601	**BATTERY ERROR** Voltage of the battery on memory card has dropped below stipulated level. ■ **Collateral information** • Common Information: Drive Name • Individual Information: — ■ **Diagnostic Timing** Always	Change the battery. NOTE: When this error occurs, the BAT. LED of the CPU module is lit too.				
1610	**FLASH ROM ERROR]** The number of writing to flash ROM (standard ROM and system securement area) exceeds 100,000 times. (Number of writings = 100,000 times max.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** When writing to ROM	Change the CPU module.	ON	ON	Continue	QnU

Tab. 11-3: *Error code list (1000 to 1999) for PLC CPUs of MELSEC System Q*

11.3.2 Error code list (2000 to 2999)

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2000	**UNIT VERFIY ERR.** In a multiple CPU system, a CPU module incompatible with the multiple CPU system is mounted. ■ **Collateral information** • Common Information: Module No. (Slot No.); For Remote I/O network: Network No./Station No. • Individual Information: — ■ **Diagnostic Timing** When an END instruction executed	Replace the CPU module incompatible with the multiple CPU system with a CPU module compatible with the multiple CPU system.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Qn(H) (Function version is B or later) QnPH
	UNIT VERFIY ERR. The I/O module status is different from the I/O module information at power ON. I/O module (or intelligent function module) is not installed properly or installed on the base unit. ■ **Collateral information** • Common Information: Module No. (Slot No.); For Remote I/O network: Network No./Station No. • Individual Information: — ■ **Diagnostic Timing** When an END instruction executed	– Read the error common information at the GX (IEC) Developer, and check and/or change the module that corresponds to the numerical value (module number) there. – Alternatively, monitor special registers SD150 to SD157 using GX (IEC) Developer, and check and replace the module where the bit of its data is "1".				Q00J/Q00/Q01
	UNIT VERFIY ERR. The I/O module status is different from the I/O module information at power ON. I/O module (or intelligent function module/special function module) not installed properly or installed on the base unit. ■ **Collateral information** • Common Information: Module No. (Slot No.); For Remote I/O network: Network No./Station No. • Individual Information: — ■ **Diagnostic Timing** When an END instruction executed	– Read the error common information at the GX (IEC) Developer, and check and/or change the module that corresponds to the numerical value (module number) there. – Alternatively, monitor special registers SD1400 to SD1431 using GX (IEC) Developer and change the output module whose bit has a value of "1". – When a GOT is bus-connected to the main base unit or extension base unit, check the connection status of the extension cable and the grounding status of the GOT.				Qn(H) QnPH QnPRH QnU
2001	**UNIT VERFIY ERR.** During operation, a module was mounted on the slot where the empty setting of the CPU module was made. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** When an END instruction executed	During operation, do not mount a module on the slot where the empty setting of the CPU module was made.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Q00J/Q00/Q01 (Function version is B or later) QnU
2010	**BASE LAY ERROR** – More than applicable number of extension base units have been used. – When a GOT was bus-connected, the CPU module was reset while the power of the GOT was OFF. ■ **Collateral information** • Common Information: Base No. • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Use the allowable number of extension base units or less. – Power on the Progammable Controller and GOT again.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) QnPRH Q00UJ-, Q00U-, Q01U- and Q02UCPU)
2011	**BASE LAY ERROR** The QA1S6□B, QA6□B or QA6ADP+A5□B/ A6□B was used as the base unit. ■ **Collateral information** • Common Information: Base No. • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Do not use the QA1S6□B, QA6□B and QA6ADP+A5□B/A6□B as the base unit.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) QnPH QnPRH QnU

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2012	**BASE LAY ERROR** – The GOT is bus-connected to the main base unit of the redundant system. The following errors are detected in the CPU redundant system compatible with the extension base unit. – The base unit other than the Q6□WRB is connected to the extension stage No.1. – The base unit is connected to any one of the extension stages No.2 to No.7, although the Q6□WRB does not exist in the extension stage No.1 . – The other system CPU module is incompatible with the extension base unit. – The QA1S6□B, QA6□B or QA6ADP+A5□B/A6□B is connected. – The number of slots of the main base unit for both systems is different. – Information of the Q6□WRB cannot be read correctly. ■ **Collateral information** • Common Information: Base No. • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Remove a bus connection cable for GOT connection connected to the main base unit. – Use the Q6□WRB (fixed to the extension stage No.1) – Use the CPU module compatible with the extension base unit for the other system. – Do not use the Q5□B, QA1S6□B, QA6□B or QA6ADP+A5 B/A6□B for the base unit. – Use the main base unit which has the same number of slots. – Hardware failure of the Q6□WRB. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnPRH (first 5 digits of serial No. is 09012 or later)
2013	**BASE LAY ERROR** Stage number of the Q6□WRB is recognized as other than extension stage No.1 in the redundant system. ■ **Collateral information** • Common Information: Base No. • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Hardware failure of the Q6□WRB. Contact your local Mitsubishi representative.				
2020	**EXT.CABLE ERR.]** The following errors are detected in the redundant system. – At power-on/reset, the standby system has detected the error in the path between the control system and the Q6□WRB. – The standby system has detected the error in the path between the host system CPU and the Q6□WRB at END processing. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset/When an END instruction executed	Check to see if the extension cable between the main base unit and the Q6□WRB is connected correctly. If not, connect it after turning OFF the main base unit where the extension cable will be connected. If the cable is connected correctly, hardware of the CPU module, Q6□WRB, or extension cable is faulty. Contact your local Mitsubishi representative.				

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2100	**SP. UNIT LAY ERR.** The slot to which the QI60 is mounted is set to other than Inteli (intelligent function module) or Interrupt (interrupt module) in the I/O assignment of PLC parameter. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Make setting again to match the PLC parameter I/O assignment with the actual loading status.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH QnPRH
	SP. UNIT LAY ERR. Wrong I/O assignment setting of PLC parameter: – In the I/O assignment setting of PLC parameter, Inteli (intelligent function module) was allocated to an I/O module or vice versa. – In the I/O assignment setting of PLC parameter, a module other than CPU (or nothing) was allocated to the location of a CPU module or vice versa. – In the I/O assignment setting of the PLC parameter, switch setting was made to the module that has no switch setting. – In the I/O assignment setting of the PLC parameter dialog box, the number of points assigned to the intelligent function module is less than the number of points of the mounted module. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Make the PLC parameter's I/O assignment setting again so it is consistent with the actual status of the intelligent function module and the CPU module. – Delete the switch setting in the I/O assignment setting of the PLC parameter.				Qn(H) QnPH QnPRH QnU
	SP. UNIT LAY ERR. Wrong I/O assignment setting of PLC parameter: – In the I/O assignment setting of PLC parameter, Inteli (intelligent function module) was allocated to an I/O module or vice versa. – In the I/O assignment setting of PLC parameter, a module other than CPU (or nothing) was allocated to the location of a CPU module or vice versa. – In the I/O assignment setting of the PLC parameter dialog box, the number of points assigned to the intelligent function module is less than the number of points of the mounted module. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Reset the parameter I/O allocation setting to conform to the actual status of the intelligent function module and the CPU module.				Q00J/Q00/Q01
2101	**SP. UNIT LAY ERR.** 13 or more A-series special function modules (except for the A1SI61) that can initiate an interrupt to the CPU module have been installed. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Reduce the A series special function modules (except the A1SI61) that can make an interrupt start to the CPU module to 12 or less.	OFF	Flicker	Stop	Qn(H)
2102	**SP. UNIT LAY ERR.** Seven or more A1SD51S have been installed. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Keep the number of A1SD51S to six or fewer.	OFF	Flicker	Stop	Qn(H)

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2103	**SP. UNIT LAY ERR.** – Two or more QI60/A1SD51S modules are mounted in a single CPU system. – Two or more QI60/A1SD51S modules are set to the same control CPU in a multiple CPU system. – Two or more A1SD51S modules are loaded in a multiple CPU system. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Reduce the number of QI60/A1SD51S modules mounted in the single CPU system to one. – Change the number of QI60/A1SD51S modules set to the same control CPU to only one in the multiple CPU system. – Reduce the number of A1SD51S modules to only one in the multiple CPU system. When using an interrupt module with each QCPU in a multiple CPU system, replace it with the QI60. (Use one A1SI61 module + max. three QI60 modules or only the QI60 modules.)	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH
	SP. UNIT LAY ERR. Two or more QI60, A1SD51S interrupt modules have been mounted. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Install only one QI60, A1SD51S module.				Qn(H) QnPRH
	SP. UNIT LAY ERR. Two or more QI60 modules are mounted. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Install only one QI60 module.				Q00J/Q00/Q01 (first 5 digits of serial No. is 04101 or later)
	SP. UNIT LAY ERR. Two or more QI60 modules where interrupt pointer setting has not been made are mounted. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Install only one QI60 module. – Make interrupt pointer setting to the second QI60 module and later.				Q00J/Q00/Q01 (Function version is B or later) QnU

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2106	**SP. UNIT LAY ERR.** – Two or more MELSECNET/H modules are mounted. – Two or more CC-Link IE controller network modules are mounted. – Two or more Ethernet modules are mounted. ■ **Collateral information** • Common Information: Module No. • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Reduce the number of MELSECNET/H modules to one. – Reduce the number of CC-Link IE controller network modules to one. – Reduce the number of Ethernet modules to one.	OFF	Flicker	Stop	Q00UJ
	SP. UNIT LAY ERR. – Five or more MELSECNET/H and CC-Link IE controller network modules in total are mounted in the entire system. – Two or more MELSECNET/H modules are mounted in the entire system. – Two or more CC-Link IE controller network modules are mounted in the entire system. – Two or more Ethernet modules are mounted in the entire system. ■ **Collateral information** • Common Information: Module No. • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Reduce the number of MELSECNET/H and CCLink IE controller network modules to four or less in total in the entire system. – Reduce the number of MELSECNET/H modules to one in the entire system. – Reduce the number of CC-Link IE controller network modules to one in the entire system. – Reduce the number of Ethernet modules to one in the entire system.	OFF	Flicker	Stop	Q00U/Q01U
	SP. UNIT LAY ERR. – Three or more MELSECNET/H and CC-Link IE controller network modules in total are mounted in the entire system. – Three or more Ethernet interface modules are mounted in the entire system. ■ **Collateral information** • Common Information: Module No. • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Reduce the MELSECNET/H and CC-Link IE controller network modules up to two or less in the entire system. – Reduce the Ethernet interface modules up to two or less in the entire system.	OFF	Flicker	Stop	Q02U
	SP. UNIT LAY ERR. – Five or more MELSECNET/H and CC-Link IE controller network modules in total are mounted in the entire system. – Five or more Ethernet interface modules are mounted in the entire system. ■ **Collateral information** • Common Information: Module No. • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Reduce the MELSECNET/H and CC-Link IE controller network modules up to four or less in the entire system. – Reduce the Ethernet interface modules up to four or less in the entire system.	OFF	Flicker	Stop	QnU (except Q00UJ-, Q00U-, Q01U and, Q02UCPU)
	SP. UNIT LAY ERR. – Three or more CC-Link IE controller network modules are mounted in the entire system. – Five or more MELSECNET/H and CC-Link IE controller network modules in total are mounted in the entire system. ■ **Collateral information** • Common Information: Module No. • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Reduce the CC-Link IE controller network modules up to two or less in the entire system. – Reduce the total number of the MELSECNET/H and CC-Link IE controller network modules up to four or less in the entire system.	OFF	Flicker	Stop	Qn(H) (first 5 digits of serial No. is 10042 or later) QnPH (first 5 digits of serial No. is 10042 or later) QnPRH (first 5 digits of serial No. is 10042 or later)
	SP. UNIT LAY ERR. – Five or more MELSECNET/H modules have been installed. – Five or more Ethernet interface modules have been installed. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Reduce the number of MELSECNET/H modules to four or less. – Reduce the number of Ethernet modules to four or less.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corre-sponding CPU
			RUN	ERR.		
2106	**SP. UNIT LAY ERR.** – Two or more MELSECNET/H modules were installed. – Two or more Ethernet modules were installed. – Three or more CC-Link modules were installed. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Reduce the MELSECNET/H modules to one. – Reduce the Ethernet modules to one. – Reduce the CC-Link modules to two or less.	OFF	Flicker	Stop	Q00J/Q00/Q01
	SP. UNIT LAY ERR. – The same network number or same station number is duplicated in the MELSECNET/H network system. ■ **Collateral information** • Common Information: Module No. (Steckplatz) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Check the network number and station number.	OFF	Flicker	Stop	Q00J/Q00/Q01 Qn(H) QnPH QnPRH
2107	**SP. UNIT LAY ERR.** The start X/Y set in the PLC parameter's I/O assignment settings is overlapped with the one for another module. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Make the PLC parameter's I/O assignment setting again so it is consistent with the actual status of the intelligent function module/special function modules.	OFF	Flicker	Stop	●
2108	**SP. UNIT LAY ERR.** • Network module A1SJ71LP21, A1SJ71BR11, A1SJ71AP21, A1SJ71AR21, or A1SJ71AT21B dedicated for the A2USCPU has been installed. • • Network module A1SJ71QLP21 or A1SJ71QBR11 dedicated for the Q2ASCPU has been installed. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Replace the network module for the A2USCPU or the network module for the Q2ASCPU with the MELSECNET/H module.	OFF	Flicker	Stop	Qn(H)
2110	**SP UNIT ERROR** – The location designated by the FROM/TO instruction set is not the intelligent function module/special function module. – The module that does not include buffer memory has been specified by the FROM/TO instruction. – The intelligent function module/special function module, Network module being accessed is faulty. – Station not loaded was specified using the instruction whose target was the CPU share memory. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: Program error location ■ **Diagnostic Timing** When instruction executed	– Read the individual information of the error using the GX (IEC) Developer, check the FROM/TO instruction that corresponds to that numerical value (program error location), and correct when necessary. – The intelligent function module/special function module that was accessed is experiencing a hardware fault. Therefore, change the faulty module. Alternatively, contact your local Mitsubishi representative.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Q00J/Q00/Q01 Qn(H) (Function version is B or later) QnPH QnPRH QnU

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2111	**SP UNIT ERROR** – The location designated by a link direct device (J□\□) is not a network module. – The I/O module (intelligent function module/special function module) was nearly removed, completely removed, or mounted during running. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: Program error location ■ **Diagnostic Timing** When instruction executed.	– Read the individual information of the error using the GX (IEC) Developer, check the FROM/TO instruction that corresponds to that numerical value (program error location), and correct when necessary. – The intelligent function module/special function module that was accessed is experiencing a hardware fault. Therefore, change the faulty module. Alternatively, contact your local Mitsubishi representative.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	●
2112	**SP UNIT ERROR** – The module other than intelligent function module/special function module is specified by the intelligent function module/special function module dedicated instruction. Or, it is not the corresponding intelligent function module/special function module. – There is no network No. specified by the network dedicated instruction. Or the relay target network does not exist. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: Program error location ■ **Diagnostic Timing** When instruction executed/STOP → RUN	Read the individual information of the error using the GX (IEC) developer, and check the special function module /special function module dedicated instruction (network instruction) that corresponds to the value (program error part) to make modification.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	●
2113	**SP UNIT ERROR** The module other than network module is specified by the network dedicated instruction. ■ **Collateral information** • Common Information: FFFFH (fixed) • Individual Information: Program error location ■ **Diagnostic Timing** When instruction executed/STOP → RUN					Qn(H) QnPH
2114	**SP UNIT ERROR** An instruction, which on execution specifies other stations, has been used for specifying the host CPU. (An instruction that does not allow the host CPU to be specified). ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: Program error location ■ **Diagnostic Timing** When instruction executed/STOP → RUN	Read the individual information of the error using the GX (IEC) Developer, check the program corresponding that value (program error location), and make correction.	OFF/ON	Flicker/ ON	Stop/ Continue	Q00J/Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH QnU
2115	**SP UNIT ERROR** An instruction, which on execution specifies the host CPU, has been used for specifying other CPUs. (An instruction that does not allow other stations to be specified). ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: Program error location ■ **Diagnostic Timing** When instruction executed/STOP → RUN	Read the individual information of the error using the GX (IEC) Developer, check the program corresponding that value (program error location), and make correction.	OFF/ON	Flicker/ ON	Stop/ Continue	Q00J/Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2116	**SP UNIT ERROR** – An instruction that does not allow the intelligent function module under the control of another CPU to be specified is being used for a similar task. – Instruction was executed for the A or QnA module under control of another CPU. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: Program error location ■ **Diagnostic Timing** When instruction executed/STOP → RUN	Read the individual information of the error using the GX (IEC) Developer, check the program corresponding that value (program error location), and make correction.	OFF/ON	Flicker/ ON	Stop/ Continue	Q00J/Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH QnU
2117	**SP UNIT ERROR** A CPU module that cannot be specified in the instruction dedicated to the multiple CPU system was specified. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: Program error location ■ **Diagnostic Timing** When instruction executed/STOP → RUN	Read the individual information of the error using the GX (IEC) Developer, check the program corresponding that value (program error location), and make correction.	OFF/ON	Flicker/ ON	Stop/ Continue	
2118	**SP UNIT ERROR** When the online module change setting is set to be "enabled" in the PLC parameter in a multiple CPU system, intelligent function module controlled by other CPU using the FROM/TO instructions is specified. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: Program error location ■ **Diagnostic Timing** When instruction executed	– When performing the online module change in a multiple CPU system, correct the program so that access will not be made to the intelligent function module controlled by the other CPU. – When accessing the intelligent function module controlled by the other CPU in a multiple CPU system, set the online module change setting to be "disabled" by parameter.	OFF/ON	Flicker/ ON	Stop/ Continue	Qn(H) (Function version is B or later) QnPH QnU (except Q00UJ-, Q00U-, Q01U and Q02UCPU)
2120	**SP. UNIT LAY ERR.** The locations of an extrension base unit is improper. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Check the location of the base unit.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Version A) Qn(H) QnPH
2121	**SP. UNIT LAY ERR.** The CPU module is installed to other than the CPU slot and slots 0 to 2. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Check the loading position of the CPU module and reinstall it at the correct slot.	OFF	Flicker	Stop	Qn(H) QnPH
2122	**SP. UNIT LAY ERR.** The QA1S6□B/QA6□B or QA6ADP+A5□B/ A6□B are used for the main base unit. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Replace the main base unit with a usable one (for MELSEC System Q).	OFF	Flicker	Stop	Qn(H) QnPH QnPRH

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2124	**SP. UNIT LAY ERR.** – A module is mounted on the 65th slot or later slot. – A module is mounted on the slot whose number is greater than the number of slots specified at [Slots] in [Standard setting] of the base setting. – A module is mounted on the slot whose number of I/O points exceeds 4096 points. – A module is mounted on the slot whose number of I/O points strides 4096 points. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Remove the module mounted on the 65th slot or later slot. – Remove the module mounted on the slot whose number is greater than the number of slots specified at [Slots] in [Standard setting] of the base setting. – Remove the module mounted on the slot whose number of I/O points exceeds 4096 points. – Replace the module with the one whose number of occupied points does not exceed 4096 points.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH QnU (except Q00UJ-, Q00U-, Q01U and Q02UCPU)
	SP. UNIT LAY ERR. – A module is mounted on after the 25th slot (or after the 17th slot for the Q00UJCPU). – A module is mounted on the slot whose number is later than the one set in the "Base setting" on the I/O assignment tab of PLC parameter in GX (IEC) Developer. – A module is mounted on the slot for which I/O points greater than 1024 (greater than 256 for the Q00UJCPU) is assigned. – A module is mounted on the slot for which I/O points is assigned from less than 1024 to greater than 1024 (from less than 256 to greater than 256 for the Q00UJCPU). ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Remove the module mounted on after the 25th (or after the 17th slot for the Q00UJCPU). – Remove the module mounted on the slot whose number is later than the one set in the "Base setting" on the I/O assignment tab of PLC parameter in GX (IEC) Developer. – Remove the module mounted on the slot for which I/O points greater than 1024 (greater than 256 for the Q00UJCPU) is assigned. – Replace the end module with the one whose number of occupied points is within 1024 (within 256 for the Q00UJCPU).	OFF	Flicker	Stop	Q00UJ Q00U/Q01U
	SP. UNIT LAY ERR. – A module is mounted on the 37th slot or later slot. – A module is mounted on the slot whose number is greater than the number of slots specified at [Slots] in [Standard setting] of the base setting. – A module is mounted on the slot whose number of I/O points exceeds 2048 points. – A module is mounted on the slot whose number of I/O points strides 2048 points ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Remove the module mounted on the 37th slot or later slot. – Remove the module mounted on the slot whose number is greater than the number of slots specified at [Slots] in [Standard setting] of the base setting. – Remove the module mounted on the slot whose number of I/O points exceeds 2048 points. – Replace the module with the one whose number of occupied points does not exceed 2048 points.	OFF	Flicker	Stop	Q02U
	SP. UNIT LAY ERR. – A module is mounted on the 25th slot or later slot. (The 17th slot or later slot for the Q00JCPU.) – A module is mounted on the slot whose number is greater than the number of slots specified at [Slots] in [Standard setting] of the base setting. – A module is mounted on the slot whose number of I/O points exceeds 1024 points. (256 points for the Q00JCPU.) – A module is mounted on the slot whose number of I/O points strides 1024 points. (256 points for the Q00JCPU.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Remove the module mounted on the 25th slot or later slot. (The 17th slot or later slot for the Q00JCPU.) – Remove the module mounted on the slot whose number is greater than the number of slots specified at [Slots] in [Standard setting] of the base setting. – Remove the module mounted on the slot whose number of I/O points exceeds 1024 points. (256 points for the Q00J.) – Replace the module with the one whose number of occupied points does not exceed 1024 points. (256 points for the Q00J.) überschreitet, gegen eines mit weniger E/As	OFF	Flicker	Stop	Q00J Q00/Q01

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2124	**SP. UNIT LAY ERR.** 5 or more extension base units were added. (3 or more base units for Q00JCPU) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Don't use more than 4 extension base units (2 extension base units for Q00JCPU).	OFF	Flicker	Stop	Q00J/Q00/Q01 (Version A)
2125	**SP. UNIT LAY ERR.** – A module which the QCPU cannot recognise has been installed. – There was no response form the intelligent function module/special function module. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Install a usable module (for MELSEC System Q). – The intelligent function module/special function module is experiencing a hardware fault.	OFF	Flicker	Stop	●
2126	**SP. UNIT LAY ERR.** CPU module locations in a multiple CPU system are either of the following. – There are empty slots between the QCPU and QCPU/motion controller. – A module other than the High performance model QCPU/Process CPU (including the motion controller) is mounted on the left-hand side of the High performance model QCPU/Process CPU. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: ■ **Diagnostic Timing** At power ON/ At reset	– Mount modules on the available slots so that the empty slots will be located on the right-hand side of the CPU module. – Remove the module mounted on the left-hand side of the High performance model QCPU/ Process CPU, and mount the High performance model QCPU/Process CPU on the empty slot. Mount the motion CPU on the right-hand side of the High performance model QCPU/ Process CPU.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH
2128	**SP. UNIT LAY ERR.** An unusable module is mounted on the extension base unit in the redundant system. ■ **Collateral information** • Common Information: Module No. • Individual Information: ■ **Diagnostic Timing** At power ON/ At reset	Remove the unusable module from the extension base unit.	OFF	Flicker	Stop	QnPRH (first 5 digits of serial No. is 09012 or later)
2150	**SP.UNIT VER. ERR.** In a multiple CPU system, the control CPU of the intelligent function module incompatible with the multiple CPU system is set to other than CPU No.1. ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset/At writing to proguram-mable controller	– Change the intelligent function module for the one compatible with the multiple CPU system. – Change the setting of the control CPU of the intelligent function module incompatible with the multiple CPU system to CPU No.1.	OFF	Flicker	Stop	Q00J/Q00/Q01 QnPH QnU (except Q00UJCPU)
2151	**SP. UNIT LAY ERR.** Either of the following modules incompatible with the redundant system has been mounted in a redundant system. • CC-Link IE controller network modules • MELSECNET/H modules • Ethernet modules ■ **Collateral information** • Common Information: Module No. (Slot No.) • Individual Information: ■ **Diagnostic Timing** At power ON/ At reset/At writing to proguram-mable controller	Use a module compatible with the redundant system.	OFF	Flicker	Stop	QnPRH

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2200	**MISSING PARA.** There is no parameter file in the drive specified as valid parameter drive by the DIP switches. ■ **Collateral information** • Common Information: Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Check and correct the valid parameter drive settings made by the DIP switches. – Set the parameter file to the drive specified as valid parameter drive by the DIP switches.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH
	MISSING PARA. There is no parameter file at the program memory. ■ **Collateral information** • Common Information: Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Set the parameter file to the program memory.				Q00J/Q00/Q01
	MISSING PARA. Parameter file does not exist in all drives where parameters will be valid. ■ **Collateral information** • Common Information: Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Set a parameter file in a drive to be valid.				QnU
2210	**BOOT ERROR** The contents of the boot file are incorrect. ■ **Collateral information** • Common Information: Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Check the boot setting.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) Qn(H) QnPH QnPRH QnU
2211	**BOOT ERROR** File formatting is failed at a boot. ■ **Collateral information** • Common Information: Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Reboot. – CPU module hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Qn(H) QnPRH QnU
2220	**RESTORE ERROR** The device information (number of points) backuped by the device data backup function is different from the number of device points of the PLC parameter. After this error occurred, perform restore per power-on/reset until the number of device points is identical to the number of device points in the PLC parameter, or until the backup data is deleted. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Set the number of device points at the time of backup to the device point setting in [PLC parameter]. Then, turn ON from OFF power supply, or reset the CPU and cancel reset. – Delete the backuped data, and turn ON from OFF power supply, or reset the CPU and cancel reset.	OFF	Flicker	Stop	QnU

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2221	**RESTORE ERROR** The device information backuped by the device data backup function is incomplete. (Turning power supply OFF or reset is suspected.) Do not return the data when this error occurs. Also, delete the incomplete device information at the time of this error occurrence. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Reset the CPU module and run it again.	OFF	Flicker	Stop	QnU
2225	**RESTORE ERROR** The model name of the restoration destination CPU module is different from the one of the backup source CPU module. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Execute a restore for the CPU module whose name is same as the backup source CPU module.				
2226	**RESTORE ERROR** – The backup data file is destroyed. (The content of the file is different from the check code. – Reading the backup data from the memory card is not successfully completed. – Since the write protect switch of the SRAM card is set to on (write inhibited), the checked "Restore for the first time only" setting cannot be performed. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Execute a restore of other backup data because the backup data may be destructed. – Set the write protect switch of the SRAM card to off (write enabled).				
2227	**RESTORE ERROR** Writing the backup data to the restoration destination drive is not successfully completed. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Execute a restore for the other CPU module too because the CPU module may be damaged.				
2300	**ICM. OPE. ERROR** – A memory card was removed without switching the memory card in/out switch OFF. – The memory card in/out switch is turned ON although a memory card is not actually installed. ■ **Collateral information** • Common Information: Drive name • Individual Information: — ■ **Diagnostic Timing** When memory card is inserted or removed	– Remove memory card after placing the memory card in/out switch OFF. – Turn on the card insert switch after inserting a memory card.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Qn(H) QnPH QnPRH QnU (except Q00UJ-, Q00U- and Q01UCPU)

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2301	**ICM. OPE. ERROR** – The memory card has not been formatted. – Memory card format status is incorrect. – The QCPU file does not exist in the Flash card. ■ **Collateral information** • Common Information: Drive name • Individual Information: — ■ **Diagnostic Timing** When memory card is inserted or removed.	– Format memory card. – Reformat memory card. – Write the QCPU file to the Flash card	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Qn(H) QnPH QnPRH QnU (except Q00UJ-, Q00U- and Q01UCPU)
	ICM. OPE. ERROR – SRAM card failure is detected. (It occurs when automatic format is not set.) – Writing parameters was performed during setting file registers. ■ **Collateral information** • Common Information: Drive name • Individual Information: — ■ **Diagnostic Timing** When memory card is inserted or removed.	– Format SRAM card after changing battery of SRAM card. – Write a parameter, which sets the file register at "Not available", in CPU, and then perform the operation.				QnU (except Q00UJ-, Q00U- and Q01UCPU)
2302	**ICM. OPE. ERROR** – A memory card that cannot be used with the CPU module has been installed. ■ **Collateral information** • Common Information: Drive name • Individual Information: — ■ **Diagnostic Timing** When memory card is inserted or removed.	– Format memory card. – Reformat memory card. – Check memory card.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Qn(H) QnPH QnPRH QnU (except Q00UJ-, Q00U- and Q01UCPU)
2400	**FILE SET ERROR** Automatic write to standard ROM was performed on the CPU module that is incompatible with automatic write to standard ROM. (Memory card where automatic write to standard ROM was selected in the boot file was fitted and the parameter enable drive was set to the memory card.) ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/ At reset/At writing to programmable controller	– Execute automatic write to standard ROM on the CPU module which is compatible with automatic write to standard ROM. – Using GX (IEC) Developer, perform write of parameters and programs to standard ROM. – Change the memory card for the one where automatic write to standard ROM has not been set, and perform boot operation from the memory card.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH QnPRH
	FILE SET ERROR The file designated at the PLC file settings in the parameters cannot be found. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/ At reset/At writing to programmable controller	– Read the individual information of the error using GX (IEC) 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 created using parameters, and load it to the CPU module.				●

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2401	**FILE SET ERROR** Program memory capacity was exceeded by performing boot operation or automatic write to standard ROM. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/ At reset/At writing to programmable controller	– Check and correct the parameters (boot setting). – Delete unnecessary files in the program memory. – Choose "Clear program memory" for boot in the parameter so that boot is started after the program memory is cleared.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH QnPRH
	FILE SET ERROR Program memory capacity was exceeded by performing boot operation. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/ At reset/At writing to programmable controller					QnU
	FILE SET ERROR The file specified by parameters cannot be created. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/ At reset/At writing to programmable controller	– Read the individual information of the error using GX (IEC) 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.	OFF	Flicker	Stop	●
	FILE SET ERROR – Although setting is made to use the device data storage file, there is no empty capacity required for creating the device data storage file in the standard ROM. – When the latch data backup function (to standard ROM) is used, there is no empty capacity required for storing backup data in standard ROM. (The parameter number "$FFFF_H$" is displayed for the error individual information.) ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/ At reset/At writing to programmable controller	Secure the empty capacity of the standard ROM.	OFF	Flicker	Stop	QnU
2410	**FILE OPE. ERROR** – The specified program does not exist in the program memory. This error may occur when the ECALL, EFCALL, PSTOP, PSCAN, POFF or PLOW instruction is executed. – The specified file does not exist. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Program error location ■ **Diagnostic Timing** When instruction executed	– Read the individual information of the error using GX (IEC) Developer, check to be sure that the program corresponds to the numerical values there (program location), and correct. – Create a file created using parameters, and load it to the CPU module. – In case a specified file does not exist, write the file to a target memory and/or check the file specified with the instruction again.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Qn(H) QnPH QnPRH QnU

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2411	**FILE OPE. ERROR** – The file is one which cannot be specified by the sequence program (such as comment file). – The specified program exists in the program memory, but has not been registered in the program setting of the Parameter dialog box. This error may occur when the ECALL, EFCALL, PSTOP, PSCAN or POFF instruction is executed. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Program error location ■ **Diagnostic Timing** When instruction executed	Read the individual information of the error using GX (IEC) Developer, check to be sure that the program corresponds to the numerical values there (program location), and correct.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Qn(H) QnPH QnPRH QnU
2412	**FILE OPE. ERROR** The SFC program file is one that cannot be designated by the sequence program. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Program error location ■ **Diagnostic Timing** When instruction executed	Read the individual information of the error using GX (IEC) Developer, check to be sure that the program corresponds to the numerical values there (program location), and correct.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Qn(H) QnPH QnPRH QnU
2413	**FILE OPE. ERROR** Check to ensure that the designated file has not been write protected. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Program error location ■ **Diagnostic Timing** When instruction executed	– Read the individual information of the error using GX (IEC) 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.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Qn(H) QnPH QnPRH
2500	**CAN'T EXE. PRG.** – There is a program file that uses a device that is out of the range set in the PLC parameter device setting. – After the PLC parameter setting is changed, only the parameter is written into the PLC. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Read the common information of the error using GX (IEC) 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.	OFF	Flicker	Stop	●
	CAN'T EXE. PRG. After the index modification of the PLC parameter is changed, only the parameter is written to the PLC. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	When the index modification of the PLC parameter is changed, batch-write the parameter and program file into the PLC.	OFF	Flicker	Stop	QnU

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2501	**CAN'T EXE. PRG.** There are multiple program files although "none" has been set at the PLC parameter program settings. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Edit the PLC parameter program setting to "yes". – Alternatively, delete unneeded programs.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH QnU
	CAN'T EXE. PRG. – There are three or more program files. – The program name differs from the program contents. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Delete unnecessary program files. – Match the program name with the program contents.	OFF	Flicker	Stop	Q00J/Q00/Q01
2502	**CAN'T EXE. PRG.** – The program file is incorrect. – Alternatively, the file contents are not those of a sequence program. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Check whether the program version is ***.QPG, and check the file contents to be sure they are for a sequence program.	OFF	Flicker	Stop	●
	CAN'T EXE. PRG. The program file is not the one for the redundant CPU. – Alternatively, the file contents are not those of a sequence program. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Create a program using GX Developer, GX IEC Developer or PX Developer for which the PLC type has been set to the redundant CPU (Q12PRH/Q25PRH), and write it to the CPU module.	OFF	Flicker	Stop	QnPRH
2503	**CAN'T EXE. PRG.** There are no program files at all. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Check program configuration. – Check parameters and program configuration.	OFF	Flicker	Stop	●
2504	**CAN'T EXE. PRG.** Two or more SFC normal programs or control programs have been designated. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Check program configuration. – Check parameters and program configuration.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH QnU
	CAN'T EXE. PRG. There are two or more SFC programs. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Reduce the SFC programs to one.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later)

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
2700	**REMOTE PASS.FAIL** The count of remote password mismatches reached the upper limit. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	Check for illegal accesses. If any illegal access is identified, take actions such as disabling communication of the connection. If no illegal access is identified, clear the error and perform the following. (Clearing the error also clears the count of remote password mismatches.) – Check if the remote password sent is correct. – Check if the remote password has been locked. – Check if concurrent access was made from multiple devices to one connection by UDP. – Check if the upper limit of the remote password mismatch count is too low.	ON	ON	Continue	QnU with Built-in Ethernet port
2710	**SNTP OPE.ERROR** Time setting failed when the programmable controller was powered ON or reset. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** When time setting function is executed.	– Check if the time setting function is set up correctly. – Check if the specified SNTP server is operating normally, or if any failure has occurred on the network connected to the specified SNTP server computer.	OFF/ON	Flicker/ ON	Stop/ Continue	

Tab. 11-4: *Error code list (2000 to 2999) for PLC CPUs of MELSEC System Q*

11.3.3 Error code list (3000 to 3999)

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
3000	**PARAMETER ERROR** In a multiple CPU system, the intelligent function module under control of another CPU is specified in the interrupt pointer setting of the PLC parameter. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	– Specify the head I/O number of the intelligent function module under control of the host CPU. – Delete the interrupt pointer setting of the parameter.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH QnU (except Q00UJCPU)
	PARAMETER ERROR The PLC parameter settings for timer time limit setting, the RUN-PAUSE contact, the common pointer number, general data processing, number of empty slots, system interrupt settings, baud rate setting, and service processing setting are outside the range that can be used by the CPU module. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	– Read the individual information of the error using GX (IEC) Developer, check the parameter item corresponding to the numerical value (parameter No.), and correct it. – Rewrite corrected parameters to the CPU module, reload the CPU power supply and/or reset the module. – If the same error occurs, it is thought to be a hardware error. Contact your local Mitsubishi representative.				●
	PARAMETER ERROR In a program memory check, the check capacity has not been set within the range applicable for the CPU module. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller					QnPH QnPRH (first 5 digits of serial No. is 07032 or later)
	PARAMETER ERROR The parameter settings in the error individual information (special register SD16) are illegal. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller					●
	PARAMETER ERROR The ATA card is set to the memory card slot when the specified drive for the file register is set to "memory card (ROM)" and [Use the following file] or [Use the same file name as the program] (either one is allowed) is set in the PLC file setting. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller					QnU (except Q00UJ-, Q00U- and Q01UCPU)

Tab. 11-5: *Error code list (3000 to 3999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
3001	**PARAMETER ERROR** The parameter settings are corrupted. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	– Read the individual information of the error using GX (IEC) Developer, check the parameter item corresponding to the numerical value (parameter No.), and correct it. – Rewrite corrected parameters to the CPU module, reload the CPU power supply and/or reset the module. – If the same error occurs, it is thought to be a hardware error. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●
3002	**PARAMETER ERROR** When "Use the following file" is selected for the file register in the PLC file setting of the PLC parameter dialog box, the specified file does not exist although the file register capacity has been set. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	– Read the individual information of the error using GX (IEC) Developer, check the parameter item corresponding to the numerical value (parameter No.), and correct it. – Rewrite corrected parameters to the CPU module, reload the CPU power supply and/or reset the module. – If the same error occurs, it is thought to be a hardware error. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH
	PARAMETER ERROR When "Use the following file" is set for the file register in the PLC file setting of the PLC parameter dialog box and the capacity of file register is not set, the file register file does not exist in the specified target memory. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller					QnU (except Q00UJCPU)
	PARAMETER ERROR When "Use the following file" is set for the device data storage file in [PLC file] of [PLC parameter], and [Capacity] is not set, the device data storage file does not exist in the target memory. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller					QnU
3003	**PARAMETER ERROR** The automatic refresh range of the multiple CPU system exceeded the file register capacity. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** When an END instruction executed	Change the file register file for the one refreshenabled in the whole range.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH QnU (except Q00UJCPU)
	PARAMETER ERROR The number of devices set at the PLC parameter device settings exceeds the possible CPU module range. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	– Read the individual information of the error using GX (IEC) Developer, check the parameter item corresponding to the numerical value (parameter No.), and correct it. – If the error is still generated following the correction of the parameter settings, the possible cause is the memory error of the CPU module's program memory or the memory card. Contact your local Mitsubishi representative.				●

Tab. 11-5: *Error code list (3000 to 3999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
3004	**PARAMETER ERROR** The parameter file is incorrect. Alternatively, the contents of the file are not parameters. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	Check whether the parameter file version is ***.QPA, and check the file contents to be sure they are parameters.	OFF	Flicker	Stop	●
3005	**PARAMETER ERROR** The contents of the parameter are damaged. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Read the individual information of the error using GX (IEC) Developer, check the parameter item corresponding to the numerical value (parameter No.), and correct it. – Write the modified parameter items to the CPU module again, and power-on the Programmable Controller or reset the CPU module. – When the same error occurs again, the hardware is faulty. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Qn(H) (first 5 digits of serial No. is 09012 or later) QnPH (first 5 digits of serial No. is 10042 or later) QnPRH (first 5 digits of serial No. is 10042 or later)
3006	**PARAMETER ERROR** – The high speed interrupt is set in a Q02CPU. – The high speed interrupt is set in a multiple CPU system. – The high speed interrupt is set for a not applicable base unit. – No module is installed at the I/O address designated by the high speed interrupt. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	– Delete the setting of the Q02CPU' s high speed interrupt. To use high speed interrupts, change the CPU module to one of the Q02H/Q06H/Q12H/Q25HCPU. – To use a multiple CPU system, delete the setting of the high-speed interrupt. To use high speed interrupts, change the system to a single CPU system. – Use applicable base units. – Re-examine the I/O address designated by the high speed interrupt setting.	OFF	Flicker	Stop	Qn(H) (first 5 digits of serial No. is 04012 or later)
3007	**MISSING PARA.** The parameter file in the drive specified as valid parameter drive by the DIP switches is inapplicable for the CPU module. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	Create parameters using GX (IEC) Developer, and write them to the drive specified as valid parameter drive by the DIP switches.	OFF	Flicker	Stop	QnPRH
3009	**PARAMETER ERROR** In a multiple CPU system, the modules for AnS, A, Q2AS and QnA have been set to multiple control CPUs. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	Re-set the parameter I/O assignment to control them under one CPU module. Change the parameters of all CPUs in the multiple CPU system.	OFF	Flicker	Stop	Qn(H) (Function version is B or later)
3010	**PARAMETER ERROR** The parameter-set number of CPU modules differs from the actual number in a multiple CPU system. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	Match the number of (CPU modules in multiple CPU setting) - (CPUs set as empty in I/O assignment) with that of actually mounted CPU modules.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH

Tab. 11-5: *Error code list (3000 to 3999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
3012	**PARAMETER ERROR** Multiple CPU setting or control CPU setting differs from that of the reference CPU settings in a multiple CPU system. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	Match the multiple CPU setting or control CPU setting in the PLC parameter with that of the reference CPU (CPU No.1) settings.	OFF	Flicker	Stop	Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnU
3013	**PARAMETER ERROR** In a multiple CPU system, the multiple CPU auto refresh setting is any of the following: – 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. – The device specified is other than the one that may be specified. – The number of send points is an odd number. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	Check the following in the multiple CPU auto refresh setting and make correction. – When specifying the bit device, specify 0 or a multiple of 16 for the refresh starting device. – Specify the device that may be specified for the refresh device. – Set the number of send points to an even number.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH
	PARAMETER ERROR In a multiple CPU system, the multiple CPU auto refresh setting is any of the following: – The total number of transmission points is greater than the maximum number of refresh points. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	Check the following in the multiple CPU auto refresh setting and make correction. – The total number of transmission points is within the maximum number of refresh points.				Q00/Q01 (Function version is B or later)
	PARAMETER ERROR In a multiple CPU system, the multiple CPU auto refresh setting is any of the following: – The device specified is other than the one that may be specified. – The number of send points is an odd number. – The total number of send points is greater than the maximum number of refresh points. – The setting of the refresh range crosses over the boundary between the internal user device and the extended data register (D) or extended link register (W). ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	Check the following in the multiple CPU auto refresh setting and make correction. – Specify the device that may be specified for the refresh device. – Set the number of send points to an even number. – Set the total number of send points within the range of the maximum number of refresh points. – Set the refresh range so that it does not cross over the boundary between the internal user device and the extended data register (D) or extended link register (W).				QnU (except Q00UJ)
3014	**PARAMETER ERROR** – In a multiple CPU system, the online module change parameter (multiple CPU system parameter) settings differ from those of the reference CPU 1. – In a multiple CPU system, the online module change setting is enabled although the CPU module mounted does not support online module change. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	– Match the online module change parameter with that of the reference CPU 1. – If the CPU module that does not support online module change is mounted, replace it with the CPU module that supports online module change.	OFF	Flicker	Stop	Qn(H) QnPH QnU (except Q00UJ-, Q00U-, Q01U- and Q02UCPU)

Tab. 11-5: *Error code list (3000 to 3999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
3015	**PARAMETER ERROR** In a multiple CPU system configuration, the CPU verified is different from the one set in the parameter setting. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No./CPU No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	Read the individual information of the error using GX (IEC) Developer, check the parameter item corresponding to the numerical value (parameter No./CPU No.) and parameter of target CPU, and correct them.	OFF	Flicker	Stop	QnU (except Q00UJ-, Q00U-, Q01U- and Q02UCPU)
3016	**PARAMETER ERROR** The CPU module incompatible with multiple CPU synchronized boot-up is set as the target for the synchronized boot-up in the [Multiple CPU synchronous startup setting]. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No./CPU No. ■ **Diagnostic Timing** At power ON/At reset/At writing to programmable controller	Delete the CPU module incompatible with multiple CPU synchronized boot-up from the setting.	OFF	Flicker	Stop	QnU (except Q00UJ-, Q00U-, Q01U- and Q02UCPU)
3040	**PARAMETER ERROR** The parameter file is damaged. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset	With GX (IEC) Developer, write [PLC parameter/Network parameter/Remote password] to a valid drive then reload the power supply for system and/or reset the CPU module. If the same error occurs, it is thought to be a hardware error. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Qn(H) (first 5 digits of serial No. is 07032 or later) QnPH (first 5 digits of serial No. is 07032 or later) QnPRH (first 5 digits of serial No. is 07032 or later)
3041	**PARAMETER ERROR** Parameter file of intelligent function module is damaged. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset	With GX (IEC) Developer, write [Intelligent function module parameter] to a valid drive then reload the power supply for system and/or reset the CPU module. If the same error occurs, it is thought to be a hardware error. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	
3042	**PARAMETER ERROR** The system file that stored the remote password setting information is damaged. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset	With GX (IEC) Developer, write [PLC parameter/Network parameter/Remote password] to a valid drive then reload the power supply for system and/or reset the CPU module. If the same error occurs, it is thought to be a hardware error. Contact your local Mitsubishi representative. – When a valid drive for parameter is set to other than [program memory], set the parameter file (PARAM) at the boot file setting to be able to transmit to the program memory. With GX (IEC) Developer, write [PLC parameter/Network parameter/Remote password] to a valid drive then reload the power supply for system and/or reset the CPU module. If the same error occurs, it is thought to be a hardware error. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	

Tab. 11-5: *Error code list (3000 to 3999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
3100	**LINK PARA. ERROR** In a multiple CPU system, the CC-Link IE controller network module controlled by another CPU is specified as the head I/O number of the CC-Link IE controller network module. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Delete the network parameter of the CC-Link IE controller network module controlled by another CPU. – Change the setting to the head I/O number of the CC-Link IE controller network module controlled by host CPU.	OFF	Flicker	Stop	Qn(H) (first 5 digits of serial No. is 09012 or later) QnPH (first 5 digits of serial No. is 10042 or later) QnU
	LINK PARA. ERROR The network parameter of the CC-Link IE controller network operating as the normal station is overwritten to the control station. Or, the network parameter of the CC-Link IE controller network operating as the control station is overwritten to the normal station. (The network parameter is updated on the module by resetting.) ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Reset the CPU module.	OFF	Flicker	Stop	Qn(H) (first 5 digits of serial No. is 09012 or later) QnPH (first 5 digits of serial No. is 10042 or later) QnPRH (first 5 digits of serial No. is 10042 or later) QnU
	LINK PARA. ERROR – The number of modules actually mounted is different from that is set in Network parameter for CC-Link IE controller network. – The head I/O number of the actually mounted module is different from the one set in the network parameter of the CC-Link IE controller network. – Data cannot be handled in the parameter existing. – The network type of CC-Link IE controller network is overwritten during power-on. (When changing the network type, switch RESET to RUN.) ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Check the network parameters and actual mounting status, and if they differ, make them match. When network parameters are modified, write them to the CPU module. – Check the setting of extension base unit stage number. – Check the connection status of extension base unit and extension cables. When the GOT is busconnected to the main base unit or extension base unit, also check its connection status. If the error occurs even after the above checks, the possible cause is a hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	
	LINK PARA. ERROR – The CC-Link IE controller network module is specified for the head I/O number of network parameter in the MELSECNET/H. – The MELSECNET/H module is specified for the head I/O number of network parameter in the CC-Link IE controller network. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN		OFF	Flicker	Stop	
	LINK PARA. ERROR – Although the CC-Link IE controller network module is mounted, network parameter for the CCLink IE controller network module is not set. – Although the CC-Link IE controller network and MELSECNET/H modules are mounted, network parameter for the MELSECNET/H module is not set. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN		OFF	Flicker	Stop	

Tab. 11-5: *Error code list (3000 to 3999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
3100	**LINK PARA. ERROR** In a multiple CPU system, the MELSECNET/H under control of another CPU is specified as the head I/O number in the network setting parameter of the MELSECNET/H. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Delete the MELSECNET/H network parameter of the MELSECNET/H under control of another CPU. – Change the setting to the head I/O number of the MELSECNET/H under control of the host CPU.	OFF	Flicker	Stop	Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH QnU (except Q00UJCPU)
	LINK PARA. ERROR The network parameter of the MELSECNET/H operating as the normal station is overwritten to the control station. Or, the network parameter of the MELSECNET/H operating as the control station is overwritten to the normal station. (The network parameter is updated on the module by resetting.) ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Reset the CPU module.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH QnPRH QnU
	LINK PARA. ERROR – The number of modules actually mounted is different from that is set in Network parameter for MELSECNET/H. – The head I/O number of actually installed modules is different from that designated in the network parameter of MELSECNET/H. – Some data in the parameters cannot be handled. – The network type of MELSECNET/H is overwritten during power-on. (When changing the network type, switch RESET to RUN.) – The mode switch of MELSECNET/H module (for module with first 5 digits of serial No. is "07032" or later) is outside the range . ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Check the network parameters and actual mounting status, and if they differ, make them match. When network parameters are modified, write them to the CPU module. – Check the setting of extension base unit stage number. – Check the connection status of extension base unit and extension cables. When the GOT is busconnected to the main base unit or extension base unit, also check its connection status. If the error occurs even after the above checks, the possible cause is a hardware fault. Contact your local Mitsubishi representative. – Set the mode switch of MELSECNET/H module (for module with first 5 digits of serial No. is "07032" or later) within the range.	OFF	Flicker	Stop	●

Tab. 11-5: *Error code list (3000 to 3999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
3101	**LINK PARA. ERROR** The link refresh range exceeded the file register capacity. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** When an END instruction executed	Change the file register file for the one that enables entire range refresh.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH QnPRH QnU (except Q00UJCPU)
	LINK PARA. ERROR – When the station number of the MELSECNET/H module is 0, the PLC-to-PLC network parameter has been set. – When the station number of the MELSECNET/H module is other than 0, the remote master parameter setting has been made. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Correct the type or station number of the MELSECNET/H module in the network parameter to meet the used system.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH QnPRH
	LINK PARA. ERROR The refresh parameter for the CC-Link IE controller network is outside the range. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Check the network parameters and actual mounting status, and if they differ, make them match. When network parameters are modified, write them to the CPU module. – Check the setting of extension base unit stage number. – Check the connection status of extension base unit and extension cables. When the GOT is busconnected to the main base unit or extension base unit, also check its connection status. If the error occurs even after the above checks, the possible cause is a hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Qn(H) (first 5 digits of serial No. is 09012 or later) QnPH (first 5 digits of serial No. is 10042 or later) QnPRH (first 5 digits of serial No. is 10042 or later) QnU
	LINK PARA. ERROR – The network No. specified by a network parameter is different from that of the actually mounted network. – The head I/O No. specified by a network parameter is different from that of the actually mounted I/O unit. – The network class specified by a network parameter is different from that of the actually mounted network. – The network refresh parameter of the MELSECNET/H, MELSECNET/10 is out of the specified area. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN		OFF	Flicker	Stop	●
	LINK PARA. ERROR A multi-remote I/O network was configured using a module that does not support a multi-remote I/O network. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Use a module that supports a multi-remote I/O network.	OFF	Flicker	Stop	QnPH
	LINK PARA. ERROR – The system A of the MELSECNET/H remote master station has been set to other than Station No. 0. – The system B of the MELSECNET/H remote master station has been set to Station No. 0. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Set the system A of the MELSECNET/H remote master station to Station No. 0. – Set the system B of the MELSECNET/H remote master station to any of Station No. 1 to 64.	OFF	Flicker	Stop	QnPRH

Tab. 11-5: *Error code list (3000 to 3999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
3101	**LINK PARA. ERROR** Since the number of points of the B/W device set in [Device] of the PLC parameter is lower than the number of B/W refresh device points when parameters of the MELSECNET/H are not set, the refresh between the CPU module and the MELSECNET/H cannot be performed. Number of B/W refresh device points when parameters of the MELSECNET/H are not set: – 1 network module mounted B: 8192; W: 8192 – 2 network modules mounted B: 8192 (4096x2); W: 8192 (4096x2) – 3 network modules mounted B: 6144 (2048x3); W: 6144 (2048x3) – 4 network modules mounted B: 8192 (2048x4); W: 8192 (2048x4) ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Set the refresh parameter of the MELSECNET/H in accordance with the number of points of B/W devices set in [Device] of the PLC parameter.	OFF	Flicker	Stop	Qn(H) (first 5 digits of serial No. is 09012 or later) QnPH (first 5 digits of serial No. is 09012 or later) QnPRH (first 5 digits of serial No. is 09012 or later) QnU
	LINK PARA. ERROR The setting of the network refresh range crosses over the boundary between the internal user device and the extended data register (D) or extended link register (W). ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Set the network refresh range so that it does not cross over the boundary between the internal user device and the extended data register (D) or extended link register (W).	OFF	Flicker	Stop	●
3102	**LINK PARA. ERROR** A CC-Link IE controller network parameter error was detected. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Correct and write the network parameters. – If the error occurs after correction, it suggests a hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Qn(H) (first 5 digits of serial No. is 09012 or later) QnPH (first 5 digits of serial No. is 10042 or later) QnPRH (first 5 digits of serial No. is 10042 or later) QnU
	LINK PARA. ERROR The network module detected a network parameter error. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN		OFF	Flicker	Stop	●
	LINK PARA. ERROR The station No. specified in pairing setting are not correct. – The stations are not numbered consecutively. – Pairing setting has not been made for the CPU module at the normal station. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Refer to the troubleshooting of the network module, and if the error is due to incorrect pairing setting, reexamine the pairing setting of the network parameter.	OFF	Flicker	Stop	QnPRH

Tab. 11-5: *Error code list (3000 to 3999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corre-sponding CPU
			RUN	ERR.		
3102	**LINK PARA. ERROR** The CC-Link IE controller network module whose first 5 digits of serial No. is "09041" or earlier is mounted. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	The CC-Link IE controller network module whose first 5 digits of serial No. is "09041" or earlier is mounted.	OFF	Flicker	Stop	QnU
	LINK PARA. ERROR Group cyclic function in CC-Link IE controller network that does not correspond to group cyclic function is set. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Set group cyclic function in function version D or later of CC-Link IE controller network.	OFF	Flicker	Stop	QnU (first 5 digits of serial No. is 10042 or later)
	LINK PARA. ERROR Pairing setting in CC-Link IE controller network modules installed in CPUs except for redundant CPUs was performed. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Examine the pairing setting for the network parameter in the control staion.	OFF	Flicker	Stop	Q00J/Q00/Q01 Qn(H) (first 5 digits of serial No. is 10042 or later) QnPH (first 5 digits of serial No. is 10042 or later) QnU (first 5 digits of serial No. is 10042 or later)
	LINK PARA. ERROR – LB/LW own station send range at LB/LW4000 or later was set. – LB/LW setting (2) was performed. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Examine the network range assignments for the network parameter in the control station.	OFF	Flicker	Stop	Q00J/Q00/Q01

Tab. 11-5: *Error code list (3000 to 3999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
3103	**LINK PARA. ERROR** In a multiple CPU system, Ethernet interface module under control of another station is specified to the start I/O number of the Ethernet network parameter. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Delete the Ethernet network parameter of Ethernet interface module under control of another station. – Change the setting to the start I/O number of Ethernet interface module under control of the host station.	OFF	Flicker	Stop	Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH QnU (except Q00UJCPU)
	LINK PARA. ERROR – Although the number of modules has been set to one or a greater number in the Ethernet module count parameter setting, the number of actually mounted module is zero. – The start I/O No. of the Ethernet network parameter differs from the I/O No. of the actually mounted module. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Correct and write the network parameters. If the error occurs after correction, it suggests a hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●
	LINK PARA. ERROR – Ethernet module whose network type is set to "Ethernet (main base)" is mounted on the extension base unit in the redundant system. – Ethernet module whose network type is set to "Ethernet (extension base)" is mounted on the main base unit in the redundant system. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Correct and write the network parameters. If the error occurs after correction, it suggests a hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnPRH (first 5 digits of serial No. is 09012 or later)
3104	**LINK PARA. ERROR** – The Ethernet, MELSECNET/H and MELSECNET/10 use the same network number. – The network number, station number or group number set in the network parameter is out of range. – The specified I/O number is outside the range of the used CPU module. – The Ethernet-specific parameter setting is not normal. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Correct and write the network parameters. If the error occurs after correction, it suggests a hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●

Tab. 11-5: *Error code list (3000 to 3999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
3105	**LINK PARA. ERROR** In a multiple CPU system, the CC-Link module under control of another station is specified as the head I/O number of the CC-Link network parameter. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Delete the CC-Link network parameter of the CC-Link module under control of another station. – Change the setting to the start I/O number of the CC-Link module under control of the host station.	OFF	Flicker	Stop	Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH QnU (except Q00UJCPU)
	LINK PARA. ERROR – Though the number of CC-Link modules set in the network parameters is one or more, the number of actually mounted modules is zero. – The start I/O number in the common parameters is different from that of the actually mounted module. – The station type of the CC-Link module count setting parameters is different from that of the actually mounted station. ■ **Collateral information** • Common Information: File name//Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Correct and write the network parameters. If the error occurs after correction, it suggests a hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	●
	LINK PARA. ERROR – CC-Link module whose station type is set to "master station (compatible with redundant function)" is mounted on the extension base unit in the redundant system. – CC-Link module whose station type is set to "master station (extension base)" is mounted on the main base unit in the redundant system. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN		OFF	Flicker	Stop	QnPRH (first 5 digits of serial No. is 09012 or later)
3106	**LINK PARA. ERROR** The CC-Link link refresh range exceeded the file register capacity. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** When an END instruction executed	Change the file register file for the one refreshenabled in the whole range.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH QnPRH QnU
	LINK PARA. ERROR The network refresh parameter for CC-Link is out of range. ■ **Collateral information** • Common Information: File name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Check the parameter setting.				●
	LINK PARA. ERROR The setting of the network refresh range crosses over the boundary between the internal user device and the extended data register (D) or extended link register (W). ■ **Collateral information** • Common Information: File name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Set the network refresh range so that it does not cross over the boundary between the internal user device and the extended data register (D) or extended link register (W).				QnU

Tab. 11-5: *Error code list (3000 to 3999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
3107	**LINK PARA. ERROR** – The CC-Link parameter setting is incorrect. – The set mode is not allowed for the version of the mounted CC-Link module. ■ **Collateral information** • Common Information: File name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Check the parameter setting.	OFF	Flicker	Stop	●
3200	**SFC PARA. ERROR** The parameter setting is illegal. Though Block 0 was set to "Automatic start" in the SFC setting of the PLC parameter dialog box, Block 0 does not exist. ■ **Collateral information** • Common Information: File name • Individual Information: Parameter No. ■ **Diagnostic Timing** STOP → RUN	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) QnPH QnPRH QnU
3201	**SFC PARA. ERROR** The block parameter setting is illegal. ■ **Collateral information** • Common Information: File name • Individual Information: Parameter No. ■ **Diagnostic Timing** STOP → RUN		OFF	Flicker	Stop	Qn(H) QnPH QnPRH
3202	**SFC PARA. ERROR** The number of step relays specified in the device setting of the PLC parameter dialog box is less than that used in the program. ■ **Collateral information** • Common Information: File name • Individual Information: Parameter No. ■ **Diagnostic Timing** STOP → RUN	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH
3203	**SFC PARA. ERROR** The execution type of the SFC program specified in the program setting of the PLC parameter dialog box is other than scan execution. ■ **Collateral information** • Common Information: File name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN (The diagnostic timing of CPU modules except for Universal QCPU can be performed only when switching the CPU modules to run.)	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH QnU
3300	**SP. PARA. ERROR** The start I/O number in the intelligent function module parameter set on GX Configurator differs from the actual I/O number. ■ **Collateral information** • Common Information: File name • Individual Information: Parameter No. (gained by dividing the head I/O number of parameter in the intelligent function module set by GX Configurator by 10H) ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Check the parameter setting.	OFF	Flicker	Stop	●

Tab. 11-5: *Error code list (3000 to 3999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
3301	**SP. PARA. ERROR** – The refresh setting of the intelligent function module exceeded the file register capacity. – The intelligent function module set in GX Configurator differs from the actually mounted module. ■ **Collateral information** • Common Information: File name • Individual Information: Parameter No. (gained by dividing the head I/O number of parameter in the intelligent function module set by GX Configurator by 10H) ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	– Change the file register file for the one which allows refresh in the whole range. – Check the parameter setting.	OFF	Flicker	Stop	Q00J/Q00/Q01 Qn(H) (Function version is B or later) QnPH QnPRH QnU
	SP. PARA. ERROR The intelligent function module's refresh parameter setting is outside the available range. ■ **Collateral information** • Common Information: File name • Individual Information: Parameter No. (gained by dividing the head I/O number of parameter in the intelligent function module set by GX Configurator by 10H) ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	Check the parameter setting.	OFF	Flicker	Stop	●
	SP. PARA. ERROR The setting of the refresh parameter range crosses over the boundary between the internal user device and the extended data register (D) or extended link register (W). ■ **Collateral information** • Common Information: File name • Individual Information: Parameter No. (gained by dividing the head I/O number of parameter in the intelligent function module set by GX Configurator by 10H) ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	Set the refresh parameter range so that it does not cross over the boundary between the internal user device and the extended data register (D) or extended link register (W).	OFF	Flicker	Stop	QnU
3302	**SP. PARA. ERROR** The intelligent function module's refresh parameter are abnormal. ■ **Collateral information** • Common Information: File name • Individual Information: Parameter No. (gained by dividing the head I/O number of parameter in the intelligent function module set by GX Configurator by 10H) ■ **Diagnostic Timing** At writing to programmable controller	Check the parameter setting.	OFF	Flicker	Stop	●
3303	**SP. PARA. ERROR** In a multiple CPU system, the automatic refresh setting or other parameter setting was made to the intelligent function module under control of another station. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/At writing to programmable controller	– Delete the automatic refresh setting or other parameter setting of the intelligent function module under control of another CPU. – Change the setting to the automatic refresh setting or other parameter setting of the intelligent function module under control of the host CPU.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH QnU (except Q00UJCPU)

Tab. 11-5: *Error code list (3000 to 3999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
3400	**REMOTE PASS. ERROR** The head I/O number of the target module of the remote password is set to other than 0H to 0FF0H. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Change the head I/O number of the target module to be within the 0H to 0FF0H range.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH QnPRH QnU (first 5 digits of serial No. is 09012 or later)
	REMOTE PASS. ERROR The head I/O number of the target module of the remote password is set to other than 0H to 07E0H. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Change the head I/O number of the target module to be within the 0H to 07E0H range.				Q02U
	REMOTE PASS. ERROR The head I/O number of the target module of the remote password is outside the following range: • Q00JCPU: 0H to 1E0H • Q00CPU/Q01CPU: 0H to 3E0H ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Change the head I/O number of the target module of the remote password for the number within the following range: – BQ00JCPU: 0H to 1E0H – Q00CPU/Q01CPU: 0H to 3E0H				Q00J/Q00/Q01 (Function version is B or later)
3401	**REMOTE PASS. ERROR** Position specified as the head I/O number of the remote password file is incorrect due to one of the following reasons: – Module is not loaded. – Other than a the intelligent function module (I/O module) – Intelligent function module other than serial communication module, modem interface module or Ethernet module – Serial communication module or Ethernet module of function version A ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Mount serial communication module, modem interface module or Ethernet module of function version B or later in the position specified in the head I/O No. of the remote password file.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH QnPRH QnU
	REMOTE PASS. ERROR Any of the following modules is not mounted on the slot specified for the head I/O number of the remote password: – Serial communication module of function version B or later – Ethernet module of function version B or later – Modem interface module of function version B or later ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN		OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later)
	REMOTE PASS. ERROR Serial communication module, modem interface module or Ethernet module of function version B or later controlled by another CPU was specified in a multiple CPU system. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	– Change it for the Ethernet module of function version B or later connected by the host CPU. – Delete the remote password setting.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH QnU (except Q00UJCPU)

Tab. 11-5: *Error code list (3000 to 3999) for PLC CPUs of MELSEC System Q*

11.3.4 Error code list (4000 to 4999)

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
4000	**INSTRCT CODE. ERR.** – The program contains an instruction code that cannot be decoded. – An unusable instruction is included in the program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/ When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●
4001	**INSTRCT CODE. ERR.** The program contains a dedicated instruction for SFC although it is not an SFC program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/ When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) Qn(H) QnPH QnPRH QnU
4002	**INSTRCT CODE. ERR.** – The name of dedicated instruction specified by the program is incorrect. – The dedicated instruction specified by the program cannot be executed by the specified module. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/ When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●
4003	**INSTRCT CODE. ERR.** The number of devices for the dedicated instruction specified by the program is incorrect. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/ When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●
4004	**INSTRCT CODE. ERR.** The device which cannot be used by the dedicated instruction specified by the program is specified. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN/ When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●
4010	**MISSING END INS.** There is no END (FEND) instruction in the program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●

Tab. 11-6: *Error code list (4000 to 4999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
4020	**CAN'T SET (P)** The total number of internal file pointers used by the program exceeds the number of internal file pointers set in the parameters. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH QnU
4021	**CAN'T SET (P)** • The common pointer Nos. assigned to files overlap. • The local pointer Nos. assigned to files overlap. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●
4030	**CAN'T SET (I)** The allocation pointer Nos. assigned by files overlap. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/STOP → RUN	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●
4100	**OPERATION ERROR** The instruction cannot process the contained data. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	●
	OPERATION ERROR Access error of ATA card occurs by SP.FREAD/ SP.FWRITE instructions. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	– Take noise reduction measures. – Reset and restart the CPU module. When the same error is displayed again, the ATA card has hardware failure. Contact your local Mitsubishi representative.				Qn(H) QnPH QnPRH QnU (except Q00UJ-, Q00U- and Q01UCPU)
	OPERATION ERROR The file being accessed by other functions was accessed with SP.FWRITE instruction. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	– Stop the file accessed with other functions to execute SP.FWRITE instruction. – Stop the access with other functions and the SP.FWRITE instruction execution at the same time.				QnU (except Q00UJ-, Q00U- and Q01UCPU)

Tab. 11-6: *Error code list (4000 to 4999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
4101	**OPERATION ERROR** – The number of setting data dealt with the instruction exceeds the applicable range. – The storage data and constant of the device specified by the instruction exceeds the applicable range. – When writing to the host CPU shared memory, the write prohibited area is specified for the write destination address. – The range of storage data of the device specified by the instruction is duplicated. – The device specified by the instruction exceeds the range of the number of device points. – The interrupt pointer No. specified by the instruction exceeds the applicable range. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	●
	OPERATION ERROR – The storage data of file register specified by the instruction exceeds the applicable range. – Or, file register is not set. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed					QnU (except Q00UJCPU)
	OPERATION ERROR Block data that crosses over the boundary between the internal user device and the extended data register (D) or extended link register is specified (including 32-bit binary, real number (single precision, double precision), indirect address, and control data). ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed					QnU

Tab. 11-6: *Error code list (4000 to 4999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
4102	**OPERATION ERROR** In a multiple CPU system, the link direct device (J□\□), was specified for the network module under control of another station. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	– Delete from the program the link direct device which specifies the network module under control of another CPU. – Using the link direct device (J□\□), specify the network module under control of the host CPU.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH QnU (except Q00UJCPU)
	OPERATION ERROR – The network No. or station No. specified for the dedicated instruction is wrong. – The link direct device (J□\□) setting is incorrect. – The module No./ network No./number of character strings exceeds the range that can be specified. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.				●
	OPERATION ERROR The specification of character string (" ") specified by dedicated instruction cannot be used for the character string. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.				QnU
4103	**OPERATION ERROR** The configuration of the PID dedicated instruction is incorrect. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Q00J/Q00/Q01 (Function version is B or later) Qn(H) QnPRH QnU
4105	**OPERATION ERROR** PLOADP/PUNLOADP/PSWAPP instructions were executed while setting program memory check. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	– Delete the program memory check setting. – When using the program memory check, delete PLOADP/PUNLOADP/PSWAPP instructions.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	QnPH (first 5 digits of serial No. is 07032 or later)
4107	**OPERATION ERROR** 33 or more multiple CPU dedicated instructions were executed from one CPU module. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Using the multiple CPU dedicated instruction completion bit, provide interlocks to prevent one CPU module from executing 33 or more multiple CPU dedicated instructions.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH Q00U/Q01U/ Q02U

Tab. 11-6: *Error code list (4000 to 4999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
4109	**OPERATION ERROR** With high speed interrupt setting PR, PRC, UDCNT1, UDCNT2, PLSY or PWM instruction is executed. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Delete the high-speed interrupt setting. When using high-speed interrupt, delete the PR, PRC, UDCNT1, UDCNT2, PLSY and PWM instructions.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Qn(H) (first 5 digits of serial No. is 04012 or later)
4111	**OPERATION ERROR** An attempt was made to perform write/read to/ from the CPU shared memory write/read disabled area of the host station CPU module with the instruction. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Q00/Q01 (Function version is B or later) QnU
4112	**OPERATION ERROR** A CPU module that cannot be specified with the multiple CPU dedicated instruction was specified. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Q00/Q01 (Function version is B or later) QnU (except Q00UJCPU)
4113	**OPERATION ERROR** – When the SP.DEVST instruction is executed, the number of writing to the standard ROM of the day exceeds the value specified by SD695. – A value outside the specified range is set to SD695. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	– Check that the number of execution of the SP.DEVST instruction is proper. – Execute the SP.DEVST instruction again the following day or later day. Or, arrange the value of SD695. – Correct the value of SD695 so that it does not exceed the range.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	QnU
4120	**OPERATION ERROR** Since the manual system switching enable flag (special register SM1592) is OFF, manual system switching cannot be executed by the control system switching instruction (SP. CONTSW). ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	To execute control system switching by the SP. CONTSW instruction, turn ON the manual system switching enable flag (special register SM1592).	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	QnPRH
4121	**OPERATION ERROR** – In the separate mode, the control system switching instruction (SP. CONTSW) was executed in the standby system CPU module. – In the debug mode, the control system switching instruction (SP. CONTSW) was executed. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	– Reexamine the interlock signal for the SP.CONTSW instruction, and make sure that the SP.CONTSW instruction is executed in the control system only. (Since the SP. CONTSW instruction cannot be executed in the standby system, it is recommended to provide an interlock using the operation mode signal or like. Refer to the manual of the redundant system). – As the SP. CONTSW instruction cannot be executed in the debug mode, reexamine the interlock signal related to the operation mode.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	QnPRH

Tab. 11-6: *Error code list (4000 to 4999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
4122	**OPERATION ERROR** – The dedicated instruction was executed to the module mounted on the extension base unit in the redundant system. – The instruction for accessing the intelligent function module mounted on the extension base unit from the standby system at separate mode was executed. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	– Delete the dedicated instruction for the module mounted on the extension base unit. – Delete the instruction for accessing the intelligent function module mounted on the extension base unit from the standby system.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	QnPRH (first 5 digits of serial No. is 09012 or later)
4130	**OPERATION ERROR** Instructions to read SFC step comment (S(P).SFCSCOMR) and SFC transition condition comment (S(P).SFCTCOMR) are executed for the comment file in ATA card. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Target comment file has to be other than the comment file in ATA card.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Qn(H) (first 5 digits of serial No. is 07012 or later) QnPH (first 5 digits of serial No. is 07032 or later) QnPRH
4131	**OPERATION ERROR** The SFC program is started up by an instruction while another SFC program has not yet been completed. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	– Check the SFC program specified by the instruction. – Or, check the executing status of the SFC program.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	QnU
4140	**OPERATION ERROR** Operation with non-allowed input data ("-0", unnormalized number, nonnumeric, ±∞) is performed. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	QnU
4141	**OPERATION ERROR** Overflow occurs at operation. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	QnU
4200	**FOR NEXT ERROR** No NEXT instruction was executed following the execution of a FOR instruction. Alternatively, there are fewer NEXT instructions than FOR instructions. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●
4201	**FOR NEXT ERROR** A NEXT instruction was executed although no FOR instruction has been executed. Alternatively, there are more NEXT instructions than FOR instructions. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●

Tab. 11-6: *Error code list (4000 to 4999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
4202	**FOR NEXT ERROR** More than 16 nesting levels are programmed. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Keep nesting levels at 16 or under.	OFF	Flicker	Stop	●
4203	**FOR NEXT ERROR** A BREAK instruction was executed although no FOR instruction has been executed prior to that. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●
4210	**CAN'T EXECUTE (P)** The CALL instruction is executed, but there is no subroutine at the specified pointer. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●
4211	**CAN'T EXECUTE (P)** There was no RET instruction in the executed subroutine program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●
4212	**CAN'T EXECUTE (P)** The RET instruction exists before the FEND instruction of the main routine program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●
4213	**CAN'T EXECUTE (P)** More than 16 nesting levels are programmed. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Keep nesting levels at 16 or under.	OFF	Flicker	Stop	●
4220	**CAN'T EXECUTE (I)** Though an interrupt input occurred, the corresponding interrupt pointer does not exist. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●
4221	**CAN'T EXECUTE (I)** An IRET instruction does not exist in the executed interrupt program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●

Tab. 11-6: *Error code list (4000 to 4999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
4223	**CAN'T EXECUTE (I)** The IRET instruction exists before the FEND instruction of the main routine program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●
	CAN'T EXECUTE (I) – The IRET instruction was executed in the fixed scan execution type program. – The STOP instruction was executed in the fixed scan execution type program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed					QnU
4225	**CAN'T EXECUTE (I)** The interrupt pointer for the module mounted on the extension base unit is set in the redundant system. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Delete the setting of interrupt pointer for the module mounted on the extension base unit, since it cannot be used.	OFF	Flicker	Stop	QnPRH (first 5 digits of serial No. is 09012 or later)
4230	**INST. FORMAT ERR** The number of CHK and CHKEND instructions is not equal. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	Qn(H) QnPH
4231	**INST. FORMAT ERR** The number of IX and IXEND instructions is not equal. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	●
4235	**INST. FORMAT ERR** The configuration of the check conditions for the CHK instruction is incorrect. Alternatively, a CHK instruction has been used in a low speed execution type program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	Qn(H) QnPH

Tab. 11-6: *Error code list (4000 to 4999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
4350	**MULTI-COM.ERROR** – The multiple CPU high-speed transmission dedicated instruction used in the program specifies the wrong CPU module. Or, the setting in the CPU module is incompatible with the multiple CPU high-speed transmission dedicated instruction. – The reserved CPU is specified. – The uninstalled CPU is specified. – The head I/O number of the target CPU/16 (n1) is outside the range of 3EH to 3E3H. – The CPU module where the instruction cannot be executed is specified. – The instruction is executed in a single CPU system. – The host CPU is specified. – The instruction is executed without setting the "Use multiple CPU high speed communication". ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	QnU (except Q00UJ-, Q00U-, Q01U- and Q02UCPU)
4351	**MULTI-COM.ERROR** – The multiple CPU high-speed transmission dedicated instruction specified by the program cannot be executed to the specified target CPU module. – The instruction name is wrong. – The instruction unsupported by the target CPU module is specified. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	QnU (except Q00UJ-, Q00U-, Q01U- and Q02UCPU)
4352	**MULTI-COM.ERROR** The number of devices for the multiple CPU highspeed transmission dedicated instruction specified by the program is wrong. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	QnU (except Q00UJ-, Q00U-, Q01U- and Q02UCPU)
4353	**MULTI-COM.ERROR** The device which cannot be used for the multiple CPU high-speed transmission dedicated instruction specified by the program is specified. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	QnU (except Q00UJ-, Q00U-, Q01U- and Q02UCPU)
4354	**MULTI-COM.ERROR** The character string which cannot be handled by the multiple CPU high-speed transmission dedicated instruction is specified. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	QnU (except Q00UJ-, Q00U-, Q01U- and Q02UCPU)

Tab. 11-6: *Error code list (4000 to 4999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
4355	**MULTI-COM.ERROR** The number of read/write data (number of request/receive data) for the multiple CPU high-speed transmission dedicated instruction specified by the program is not valid. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	QnU (except Q00UJ-, Q00U-, Q01U- and Q02UCPU)
4400	**SFCP. CODE ERROR** No SFCP or SFCPEND instruction in SFC program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Write the program to the CPU module again using GX (IEC) Developer.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH
4410	**CAN'T SET (BL)** The block number designated by the SFC program exceeds the range. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Write the program to the CPU module again using GX (IEC) Developer.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) Qn(H) QnPRH QnU
4411	**CAN'T SET (BL)** Block number designations overlap in SFC program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Write the program to the CPU module again using GX (IEC) Developer.	OFF	Flicker	Stop	
4420	**CAN'T SET (S)** A step number designated in an SFC program exceeds the range. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Write the program to the CPU module again using GX (IEC) Developer.	OFF	Flicker	Stop	
4421	**CAN'T SET (S)** Total number of steps in all SFC programs exceed the maximum. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Write the program to the CPU module again using GX (IEC) Developer.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) Qn(H) QnPRH QnU
4422	**CAN'T SET (S)** Step number designations overlap in SFC program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Write the program to the CPU module again using GX (IEC) Developer.	OFF	Flicker	Stop	

Tab. 11-6: *Error code list (4000 to 4999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
4423	**CAN'T SET (S)** The total number of (maximum step No.+1) of each block exceeds the total number of step relays. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Correct the total number of step relays so that it does not exceed the total number of (maximum step No.+1) of each block.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) QnU
4430	**SFC EXE. ERROR** The SFC program cannot be executed. – The data of the block data setting is illegal. – The SFC data device of the block data setting is beyond the device setting range set in the PLC parameter. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	– Write the program to the CPU module again using GX (IEC) Developer. – After correcting the setting of the SFC data device, write it to the CPU module. – After correcting the device setting range set in the PLC parameter, write it to the CPU module.	OFF	Flicker	Stop	
4431	**SFC EXE. ERROR** The SFC program cannot be executed. The block parameter setting is abnormal. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Write the program to the CPU module again using GX (IEC) Developer.	OFF	Flicker	Stop	
4432	**SFC EXE. ERROR** The SFC program cannot be executed. The structure of the SFC program is illegal. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Write the program to the CPU module again using GX (IEC) Developer.	OFF	Flicker	Stop	
4500	**SFCP. FORMAT ERR.** The numbers of BLOCK and BEND instructions in an SFC program are not equal. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Write the program to the CPU module again using GX (IEC) Developer.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH
4501	**SFCP. FORMAT ERR.** The configuration of the STEP* to TRAN* to TSET to SEND instructions in the SFC program is incorrect. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Write the program to the CPU module again using GX (IEC) Developer.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH

Tab. 11-6: *Error code list (4000 to 4999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
4502	**SFCP. FORMAT ERR.** The structure of the SFC program is illegal. STEPI* instruction does not exist in the block of the SFC program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Write the program to the CPU module again using GX (IEC) Developer.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) Qn(H) QnPRH QnU
4503	**SFCP. FORMAT ERR.** The structure of the SFC program is illegal: – The step specified in the TSET instruction does not exist. – In jump transition, the host step number was specified as the destination step number. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	– Write the program to the CPU module again using GX (IEC) Developer. – Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	
4504	**SFCP. FORMAT ERR.** The structure of the SFC program is illegal. The step specified in the TAND instruction does not exist. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Write the program to the CPU module again using GX (IEC) Developer.	OFF	Flicker	Stop	
4505	**SFCP. FORMAT ERR.** The structure of the SFC program is illegal. In the operation output of a step, the SET Sn/BLmSn or RST Sn/BLmSn instruction was specified for the host step. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) QnU
4506	**SFCP. FORMAT ERR.** The structure of the SFC program is illegal. In a reset step, the host step number was specified as the destination step. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	

Tab. 11-6: *Error code list (4000 to 4999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
4600	**SFCP. OPE. ERROR** The SFC program contains data that cannot be processed. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	Qn(H) QnPH QnPRH
4601	**SFCP. OPE. ERROR** Exceeds device range that can be designated by the SFC program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	
4602	**SFCP. OPE. ERROR** The START instruction in an SFC program is preceded by an END instruction. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF/ON	Flicker/ ON	Stop/ Continue (can be set in the parameters at error occurrence)	
4610	**SFCP. EXE. ERROR** The active step information at presumptive start of the SFC program is incorrect. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Read the common information of the error using GX (IEC) 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.	ON	ON	Continue	Qn(H) QnPH QnPRH
4611	**SFCP. EXE. ERROR** Key-switch was reset during RUN when presumptive start was designated for SFC program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** STOP → RUN	Read the common information of the error using GX (IEC) 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.	ON	ON	Continue	Qn(H) QnPH QnPRH
4620	**BLOCK EXE. ERROR** Startup was executed at a block in the SFC program that was already started up. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH
4621	**BLOCK EXE. ERROR** Startup was attempted at a block that does not exist in the SFC program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	– Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem. – Turn ON if the special relay SM321 is OFF.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) Qn(H) QnPH QnPRH QnU
4630	**STEP EXE. ERROR** Startup was executed at a block in the SFC program that was already started up. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH

Tab. 11-6: *Error code list (4000 to 4999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
4631	**STEP EXE. ERROR** – Startup was attempted at the step that does not exist in the SFC program. Or, the step that does not exist in the SFC program was specified for end. – Forced transition was executed based on the transition condition that does not exist in the SFC program. Or, the transition condition for forced transition that does not exist in the SFC program was cancelled. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	– Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem. – Turn ON if the special relay SM321 is OFF.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) Qn(H) QnPH QnPRH QnU
4632	**STEP EXE. ERROR** There were too many simultaneous active steps in blocks that can be designated by the SFC program. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH QnU
4633	**STEP EXE. ERROR** There were too many simultaneous active steps in all blocks that can be designated. ■ **Collateral information** • Common Information: Program error location • Individual Information: — ■ **Diagnostic Timing** When instruction executed	Read the common information of the error using GX (IEC) Developer, check error step corresponding to its numerical value (program error location), and correct the problem.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH QnU

Tab. 11-6: *Error code list (4000 to 4999) for PLC CPUs of MELSEC System Q*

11.3.5 Error code list (5000 to 5999)

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
5000	**WDT ERROR** The scan time of the initial execution type program exceeded the initial execution monitoring time specified in the PLC RAS setting of the PLC parameter. ■ **Collateral information** • Common Information: Time (value set) • Individual Information: Time (value actually measured) ■ **Diagnostic Timing** Always	– Read the individual information of the error from GX (IEC) Developer, check its value (time), and shorten the scan time. – Change the initial execution monitoring time or the WDT value in the PLC RAS setting of the PLC parameter. – Resolve the endless loop caused by jump transition.	OFF	Flicker	Stop	Qn(H) QnPH QnPRH QnU
	WDT ERROR – The power supply of the standby system is turned OFF. – The tracking cable is disconnected or connected without turning off or resetting the standby system. – The tracking cable is not secured by the connector fixing screws. ■ **Collateral information** • Common Information: Time (value set) • Individual Information: Time (value actually measured) ■ **Diagnostic Timing** Always	– Since power-off of the standby system increases the control system scan time, reset the WDT value, taking the increase of the control system scan time into consideration. – When the tracking cable is disconnected during operation, securely connect it and restart the CPU module. If the same error is displayed again, the tracking cable or CPU module has a hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnPRH
5001	**WDT ERROR** The scan time of the program exceeded the WDT value specified in the PLC RAS setting of the PLC parameter. ■ **Collateral information** • Common Information: Time (value set) • Individual Information: Time (value actually measured) ■ **Diagnostic Timing** Always	– Read the individual information of the error from GX (IEC) Developer, check its value (time), and shorten the scan time. – Change the initial execution monitoring time or the WDT value in the PLC RAS setting of the PLC parameter. – Resolve the endless loop caused by jump transition.	OFF	Flicker	Stop	●
	WDT ERROR – The power supply of the standby system is turned OFF. – The tracking cable is disconnected or connected without turning off or resetting the standby system. – The tracking cable is not secured by the connector fixing screws. ■ **Collateral information** • Common Information: Time (value set) • Individual Information: Time (value actually measured) ■ **Diagnostic Timing** Always	– Since power-off of the standby system increases the control system scan time, reset the WDT value, taking the increase of the control system scan time into consideration. – When the tracking cable is disconnected during operation, securely connect it and restart the CPU module. If the same error is displayed again, the tracking cable or CPU module has a hardware fault. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnPRH

Tab. 11-7: *Error code list (5000 to 5999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
5010	**PRG. TIME OVER** The program scan time exceeded the constant scan setting time specified in the PLC RAS setting of the PLC parameter. ■ **Collateral information** • Common Information: Time (value set) • Individual Information: Time (value actually measured) ■ **Diagnostic Timing** Always	– Review the constant scan setting time. – Review the constant scan setting time and low speed program execution time in the PLC parameter so that the excess time of constant scan can be fully secured.	ON	ON	Continue	Qn(H) QnPH QnPRH QnU
	PRG. TIME OVER The low speed program execution time specified in the PLC RAS setting of the PLC parameter exceeded the excess time of the constant scan. ■ **Collateral information** • Common Information: Time (value set) • Individual Information: Time (value actually measured) ■ **Diagnostic Timing** Always					Qn(H) QnPH QnPRH
	PRG. TIME OVER The program scan time exceeded the constant scan setting time specified in the PLC RAS setting of the PLC parameter. ■ **Collateral information** • Common Information: Time (value set) • Individual Information: Time (value actually measured) ■ **Diagnostic Timing** Always	– Review the constant scan setting time in the PLC parameter so that the excess time of constant scan can be fully secured.				Q00J/Q00/Q01
5011	**PRG. TIME OVER** The scan time of the low speed execution type program exceeded the low speed execution watch time specified in the PLC RAS setting of the PLC parameter dialog box. ■ **Collateral information** • Common Information: Time (value set) • Individual Information: Time (value actually measured) ■ **Diagnostic Timing** Always	– Read the individual information of the error using GX (IEC) Developer, check the numerical value (time) there, and shorten scan time if necessary. – Change the low speed execution watch time in the PLC RAS setting of the PLC parameter dialog box.	ON	ON	Continue	Qn(H) QnPH

Tab. 11-7: *Error code list (5000 to 5999) for PLC CPUs of MELSEC System Q*

11.3.6 Error code list (6000 to 6999)

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
6000	**FILE DIFF.** In a redundant system, the control system and standby system do not have the same programs and parameters. The file type detected as different between the two systems can be checked by the file name of the error common information. – The program is different. (File name = ********.QPG) – The PLC parameters/network parameters/ redundant parameters are different. (File name = PARAM.QPA) – The remote password is different. (File name = PARAM.QPA) – The intelligent function module parameters are different. (File name = IPARAM.QPA) – The device initial values are different. (File name = ********.QDI) – The capacity of each write destination within the CPU for online pchange of multiple program blocks is different. (File name = MBOC.QMB) (This can be detected from the standby system of the redundant system.) ■ **Collateral information** • Common Information: File name • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/At tracking cable connection/At changing to backup mode/At completion of write during RUN/At Switching execution/At switching both systems into RUN	– Match the programs and parameters of the control system and standby system. – Verify the systems by either of the following procedures 1), 2) to clarify the differences between the files of the two systems, then correct a wrong file, and execute "Write to PLC" again. 1) After reading the programs/parameters of System A using GX (IEC) Developer or PX Developer, verify them with those of System B. 2) Verify the programs/parameters of GX (IEC) Developer or PX Developer saved in the offline environment with those written to the CPU modules of both systems. – When the capacity of each write destination within the CPU for online change of multiple program blocks is different between the two systems, take corrective action 1) or 2). 1) Using the memory copy from control system to standby system, copy the program memory from the control system to the standby system. 2) Format the CPU module program memories of both systems. (For the capacity of each write destination within the CPU for online change of multiple program blocks, set the same value to both systems.)	OFF	Flicker	Stop	QnPRH
6001	**FILE DIFF.** In a redundant system, the valid parameter drive settings (SW2, SW3) made by the DIP switches are not the same. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/At tracking cable connection/At operation mode change	Match the valid parameter drive settings (SW2, SW3) by the DIP switches of the control system and standby system.	OFF	Flicker	Stop	QnPRH
6010	**OPE. MODE DIFF.** The operational status of the control system and standby system in the redundant system is not the same. (This can be detected from the standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	Synchronise the operation statuses of the control system and standby system.	ON	ON	Continue	QnPRH
6020	**OPE. MODE DIFF.** At power ON/reset, the RUN/STOP switch settings of the control system and standby system are not the same in a redundant system. (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset	Set the RUN/STOP switches of the control system and standby system to the same setting.	OFF	Flicker	Stop	QnPRH

Tab. 11-8: *Error code list (6000 to 6999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
6030	**UNIT LAY. DIFF.** – In a redundant system, the module configuration differs between the control system and standby system. – The network module mode setting differs between the two systems. (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: Module No. • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/At tracking cable connection/At operation mode change	– Match the module configurations of the control system and standby system. – In the redundant setting of the network parameter dialog box, match the mode setting of System B to that of System A.	OFF	Flicker	Stop	QnPRH
6035	**UNIT LAY. DIFF.** In a redundant system, the CPU module model name differs between the control system and standby system. (This can be detected from the standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/At tracking cable connection/At operation mode change	Match the model names of the control system and standby system.	OFF	Flicker	Stop	QnPRH
6036	**UNIT LAY. DIFF.** A difference in the remote I/O configuration of the MELSECNET/H multiplexed remote I/O network between the control system and standby system of a redundant system was detected. (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: Module No. • Individual Information: — ■ **Diagnostic Timing** Always	Check the network cables of the MELSECNET/H multiplexed remote I/O network for disconnection.	OFF	Flicker	Stop	QnPRH
6040	**CARD TYPE DIFF.** In a redundant system, the memory card installation status (installed/not installed) differs between the control system and standby system. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset	Match the memory card installation statuses (installed/not installed) of the control system and standby system.	OFF	Flicker	Stop	QnPRH
6041	**CARD TYPE DIFF.** In a redundant system, the memory card type differs between the control system and standby system. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset	Match the memory card types of the control system and standby system.	OFF	Flicker	Stop	QnPRH
6050	**CAN'T EXE. MODE.** The function inexecutable in the debug mode or operation mode (backup/separate mode) was executed. (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	Execute the function in the debug mode or operation mode (backup/separate mode).	ON	ON	Continue	QnPRH

Tab. 11-8: *Error code list (6000 to 6999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
6060	**CPU MODE DIFF.** In a redundant system, the operation mode (backup/separate) differs between the control system and standby system. (This can be detected from the standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/At tracking cable connection/	Match the operation modes of the control system and standby system.	OFF	Flicker	Stop	QnPRH
6061	**CPU MODE DIFF.** In a redundant system, the operation mode (backup/separate) differs between the control system and standby system. (This can be detected from the standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** When an END instruction executed	Match the operation modes of the control system and standby system.	OFF	Flicker	Stop	QnPRH
6062	**CPU MODE DIFF.** Both System A and B are in the same system status (control system). (This can be detected from the system B of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset/At tracking cable connection/	Power the CPU module (System B) which resulted in a stop error, OFF and then ON.	OFF	Flicker	Stop	QnPRH
6100	**TRK. TRANS. ERR.** – An error (e.g. retry limit exceeded) occurred in tracking data transmission. (This error may be caused by tracking cable removal or other system power-off (including reset).) – The error occurred at a startup since the redundant system startup procedure was not followed. ■ **Collateral information** • Common Information: Tracking transmission data classification • Individual Information: — ■ **Diagnostic Timing** Always	– Check the CPU module or tracking cable. If the error still occurs, this indicates the CPU module or tracking cable is faulty. Contact your local Mitsubishi representative. – Confirm the redundant system startup procedure, and execute a startup again.	ON	ON	Continue	QnPRH
6101	**TRK. TRANS. ERR.** – A timeout error occurred in tracking (data transmission). (This error may be caused by tracking cable removal or other system power-off (including reset).) – The error occurred at a startup since the redundant system startup procedure was not followed. (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: Tracking transmission data classification • Individual Information: — ■ **Diagnostic Timing** Always	– Check the CPU module or tracking cable. If the error still occurs, this indicates the CPU module or tracking cable is faulty. Contact your local Mitsubishi representative. – Confirm the redundant system startup procedure, and execute a startup again.	ON	ON	Continue	QnPRH

Tab. 11-8: *Error code list (6000 to 6999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
6102	**TRK. TRANS. ERR.** A data sum value error occurred in tracking (data reception). (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	– Check the CPU module or tracking cable. If the error still occurs, this indicates the CPU module or tracking cable is faulty. Contact your local Mitsubishi representative. – Confirm the redundant system startup procedure, and execute a startup again.	ON	ON	Continue	QnPRH
6103	**TRK. TRANS. ERR.** – A data error (other than sum value error) occurred in tracking (data reception). (This error may be caused by tracking cable removal or other system power-off (including reset).) – The error occurred at a startup since the redundant system startup procedure was not followed. (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	– Check the CPU module or tracking cable. If the error still occurs, this indicates the CPU module or tracking cable is faulty. Contact your local Mitsubishi representative. – Confirm the redundant system startup procedure, and execute a startup again.	ON	ON	Continue	QnPRH
6105	**TRK. TRANS. ERR.** – An error (e.g. retry limit exceeded) occurred in tracking (data transmission). (This error may be caused by tracking cable removal or other system power-off (including reset).) – The error occurred at a startup since the redundant system startup procedure was not followed. (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: Tracking transmission data classification • Individual Information: — ■ **Diagnostic Timing** Always	– Check the CPU module or tracking cable. If the error still occurs, this indicates the CPU module or tracking cable is faulty. Contact your local Mitsubishi representative. – Confirm the redundant system startup procedure, and execute a startup again.	ON	ON	Continue	QnPRH
6106	**TRK. TRANS. ERR.** – A timeout error occurred in tracking (data transmission). (This error may be caused by tracking cable removal or other system power-off (including reset).) – The error occurred at a startup since the redundant system startup procedure was not followed. (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: Tracking transmission data classification • Individual Information: — ■ **Diagnostic Timing** Always	– Check the CPU module or tracking cable. If the error still occurs, this indicates the CPU module or tracking cable is faulty. Contact your local Mitsubishi representative. – Confirm the redundant system startup procedure, and execute a startup again.	ON	ON	Continue	QnPRH
6107	**TRK. TRANS. ERR.** A data sum value error occurred in tracking (data reception). (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	– Check the CPU module or tracking cable. If the error still occurs, this indicates the CPU module or tracking cable is faulty. Contact your local Mitsubishi representative. – Confirm the redundant system startup procedure, and execute a startup again.	ON	ON	Continue	QnPRH

Tab. 11-8: *Error code list (6000 to 6999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
6108	**TRK. TRANS. ERR.** – A data error (other than sum value error) occurred in tracking (data reception). (This error may be caused by tracking cable removal or other system power-off (including reset).) – The error occurred at a startup since the redundant system startup procedure was not followed. (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	– Check the CPU module or tracking cable. If the error still occurs, this indicates the CPU module or tracking cable is faulty. Contact your local Mitsubishi representative. – Confirm the redundant system startup procedure, and execute a startup again.	ON	ON	Continue	QnPRH
6110	**TRK. SIZE ERROR** The tracking capacity exceeded the allowed range. (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: Tracking capacity excess error factor • Individual Information: — ■ **Diagnostic Timing** When an END instruction executed	Reexamine the tracking capacity.	ON	ON	Continue	QnPRH
6111	**TRK. SIZE ERROR** The control system does not have enough file register capacity for the file registers specified in the tracking settings. (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** When an END instruction executed	Switch to the file registers of which capacity is greater than the file registers specified in the tracking settings.	ON	ON	Continue	QnPRH
6112	**TRK. SIZE ERROR** File registers greater than those of the standby system were tracked and transmitted from the control system. (This can be detected from the standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** When an END instruction executed	Switch to the file registers of which capacity is greater than the file registers specified in the tracking settings.	ON	ON	Continue	QnPRH
6120	**TRK. CABLE ERR.** – A start was made without the tracking cable being connected. – A start was made with the tracking cable faulty. – As the tracking hardware on the CPU module side was faulty, communication with the other system could not be made via the tracking cable. (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset	Make a start after connecting the tracking cable. If the same error still occurs, this indicates the tracking cable or CPU module side tracking transmission hardware is faulty. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnPRH

Tab. 11-8: *Error code list (6000 to 6999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
6130	**TRK. DISCONNECT** – The tracking cable was removed. – The tracking cable became faulty while the CPU module is running. – The CPU module side tracking hardware became faulty. (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	– If the tracking cable was removed, connect the tracking cable to the connectors of the CPU modules of the two systems. – When the error is not resolved after connecting the tracking cable to the connectors of the CPU modules of the two systems and resetting the error, the tracking cable or CPU module side tracking hardware is faulty. Contact your local Mitsubishi representative.	ON	ON	Continue	QnPRH
6140	**TRK.INIT. ERROR** – The other system did not respond during initial communication at power ON/reset. – The error occurred at a startup since the redundant system startup procedure was not followed. (This can be detected from the control system or standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset	– Power the corresponding CPU module OFF and then ON again, or reset it and then unreset. If the same error still occurs, this indicates the CPU module is faulty. Contact your local Mitsubishi representative. – Confirm the redundant system startup procedure, and execute a startup again.	OFF	Flicker	Stop	QnPRH
6200	**CONTROL EXE.** The standby system has been switched to the control system in a redundant system. (Detected by the CPU that was switched from the standby system to the control system). Since this error code does not indicate the error information of the CPU module but indicates its status, the error code and error information are not stored into SD0 to SD26, but are stored into the error log every system switching. (Check the error information by reading the error log using GX (IEC) Developer.) ■ **Collateral information** • Common Information: Reason(s) for system switching • Individual Information: — ■ **Diagnostic Timing** Always	—	ON	OFF	No error	QnPRH
6210	**STANDBY** The control system has been switched to the standby system in a redundant system. (Detected by the CPU that was switched from the standby system to the control system). Since this error code does not indicate the error information of the CPU module but indicates its status, the error code and error information are not stored into SD0 to SD26, but are stored into the error log every system switching. (Check the error information by reading the error log using GX (IEC) Developer.) ■ **Collateral information** • Common Information: Reason(s) for system switching • Individual Information: — ■ **Diagnostic Timing** Always	—	ON	OFF	No error	QnPRH

Tab. 11-8: *Error code list (6000 to 6999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
6220	**CAN'T SWITCH** System switching cannot be executed due to standby system error/ tracking cable error/ online module change in execution at separate mode. Causes for switching system at control system are as follows: – System switching by SP. CONTSW instruction – System switching request from network module ■ **Collateral information** • Common Information: Reason(s) for system switching • Individual Information: Reason(s) for system switching failure ■ **Diagnostic Timing** At switching execution	– Check the status of the standby system and resolve the error. – Complete the online module change.	ON	ON	No error	QnPRH
6300	**STANDBY SYS. DOWN** Any of the following errors was detected in the backup mode. – The standby system has not started up in the redundant system. – The standby system has developed a stop error in the redundant system. – The CPU module in the debug mode was connected to the operating control system. (This can be detected from the control system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	– Check whether the standby system is on or not, and if it is not on, power it on. – Check whether the standby system has been reset or not, and if it has been reset, unreset it. – Check whether the standby system has developed a stop error or not, and if it has developed the error, remove the error factor and restart it. – When the CPU module in the debug mode was connected to the control system operating in the backup mode, make connection so that the control system and standby system are combined correctly.	ON	ON	Continue	QnPRH
6310	**CONTROL SYS. DOWN** Any of the following errors was detected in the backup mode. – The control system has not started up in the redundant system. – The control system has developed a stop error in the redundant system. – The CPU module in the debug mode was connected to the operating standby system. – The error occurred at a startup since the redundant system startup procedure was not followed. (This can be detected from the standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	– The standby system exists but the control system does not exist. – Check whether the system other than the standby system is on or not, and if it is not on, power it on. – Check whether the system other than the standby system has been reset or not, and if it is has been reset, unreset it. – Check whether the system other than the standby system has developed a stop error or not, and if has developed the error, remove the error factor, set the control system and standby system to the same operating status, and restart. – When the CPU module in the debug mode was connected to the control system operating in the backup mode, make connection so that the control system and control system are combined correctly. – Confirm the redundant system startup procedure, and execute a startup again.	OFF	Flicker	Stop	QnPRH
6311 6312	**CONTROL SYS. DOWN** – As consistency check data have not been transmitted from the control system in a redundant system, the other system cannot start as a standby system. – The error occurred at a startup since the redundant system startup procedure was not followed. (This can be detected from the standby system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset	– Replace the tracking cable. If the same error still occurs, this indicates the CPU module is faulty. Contact your local Mitsubishi representative. – Confirm the redundant system startup procedure, and execute a startup again.	OFF	Flicker	Stop	QnPRH

Tab. 11-8: *Error code list (6000 to 6999) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
6313	**CONTROL SYS. DOWN** The control system detected the error of the system configuration and informed the standby system (host system) in the redundant system. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset	Restart the system after checking that the connection between base unit and the system configuration (type/number/parameter of module) are correct.	OFF	Flicker	Stop	QnPRH
6400	**PRG. MEM. CLEAR** The memory copy from control system to standby system was executed, and the program memory was cleared. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At execution of the memory copy from control system to standby system	After the memory copy from control system to standby system is completed, switch power OFF and then ON, or make a reset.	OFF	Flicker	Stop	QnPRH
6410	**MEM.COPY EXE]** The memory copy from control system to standby system was executed. (This can be detected from the control system of the redundant system.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At execution of the memory copy from control system to standby system	After the memory copy from control system to standby system is completed, switch power OFF and then ON, or make a reset.	ON	ON	Continue	QnPRH
6500	**TRK. PARA. ERROR** The file register file specified in the tracking setting of the PLC parameter dialog box does not exist. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset	Read the individual information of the error using GX (IEC) Developer, and check and correct the drive name and file name. Create the specified file.	OFF	Flicker	Stop	QnPRH
6501	**TRK. PARA. ERROR** The file register range specified in the device detail setting of the tracking setting of the PLC parameter dialog box exceeded the specified file register file capacity. ■ **Collateral information** • Common Information: File name/Drive name • Individual Information: Parameter No. ■ **Diagnostic Timing** At power ON/At reset	Read the individual information of the error using GX (IEC) Developer, and increase the file register capacity.	OFF	Flicker	Stop	QnPRH

Tab. 11-8: *Error code list (6000 to 6999) for PLC CPUs of MELSEC System Q*

11.3.7 Error code list (7000 to 10000)

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
7000	**MULT CPU DOWN** – In the operating mode of a multiple CPU system, a CPU error occurred at the CPU where "All station stop by stop error of CPU " was selected. – In a multiple CPU system, a CPU module incompatible with the multiple CPU system was mounted. – CPU modules other than CPU No.1 were removed from the base unit in operation, or reset. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** Always	– Read the individual information of the error using GX (IEC) Developer, identify the error of the CPU module, and remove the error. – Remove the CPU module incompatible with the multiple CPU system from the main base unit. – Check the mounting status of CPU modules other than CPU No.1 and whether the CPU modules were reset.	OFF	Flicker	Stop	Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH QnU (except Q00UJCPU)
	MULT CPU DOWN In a multiple CPU system, CPU other than CPU No.1 cannot be started up due to stop error of the CPU No.1 at power-on, which occurs to CPU No.2 to No.4. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset	Read the individual information of the error using GX (IEC) Developer, identify the error of the CPU module, and remove the error.				
7002	**MULT CPU DOWN** – There is no response from the target CPU module in a multiple CPU system during initial communication. – In a multiple CPU system, a CPU module incompatible with the multiple CPU system was mounted. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Reset the CPU module and RUN it again. If the same error is displayed again, this suggests the hardware fault of any of the CPU modules. Contact your local Mitsubishi representative.) – Remove the CPU module incompatible with the multiple CPU system from the main base unit. Or, replace the CPU module incompatible with the multiple CPU system with the compatible one.	OFF	Flicker	Stop	Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH
	MULT CPU DOWN There is no response from the target CPU module in a multiple CPU system during initial communication. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Reset the CPU module and RUN it again. If the same error is displayed again, this suggests the hardware fault of any of the CPU modules. Contact your local Mitsubishi representative.				QnU (except Q00UJCPU)
7003	**MULT CPU DOWN** There is no response from the target CPU module in a multiple CPU system at initial communication stage. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Reset the CPU module and RUN it again. If the same error is displayed again, this suggests the hardware fault of any of the CPU modules. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH
7004	**MULT CPU DOWN** In a multiple CPU system, a data error occurred in communication between the CPU modules. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** Always	– Check the system configuration to see if modules are mounted in excess of the number of I/O points. – When there are no problems in the system configuration, this indicates the CPU module hardware is faulty. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later)

Tab. 11-9: *Error code list (7000 to 10000) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
7010	**MULTI EXE. ERROR** – In a multiple CPU system, a faulty CPU module was mounted. – In a multiple CPU system, a CPU module incompatible with the multiple CPU system was mounted. (The CPU module compatible with the multiple CPU system was used to detect an error.) – In a multiple CPU system, any of the CPU No. 2 to 4 was reset with power ON. (The CPU whose reset state was cancelled was used to detect an error.) ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Read the individual information of the error using GX (IEC) Developer, and replace the faulty CPU module. – Replace the CPU module with the one compatible with the multiple CPU system. – Do not reset any of the No. 2 to 4 CPU modules. – Reset CPU No. 1 and restart the multiple CPU system.	OFF	Flicker	Stop	Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH QnU (except Q00UJCPU)
	MULTI EXE. ERROR The PC CPU module-compatible software package (PPC-DRV-01) whose version is 1.06 or earlier is used in a multiple CPU system. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Change the version of the PC CPU module-compatible software package (PPC-DRV-01) to 1.07 or later.				Q00/Q01 (Function version is B or later)
	MULTI EXE. ERROR The Q172(H)CPU(N) or Q173(H)CPU(N) is mounted on the multiple CPU high-speed main base unit (Q3□DB). (This may result in a module failure.) ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Replace the Q172(H)CPU(N) and Q173(H)CPU(N) with the Motion CPU compatible with the multiple CPU high-speed main base unit.				Qn(H) (first 5 digits of serial No. is 09082 or later) QnPH (first 5 digits of serial No. is 09082 or later)
	MULTI EXE. ERROR The Universal model QCPU (except Q02UCPU) and Q172(H)CPU(N) are mounted on the same base unit. (This may result in a module failure.) ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Check the QCPU and Motion CPU that can be used in a multiple CPU system, and change the system configuration.				Qn(H) (first 5 digits of serial No. is 09082 or later) QnPH (first 5 digits of serial No. is 09082 or later)
7011	**MULTI EXE. ERROR** Either of the following settings was made in a multiple CPU system. – Multiple CPU automatic refresh setting was made for the inapplicable CPU module. – "I/O sharing when using multiple CPUs" setting was made for the inapplicable CPU module. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Correct the settings.	OFF	Flicker	Stop	Q00/Q01 (Function version is B or later) QnU (except Q00UJCPU)

Tab. 11-9: *Error code list (7000 to 10000) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
7011	**MULTI EXE. ERROR** The system configuration for using the Multiple CPU high speed transmission function is not met. – The QnUCPU is not used for the CPU No.1. – The Multiple CPU high speed main base unit Q3□BD is not used. – Points other than 0 is set to the send range for the CPU module incompatible with the multiple CPU high speed transmission function. – Points other than 0 is set to the send range for the CPU module incompatible with the multiple CPU. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Change the system configuration to meet the conditions for using the Multiple CPU high speed transmission function. – Set the send range of CPU, that does not correspond to multiple CPU compatible area, at 0 point, when performing automatic refreshing in multiple CPU compatible area.	OFF	Flicker	Stop	QnU (except Q00UJ-, Q00U-, Q01U- and Q02UCPU)
7013	**MULTI EXE. ERROR** The Q172(H)CPU(N) or Q173(H)CPU(N) is mounted to the CPU slot or slots 0 to 2. (The module may break down.) ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Check the QCPU and Motion CPU that can be used in a multiple CPU system, and change the system configuration. – Remove the Motion CPU incompatible with the multiple CPU system.	OFF	Flicker	Stop	QnU
7020	**MULTI CPU ERROR** In the operating mode of a multiple CPU system, an error occurred in the CPU where "system stop" was not selected. (The CPU module where no error occurred was used to detect an error.) ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** Always	Read the individual information of the error using GX (IEC) Developer, check the error of the CPU module resulting in CPU module fault, and remove the error.	ON	ON	Continue	Q00/Q01 (Function version is B or later) Qn(H) (Function version is B or later) QnPH QnU (except Q00UJCPU)
7030	**CPU LAY. ERROR** An assignment error occurred in the CPU-mountable slot (CPU slot, I/O slot 0, 1) in excess of the number of CPU modules specified in the multiple CPU setting of the PLC parameter dialog box. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Set the same value to the number of CPU modules specified in the multiple CPU setting of the PLC parameter dialog box and the number of mounted CPU modules (including CPU (empty)). – Make the type specified in the I/O assignment setting of the PLC parameter dialog box consistent with the CPU module configuration.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) QnU
7031	**CPU LAY. ERROR** An assignment error occurred within the range of the number of CPUs specified in the multiple CPU setting of the PLC parameter dialog box. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Set the same value to the number of CPU modules specified in the multiple CPU setting of the PLC parameter dialog box and the number of mounted CPU modules (including CPU (empty)). – Make the type specified in the I/O assignment setting of the PLC parameter dialog box consistent with the CPU module configuration.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) QnU
7032	**CPU LAY. ERROR** The number of CPU modules mounted in a multiple CPU system is wrong. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Configure a system so that the number of mountable modules of each CPU module does not exceed the maximum number of mountable modules specified in the specification.	OFF	Flicker	Stop	Q00/Q01 (Function version is B or later) QnU (except Q00UJCPU)

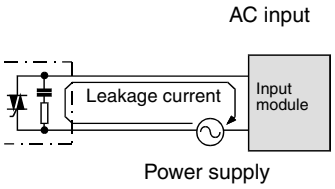
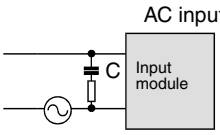
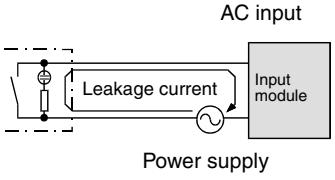
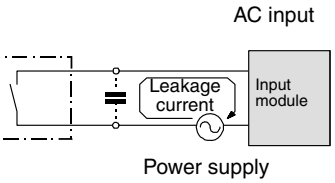
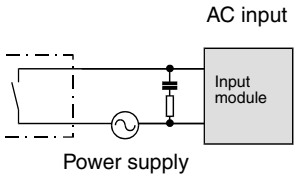
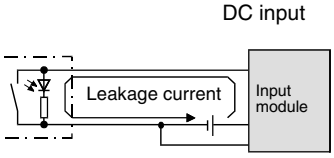
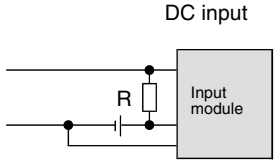
Tab. 11-9: *Error code list (7000 to 10000) for PLC CPUs of MELSEC System Q*

Error code	Error contents and cause	Corrective action	LED status		CPU status	Corresponding CPU
			RUN	ERR.		
7035	**CPU LAY. ERROR** The CPU module has been mounted on the inapplicable slot. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	Mount the CPU module on the applicable slot.	OFF	Flicker	Stop	Q00J/Q00/Q01 (Function version is B or later) QnPRH QnU
7036	**CPU LAY. ERROR** The host CPU No. set by the multiple CPU setting and the host CPU No. determined by the mounting position of the CPU module are not the same. ■ **Collateral information** • Common Information: Module No. (CPU No.) • Individual Information: — ■ **Diagnostic Timing** At power ON/ At reset	– Mount the mounting slot of the CPU module correctly. – Correct the host CPU No. set by the multiple CPU setting to the CPU No. determined by the mounting position of the CPU module.	OFF	Flicker	Stop	QnU (except Q00UJ-, Q00U-, Q01U- and Q02UCPU)
8031	**INCORRECT FILE** The error of stored file (enabled parameter file) is detected. ■ **Collateral information** • Common Information: — • Individual Information: File diagnostic information ■ **Diagnostic Timing** At power ON/ At reset/STOP → RUN/ At writing to programmable controller	Write the file shown as SD17 to SD22 of individual information to the drive shown as SD16(L) of individual information, and turn ON from OFF the power supply of the CPU module or cancel the reset. If the same error is displayed again, this indicates the CPU module hardware is faulty. Contact your local Mitsubishi representative.	OFF	Flicker	Stop	QnU
9000	**F****** Annunciator (F) was set ON. ■ **Collateral information** • Common Information: Program error location • Individual Information: Annunciator number ■ **Diagnostic Timing** When instruction executed	Read the individual information of the error using GX (IEC) Developer, and check the program corresponding to the numerical value (annunciator number).	ON	ON/OFF USER LED: ON	Continue	●
9010	**<CHK> ERR *** _ ***** Error detected by the CHK instruction. ■ **Collateral information** • Common Information: Program error location • Individual Information: Error number ■ **Diagnostic Timing** When instruction executed	Read the individual information of the error using GX (IEC) Developer, and check the program corresponding to the numerical value (error number).	ON	OFF USER LED: ON	Continue	Qn(H) QnPH QnPRH
9020	**BOOT OK** Storage of data onto ROM was completed normally in automatic write to standard ROM. (BOOT LED also flickers.) ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** At power ON/At reset	Use the DIP switches to set the valid parameter drive to the standard ROM. Then, switch power on again, and perform boot operation from the standard ROM.	OFF	Flicker	Stop	Qn(H) (Function version is B or later) QnPH QnPRH
10000	**CONT.UNIT ERROR** In the multiple CPU system, an error occurred in the CPU module other than the Process CPU/ High performance model QCPU. ■ **Collateral information** • Common Information: — • Individual Information: — ■ **Diagnostic Timing** Always	Check the details of the generated error by connecting to the corresponding CPU module.	OFF	Flicker	Continue	Qn(H) (Function version is B or later) QnPH

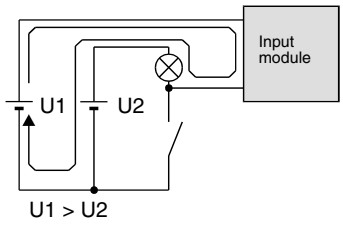
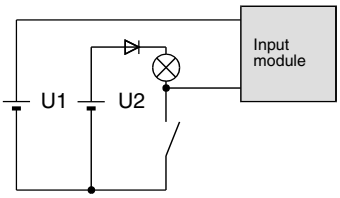
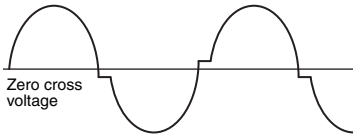
Tab. 11-9: *Error code list (7000 to 10000) for PLC CPUs of MELSEC System Q*

11.4 I/O circuit troubleshooting

11.4.1 Input circuit troubleshooting

Example	Condition	Cause	Corrective action
1	Input signal is not turned off.	Leakage current of input switch (e.g. drive by non-contact switch). 	Connect an appropriate CR so that the voltage across the terminals of the input module becomes lower than the off voltage.  It is recommended to use 0.1 to 47 μF +47 to 120 Ω (1/2 W) for the CR constant.
2	Input signal is not turned off.	Drive by a limit switch with neon lamp. 	• Same as Example 1 or • Provide an independent display circuit separately.
3	Input signal is not turned 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.) 
4	Input signal is not turned off.	Drive by a switch with LED display. 	Connect an appropriate resistor so that the current across the input module becomes lower than the off current.  * A calculation example of the resistance to be connected is shown on the following page.

Tab. 11-1: *Input circuit troubleshooting*

Exam-ple	Condition	Cause	Corrective action
5	Input signal is not turned off.	Sneak path due to the use of two power supplies. 	Use only one power supply. Connect a sneak path prevention diode. 
6	Input signal is not turned on (AC input module)	Stepwise distortion as shown below appears to the zero cross voltage of input signal (AC). 	Improve input signal waveform by using the online system etc.
7	False input due to noise	Depending on response time setting, noise is imported as input.	Change the response time setting. Example: 1 ms to 5 ms

Tab. 11-1: *Input circuit troubleshooting*

Calculation example of the resistance to be connected in Example 4

Connecting a switch with LED display, in which a maximum 4.0 mA leakage current flows when 24 V DC is supplied to the QX80.

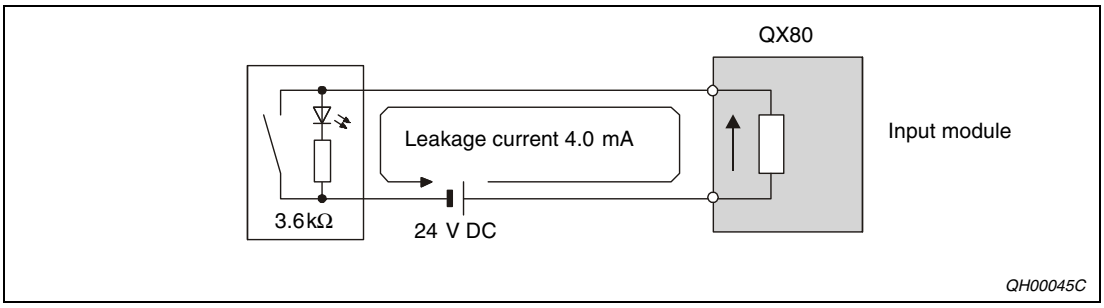


Fig. 0-1: *Signal input switch to module input*

In this case, the circuit does not satisfy the condition that the off current of the QX80 is 1.7 mA or less. Connect a resistance as follows.

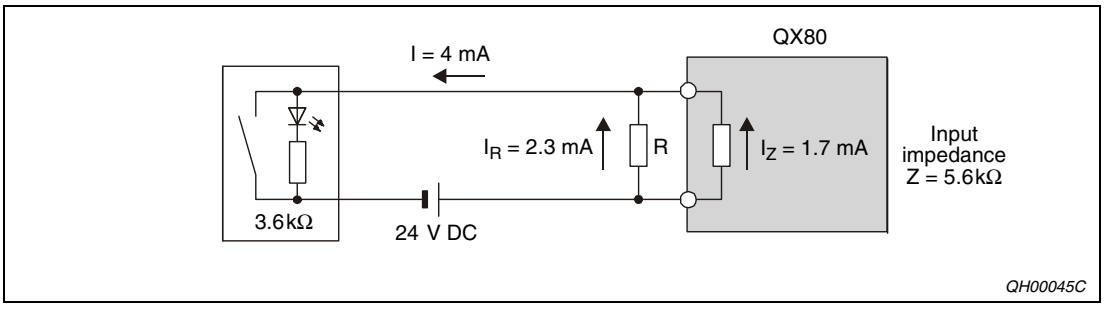


Fig. 0-2: *Resistor R parallel to input*

The current flowing through the resistor R must be minimum 2.3 mA.

$I_R = I - I_Z = 4\ mA - 1.7\ mA = 2.3\ mA$

The ratio of the resistors is equivalent to the reverse ratio of the currents:

$I_R / I_Z = Z / R$

The result for resistor R is:

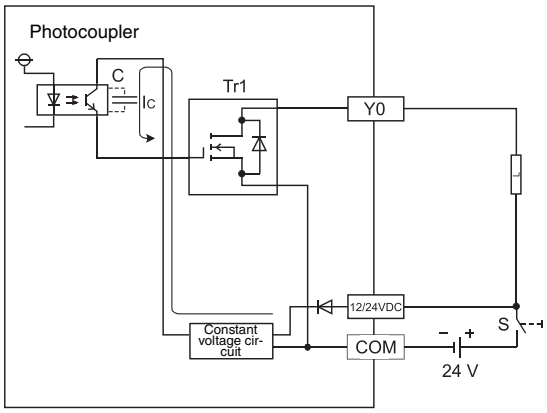
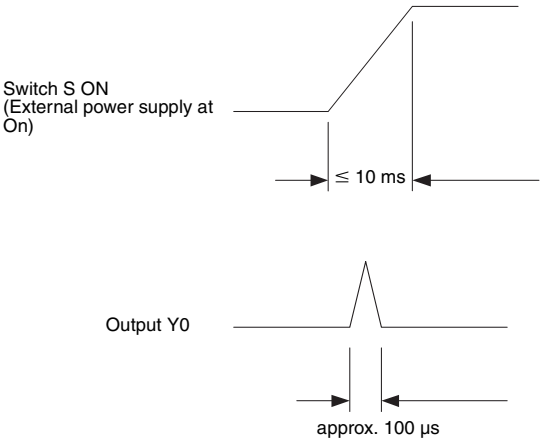
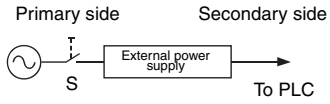
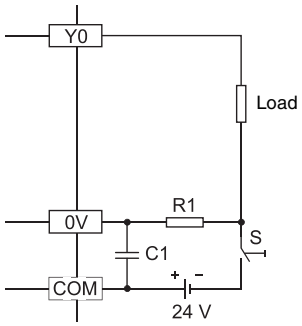
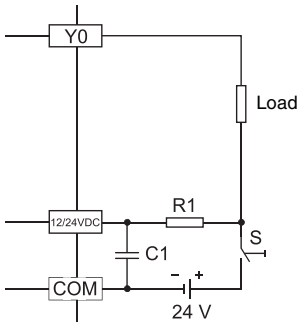
$R = (I_Z / I_R) \times Z = (1.7\ mA / 2.3\ mA) \times 5.6\ k\Omega = 4.14\ k\Omega$

The nearest resistor value of the E12 resistor series is 3.9 kΩ . The electric power W of the resistance R can be calculated by the following formula:

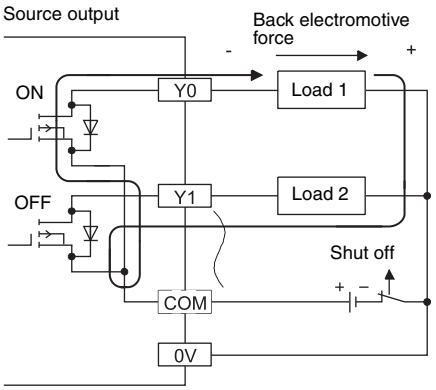
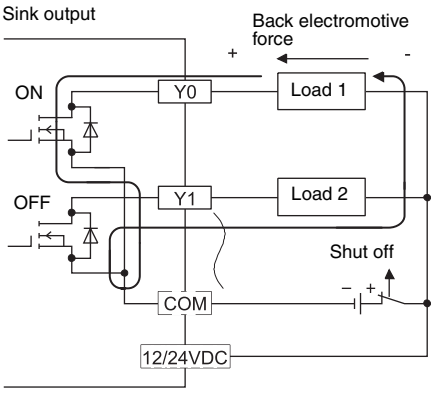
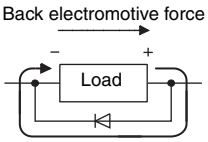
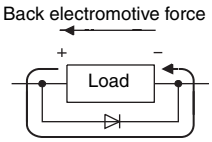
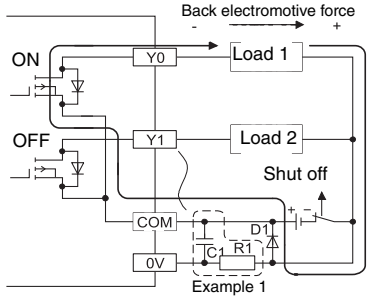
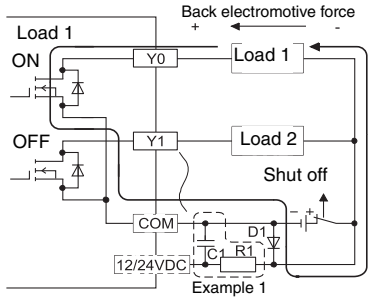
$W = (\text{Input voltage})^2 / R = 28.8^2\ V / 3.9\ k\Omega = 0.2\ W$

The power dissipation of the resistor should be for safety reasons 3 to 5 times higher, as the real value.
Therefore select a resistor 3.9 kΩ / 1 W for this example.

11.4.2 Output circuit troubleshooting

Example	Condition	Cause	Corrective action
1	When the external power supply turns on, the load is turned on for a moment.	Erroneous output due to the stray capacitance (C) between collector and emitter of photocoupler. (An erroneous output may occur at high sensitivity load (such as solid state relay). Output module, Combined module  If the external power supply is turned on precipitously, I_C current flows to the next stage of transistor Tr1 gate and Y0 output turns on by 100 µs.  	When turning on or off the external power, check that the external power supply rising edge is 10 ms or more, and switch S to the primary side of external power supply.  If the external power supply should be switched on the secondary side, the rise time of the voltage should be extended by RC-circuit to minimum 10 ms. Sink output  Source output  Calculation of the components: R1: Several tens of Ohms; Power capacity = (external power supply current)^2 x R1 x (3 to 5) C1: Several hundreds of microfarads, 50 V Example: R1= 40 Ω, C1 = 300 µF Use the below expression to calculate a time constant: T= C1 x R1 = 300 x 10^{-6} x 40 = 12 x 10^{-3} = 12 ms Measures will not be effective to the Output module QY81P due to the characterictic of external power supply circuit.

Tab. 11-1: *Output circuit troubleshooting*

Example	Condition	Cause	Corrective action
2	The load which was turned off is turned on for a moment at power-off.	The load [2] which was turned OFF may be turned ON due to back electromotive force at the time of power-off if an inductive load [1] is used.  	Take either of the following measure: • To prevent the generation of the back electromotive force, connect diode in parallel with load where the back electromotive force has been generated. Source output  Sink putput  • Connect diode between (+) and (–) of the external power supply so that a sneak path circuit is porvided. Connect the diode to C1 and R1 in parallel when example 1 is performed simultaneously. Source output  * Measures will not be effective to the Output module QY81P due to the characterictic of external power supply circuit. Sink output  As for D1, choose a diode with following specifications: – Reverse current: Approx. 10 times the rated voltage of the spec. – Forward current: More than 2 times the Max. load current (common) of the spec.

Tab. 11-1: *Output circuit troubleshooting*

Example	Condition	Cause	Corrective action
3	Excessive voltage is applied to load when output turns off. (Triac output)	The load (e. g. magnetic valve) contains a rectifier for one way (diode). The internal capacitor of the output module is charged by this diode during one sine halfwave. The resulting voltage at the diode during the other halfwave is the voltage of the power supply plus the charged voltage of the capacitor. (This usage does not pose 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 at both ends of the load.
4	Load does not turn off. (Triac output)	Leakage current due to the built-in surge suppressor	Connect a resistor at both ends of 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.)
5	Load does not turn off. (Triac output)	The load current is lower than the minimum load current of the output module.	Connect a resistor to both ends of a load so that the load current is higher than the minimum load current.

Tab. 11-1: *Output circuit troubleshooting*

12 Specifications

12.1 General specifications

<table>
<tr><th>Item</th><th colspan="5">Specification</th></tr>
<tr><td>Operating ambient temperature</td><td colspan="5">0 to +55 °C</td></tr>
<tr><td>Storage ambient temperature</td><td colspan="5">–25 to +75 °C</td></tr>
<tr><td>Ambient relative humidity (Operating and Storage)</td><td colspan="5">5 to 95% (non-condensing)</td></tr>
<tr><td rowspan="7">Vibration resistance</td><td rowspan="7">Compliant with JIS B 3502 and IEC61131-2</td><td colspan="3">Under intermittent vibration</td><td rowspan="2">Sweep count</td></tr>
<tr><td>Frequency</td><td>Acceleration</td><td>Amplitude</td></tr>
<tr><td>5 to 9 Hz</td><td>—</td><td>3.5 mm</td><td rowspan="2">10 times each in X, Y, Z directions</td></tr>
<tr><td>9 to 150 Hz</td><td>9.8 m/s^2 (1 g)</td><td>—</td></tr>
<tr><td colspan="3">Under continuous vibration</td><td rowspan="3">—</td></tr>
<tr><td>5 to 9 Hz</td><td>—</td><td>1.75 mm</td></tr>
<tr><td>9 to 150 Hz</td><td>4.9 m/s^2 (0.5 g)</td><td>—</td></tr>
<tr><td>Shock resistance</td><td colspan="5">Compliant with JIS B 3502 and IEC61131-2:
147 m/s^2 (15 g), 3 times in each of 3 directions X, Y, Z</td></tr>
<tr><td>Operating ambience</td><td colspan="5">No corrosive gases etc.</td></tr>
<tr><td>Insulation resistance</td><td colspan="5">≥ 10 MΩ</td></tr>
<tr><td>Noise durability</td><td colspan="5">By noise simulator (peak value of noise voltage: 500 V ①,
noise width: 1 μs, noise frequency: 25 to 60 Hz)</td></tr>
<tr><td>Operating altitude</td><td colspan="5">2000 m max.</td></tr>
<tr><td>Installation location</td><td colspan="5">Inside control panel</td></tr>
<tr><td>Overvoltage category ②</td><td colspan="5">II max.</td></tr>
<tr><td>Pollution level ③</td><td colspan="5">2 max.</td></tr>
<tr><td>Cooling system</td><td colspan="5">Self cooling</td></tr>
</table>

Tab. 12-1: *General specifications*

① With the models QX10, QX10-TS, QX28, QY10, QY10-TS, QY18A and QY22 the peak value of the noise voltage is 1500 V.

② 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.

③ 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.

CAUTION:

Do not use or store the programmable controller under pressure higher than the atmospheric pressure of altitude 0 m. Doing so can cause a malfunction.

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

12.2 Hardware specifications of the CPU modules

12.2.1 Basic model QCPU

Item			Q00JCPU	Q00CPU	Q01CPU
Control method			Stored program repeat operation		
I/O control mode			Refresh mode		
Program language			Ladder (LD), Instruction (IN), Sequential function chart (SFC), Function block (FB), Structured text (ST)		
Processing speed (sequence instruction) [ns/step]					
	LD:		200	160	100
	MOV:		700	560	350
No. of I/O points		Usable on program	2048	2048	
		Accessible to the actual I/O module	256	1024	
Constant scan (Function for keeping regular scan time)			1 to 2000 ms (Setting available in 1 ms unit.)		
Program memory					
	No. of program steps (Drive 0)		8 k	8 k	14 k
Memory size			refer to sections 2.2.1and 4.2		
Devices			refer to section 4.1.1		
Self diagnostic			Plausibility of program, Watch Dog Timer (WDT monitor), battery monitor, memory check, CPU check, line voltage monitor, fuse monitor, etc.		
RUN/PAUSE contact			One contact can be set up in X000 to 7FFF for each of RUN and PAUSE		
Operation mode in case of error			Stop or continue (set by parameters)		
Output status after switching from STOP to RUN			The outputs keep their status at the time, when the CPU stops, or they are refreshed to the current process status with a delay time of one cycle.		
Clock function					
	Year, month, date, hour, minute, second and day of the week (Automatic leap year detection)				
	Accuracy:		–3.2 to +5.27 s (Typ. +1.98 s)/d at 0°C –2.57 to +5.27 s (Typ. +2.22 s)/d at 25°C –11.68 to +3.65 s (Typ. -2.64 s)/d at 55°C		
Allowable momentary power failure time			20 ms or less	Varies depending on the power supply module	
Current consumption (5 V DC)			0.26 A ①	0.25 A	0.27 A
Weight			0.66 kg	0.13 kg	0.13 kg

Tab. 12-2: *Performance specifications of CPU types Q00J, Q00 and Q01*

① Current consumption of base unit, power supply module and CPU module

12.2.2 High performance model QCPU

Item			Q02	Q02H	Q06H	Q12H	Q25H
Control method			Stored program repeat operation				
I/O control mode			Refresh mode				
Program language			Ladder (LD), Instruction (IN), Sequential function chart (SFC), Function block (FB), Structured text (ST)				
Processing speed (sequence instruction) [ns/step]							
	LD:		79	34			
	MOV:		237	102			
No. of I/O points		Usable on program	8192				
		Accessible to the actual I/O module	4096				
Constant scan (Function for keeping regular scan time)			0.5 to 2000 ms (Setting available in 0.5 ms unit.)				
Program memory							
	No. of program steps (Drive 0)		28 k	28 k	60 k	124 k	252 k
Memory size			refer to sections 2.2.1, 2.2.2 and 4.2				
Devices			refer to section 4.1.2				
Self diagnostic			Plausibility of program, Watch Dog Timer (WDT monitor), battery monitor, memory check, CPU check, line voltage monitor, fuse monitor, etc.				
RUN/PAUSE contact			One contact can be set up in X000 to 7FFF for each of RUN and PAUSE				
Operation mode in case of error			Stop or continue (set by parameters)				
Output status after switching from STOP to RUN			The outputs keep their status at the time, when the CPU stops, or they are refreshed to the current process status with a delay time of one cycle.				
Clock function							
	Year, month, date, hour, minute, second and day of the week (Automatic leap year detection)						
	Accuracy:		–3.18 to +5.25 s (Typ. +2.12 s)/d at 0°C –3.93 to +5.25 s (Typ. +1.90 s)/d at 25°C –14.69 to +3.53 s (Typ. -3.67 s)/d at 55°C				
Allowable momentary power failure time			Varies depending on the power supply module				
Current consumption (5 V DC)			0.6 A	0.64 A	0.64 A	0.64 A	0.64 A
Weight			0.20 kg				

Tab. 12-3: *Performance specifications of CPU types Q02(H), Q06H, Q12H and Q25H*

12.2.3 Universal model QCPU

Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU and Q03U(E)CPU

Item			Q00UJ	Q00U	Q01U	Q02U	Q03U Q03UE ①
Control method			Stored program repeat operation				
I/O control mode			Refresh mode				
Program language			Ladder (LD), Instruction (IN), Sequential function chart (SFC), Function block (FB), Structured text (ST)				
Processing speed (sequence instruction) [ns/step]							
	LD:		120	80	60	40	20
	MOV:		240	160	120	80	40
No. of I/O points		Usable on program	8192	8192	8192	8192	8192
		Accessible to the actual I/O module	256	1024	1024	2048	4096
Constant scan (Function for keeping regular scan time)			0.5 to 2000 ms (Setting available in 0.5 ms unit.)				
Program memory							
	No. of program steps (Drive 0)		10 k	10 k	15 k	20 k	30 k
Memory size			refer to sections 2.2.3 and 4.2				
Devices			refer to section 4.1.3				
Self diagnostic			Plausibility of program, Watch Dog Timer (WDT monitor), battery monitor, memory check, CPU check, line voltage monitor, fuse monitor, etc.				
RUN/PAUSE contact			One contact can be set up in X000 to 7FFF for each of RUN and PAUSE				
Operation mode in case of error			Stop or continue (set by parameters)				
Output status after switching from STOP to RUN			The outputs keep their status at the time, when the CPU stops, or they are refreshed to the current process status with a delay time of one cycle.				
Clock function							
	Year, month, date, hour, minute, second and day of the week (Automatic leap year detection)						
	Accuracy:		–2.96 to +3.74 s (Typ. +1.24 s)/d at 0°C –2.34 to +3.74 s (Typ. +1.63 s)/d at 25°C –11.48 to +2.12 s (Typ. -3.67 s)/d at 55°C			–2.96 to +3.74 s/d at 0°C (Typ. +1.42 s/d) –3.18 to +3.74 s/d at 25°C (Typ. +1.50 s/d) –13.20 to +2.12 s/d at 55°C (Typ. -3.54 s/d)	
Allowable momentary power failure time			20 ms or less	Varies depending on the power supply module			
Current consumption (5 V DC)			0.37 A ②	0.33 A	0.33 A	0.23 A	Q03UCPU: 0.33 A Q03UECPU: 0.46 A
Weight			0.70 kg	0.15 kg	0.15 kg	0.20 kg	Q03UCPU: 0.20 kg Q03UECPU: 0.22 kg

Tab. 12-4: *Performance specifications of CPU types Q00UJ, Q00U, Q01U, Q02U and Q03U(E)*

① With built-in ETHERNET port

② Current consumption of base unit, power supply module and CPU module

Q04UD(E)CPU to Q26UD(E)CPU*

Item			Q04UDH Q04UDEH	Q06UDH Q06UDEH	Q10UDH Q10UDEH	Q13UDH Q13UDEH	Q20UDH Q20UDEH	Q26UDH Q26UDEH
Control method			Stored program repeat operation					
I/O control mode			Refresh mode					
Program language			Ladder (LD), Instruction (IN), Sequential function chart (SFC), Function block (FB), Structured text (ST)					
Processing speed (sequence instruction) [ns/step]								
	LD:		9.5					
	MOV:		19					
No. of I/O points		Usable on program	8192					
		Accessible to the actual I/O module	4096					
Constant scan (Function for keeping regular scan time)			0.5 to 2000 ms (Setting available in 0.5 ms unit.)					
Program memory								
	No. of program steps (Drive 0)		40 k	60 k	100 k	130 k	200 k	260 k
Memory size			refer to sections 2.2.3 and 4.2					
Devices			refer to section 4.1.3					
Self diagnostic			Plausibility of program, Watch Dog Timer (WDT monitor), battery monitor, memory check, CPU check, line voltage monitor, fuse monitor, etc.					
RUN/PAUSE contact			One contact can be set up in X000 to 7FFF for each of RUN and PAUSE					
Operation mode in case of error			Stop or continue (set by parameters)					
Output status after switching from STOP to RUN			The outputs keep their status at the time, when the CPU stops, or they are refreshed to the current process status with a delay time of one cycle.					
Clock function								
	Year, month, date, hour, minute, second and day of the week (Automatic leap year detection)							
	Accuracy:		–2.96 to +3.74 s (Typ. +1.42 s)/d at 0°C –3.18 to +3.74 s (Typ. +1.50 s)/d at 25°C –13.20 to +2.12 s (Typ. -3.54 s)/d at 55°C					
Allowable momentary power failure time			Varies depending on the power supply module					
Current consumption (5 V DC)			• Modules without integrated ETHERNET interface: 0.39 A • Modules with integrated ETHERNET interface: 0.49 A					
Weight			• Modules without integrated ETHERNET interface: 0.20 kg • Modules with integrated ETHERNET interface: 0.22 kg					

Tab. 12-5: *Performance specifications of CPU types Q04UD(E)H to Q26UD(E)H*

* The universal model PLC CPU modules with an "E" in the model name are equipped with an Ethernet interface.

12.2.4 Process CPU

Item			Q02PH	Q06PH	Q12PH	Q25PH
Control method			Stored program repeat operation			
I/O control mode			Refresh mode			
Program language			Ladder (LD), Instruction (IN), Sequential function chart (SFC), Function block (FB), Structured text (ST)			
Processing speed (sequence instruction) [ns/step]						
	LD:		34			
	MOV:		102			
No. of I/O points		Usable on program	8192			
		Accessible to the actual I/O module	4096			
Constant scan (Function for keeping regular scan time)			0.5 to 2000 ms (Setting available in 0.5 ms unit.)			
Program memory						
	No. of program steps (Drive 0)		28 k	60 k	124 k	252 k
Memory size			refer to sections 2.2.4 to 4.2			
Devices			refer to section 4.1.4			
Self diagnostic			Plausibility of program, Watch Dog Timer (WDT monitor), battery monitor, memory check, CPU check, line voltage monitor, fuse monitor, etc.			
RUN/PAUSE contact			One contact can be set up in X000 to 7FFF for each of RUN and PAUSE			
Operation mode in case of error			Stop or continue (set by parameters)			
Output status after switching from STOP to RUN			The outputs keep their status at the time, when the CPU stops, or they are refreshed to the current process status with a delay time of one cycle.			
Clock function						
	Year, month, date, hour, minute, second and day of the week (Automatic leap year detection)					
	Accuracy:		–3.18 to +5.25 s (Typ. +2.12 s)/d at 0°C –3.93 to +5.25 s (Typ. +1.90 s)/d at 25° –14.69 to +3.53 s (Typ. -3.67 s)/d at 55°C			
Allowable momentary power failure time			Varies depending on the power supply module			
Current consumption (5 V DC)			0.6 A	0.64 A	0.64 A	0.64 A
Weight			0.20 kg			

Tab. 12-6: *Performance specifications of CPU types Q02PH, Q06PH, Q12PH and Q25PH*

12.2.5 Redundant CPU

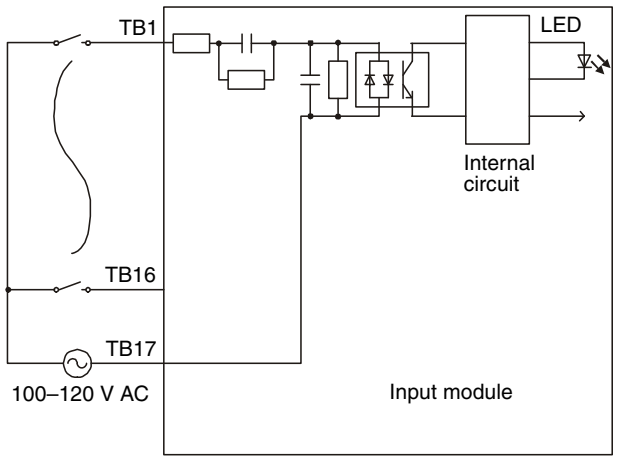
Item			Q12PRH	Q25PRH
Control method			Stored program repeat operation	
I/O control mode			Refresh mode	
Program language			Ladder (LD), Instruction (IN), Sequential function chart (SFC), Function block (FB), Structured text (ST)	
Processing speed (sequence instruction) [ns/step]				
	LD:		34	
	MOV:		102	
No. of I/O points		Usable on program	8192	
		Accessible to the actual I/O module	4096	
Constant scan (Function for keeping regular scan time)			0.5 to 2000 ms (Setting available in 0.5 ms unit.)	
Program memory				
	No. of program steps (Drive 0)		124 k	252 k
Memory size			refer to sections 2.2.5 and 4.2	
Devices			refer to section 4.1.5	
Self diagnostic			Plausibility of program, Watch Dog Timer (WDT monitor), battery monitor, memory check, CPU check, line voltage monitor, fuse monitor, etc.	
RUN/PAUSE contact			One contact can be set up in X000 to 7FFF for each of RUN and PAUSE	
Operation mode in case of error			Stop or continue (set by parameters)	
Output status after switching from STOP to RUN			The outputs keep their status at the time, when the CPU stops, or they are refreshed to the current process status with a delay time of one cycle.	
Clock function				
	Year, month, date, hour, minute, second and day of the week (Automatic leap year detection)			
	Accuracy:		–3.2 to +5.27 s (Typ. +2.07 s)/d at 0°C –2.77 to +5.27 s (Typ. +2.22 s)/d at 25°C –12.14 to +3.65 s (Typ. -2.89 s)/d at 55°C	
Allowable momentary power failure time			Varies depending on the power supply module	
Current consumption (5 V DC)			0.89 A	
Weight			0.3 kg	

Tab. 12-7: *Performance specifications of CPU types Q12PRH and Q25PRH*

12.3 Input/output module specifications

12.3.1 Digital input module QX10

Item		QX10
Number of input points		16
Isolation method		Photocoupler
Rated input voltage		110–120 V AC (+10/–15 %), 50/60 Hz (± 3 Hz), distortion within 5 %
Rated input current		approx. 7 mA (at 100 V AC, 50 Hz); approx. 8 mA (at 100 V AC, 60 Hz)
Max. simultaneously ON		Refer to the derating chart
Inrush current		max. 200 mA within 1 ms (at 132V AC)
ON voltage/ON current		≥ 80 V AC / ≥ 5 mA (50 Hz / 60 Hz)
OFF voltage/OFF current		≤ 30 V AC / ≤ 1.7 mA (50 Hz / 60 Hz)
Input impedance		approx. 15 kΩ at 50 Hz, approx. 12 kΩ at 60 Hz
Response time	OFF → ON	≤ 15 ms (100 V AC, 50 Hz / 60 Hz)
	ON → OFF	≤ 20 ms (100 V AC, 50 Hz / 60 Hz)
Groups of input		1; 16 points/common (common terminal: TB17)
Input status display		One LED per input
Dielectric withstand voltage		1780 V AC rms/3 cycles (altitude 2000 m)
External connections		18-point removable terminal block with screws (M3 x 6 screws)
Applicable wire size		0.3 to 0.75 mm^2 core (outside diameter: 2.8 mm max.)
Internal current consumption (5 V DC)		50 mA (all input points ON)
Weight		0.17 kg

External Connections	Terminal block number	Signal
	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	COM
	TB18	Vacant

Tab. 12-8: *Input module QX10*

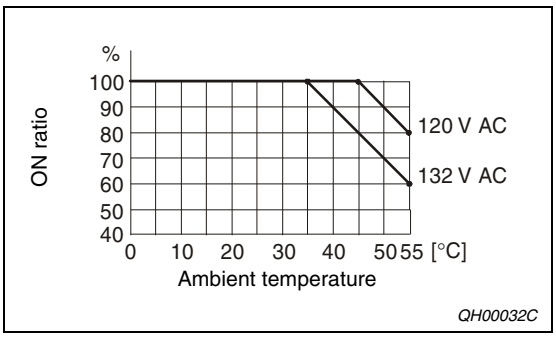
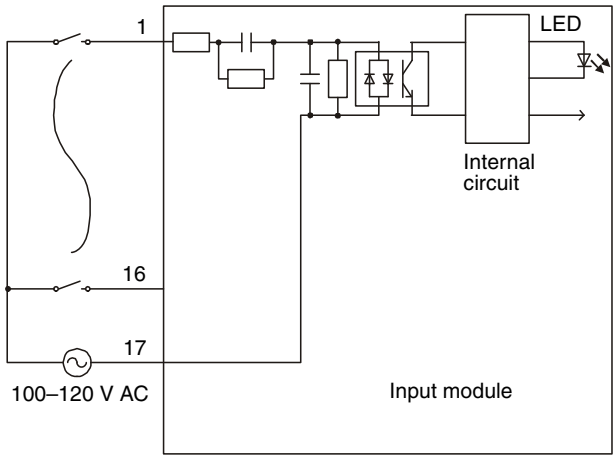


Fig.12-1:
QX10 Derating chart

12.3.2 Digital input module QX10-TS

Item		QX10-TS
Number of input points		16
Isolation method		Photocoupler
Rated input voltage		110–120 V AC (+10/–15 %), 50/60 Hz (± 3 Hz), distortion within 5 %
Rated input current		approx. 7 mA (at 100 V AC, 50 Hz); approx. 8 mA (at 100 V AC, 60 Hz)
Max. simultaneously ON		Refer to the derating chart
Inrush current		max. 200 mA within 1 ms (at 132V AC)
ON voltage/ON current		≥ 80 V AC / ≥ 5 mA (50 Hz / 60 Hz)
OFF voltage/OFF current		≤ 30 V AC / ≤ 1 mA (50 Hz / 60 Hz)
Input impedance		approx. 15 kΩ at 50 Hz, approx. 12 kΩ at 60 Hz
Response time	OFF → ON	≤ 15 ms (100 V AC, 50 Hz / 60 Hz)
	ON → OFF	≤ 20 ms (100 V AC, 50 Hz / 60 Hz)
Groups of input		1; 16 points/common (common terminal: 17)
Input status display		One LED per input
Dielectric withstand voltage		1780 V AC rms/3 cycles (altitude 2000 m)
External connections		Removable terminal block with spring terminals
Applicable wire size		Core cable 0.3 to 2.0 mm^2, (outside diameter: 1.45 mm max.)
Internal current consumption (5 V DC)		50 mA (all input points ON)
Weight		0.17 kg

External connections	Terminal block number	Signal
	1	X00
	2	X01
	3	X02
	4	X03
	5	X04
	6	X05
	7	X06
	8	X07
	9	X08
	10	X09
	11	X0A
	12	X0B
	13	X0C
	14	X0D
	15	X0E
	16	X0F
	17	COM
	18	Vacant

Tab. 12-9: *Input module QX10-TS*

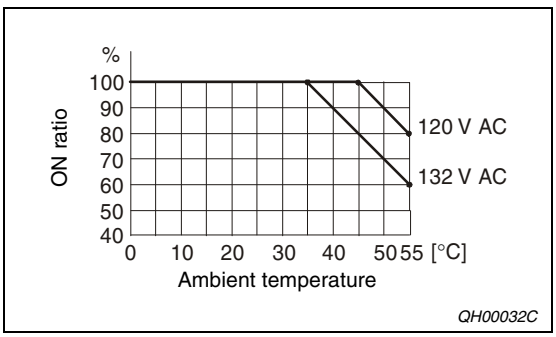
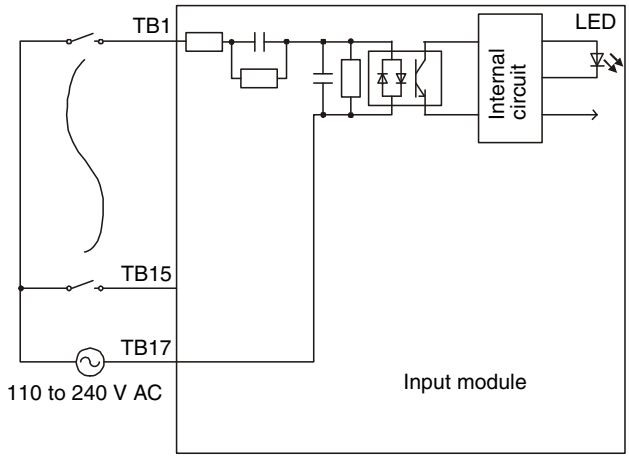


Fig.12-2:
QX10-TS Derating chart

12.3.3 Digital input module QX28

Item		QX28
Number of input points		8
Isolation method		Photocoupler
Rated input voltage		110–240 V AC (+10/–15 %), 50/60 Hz (± 3 Hz), distortion within 5 %
Rated input current		approx. 7 mA (at 100 V AC, 50 Hz); approx. 8 mA (at 100 V AC, 60 Hz) approx. 14 mA (at 200 V AC, 50 Hz); approx. 17 mA (at 200 V AC, 60 Hz
Max. simultaneously ON		refer to the derating chart
Inrush current		max. 500 A within 1 ms (at 264 V AC)
ON voltage/ON current		≥ 80 V AC / ≥ 5 mA (50 Hz / 60 Hz)
OFF voltage/OFF current		≤ 30 V AC / ≤ 1 mA (50 Hz / 60 Hz)
Input impedance		approx. 15 kΩ at 50 Hz, approx. 12 kΩ at 60 Hz
Response time	OFF → ON	≤ 10 ms (100 V AC, 50 Hz / 60 Hz)
	ON → OFF	≤ 20 ms (100 V AC, 50 Hz / 60 Hz)
Groups of input		1; 8 points/common (common terminal: TB17)
Input status display		One LED per input
Dielectric withstand voltage		1780 V AC rms/3 cycles (altitude 2000 m)
External connections		18-point removable terminal block with screws (M3x6 screws)
Applicable wire size		0.3 to 0.75 mm² core (outside diameter: 2.8 mm max.)
Internal current consumption (5 V DC)		50 mA (all input points ON)
Weight		0.2 kg

External connections	Terminal block number	Signal
	TB1	X00
	TB2	Vacant
	TB3	X01
	TB4	Vacant
	TB5	X02
	TB6	Vacant
	TB7	X03
	TB8	Vacant
	TB9	X04
	TB10	Vacant
	TB11	X05
	TB12	Vacant
	TB13	X06
	TB14	Vacant
	TB15	X07
	TB16	Vacant
	TB17	COM
	TB18	Vacant

Tab. 12-10: *Input module QX28*

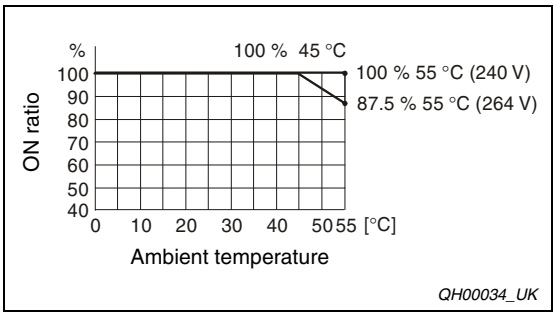
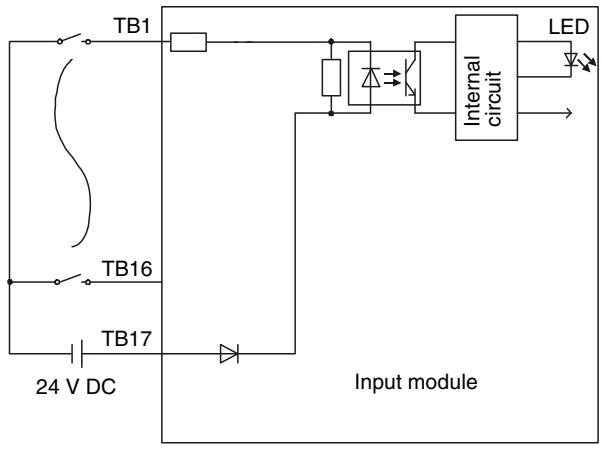


Fig.12-3:
QX28 Derating chart

12.3.4 Digital input module QX40

Item		QX40
Number of input points		16
Isolation method		Photocoupler
Rated input voltage		24 V DC (+20/–15 %, ripple ratio within 5 %)
Rated input current		approx. 4 mA
Max. simultaneously ON		All inputs can be switched on simultaneously.
Inrush current		—
ON voltage/ON current		≥ 19 V DC / ≥ 3 mA
OFF voltage/OFF current		≤ 11 V DC / ≤ 1.7 mA
Input impedance		approx. 5.6 kΩ
Response time	OFF → ON	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
	ON → OFF	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
Groups of input		1; 16 points/common (common terminal: TB17)
Input status display		One LED per input
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		18-point removable terminal block with screws (M3x6 screws)
Applicable wire size		0.3 to 0.75 mm^2 core (outside diameter: 2.8 mm max.)
Internal current consumption (5 V DC)		50 mA (all input points ON)
Weight		0.16 kg

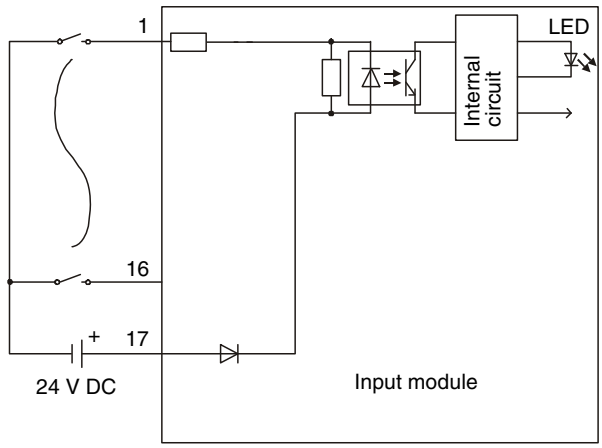
External connections	Terminal block number	Signal
	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	COM
	TB18	Vacant

Tab. 12-11: *Input module QX40*

① The response times OFF –> ON and ON –> OFF can't be set to different values.

12.3.5 Digital input module QX40-TS

Item		QX40-TS
Number of input points		16
Isolation method		Photocoupler
Rated input voltage		24 V DC (+20/–15 %, ripple ratio within 5 %)
Rated input current		approx. 4 mA
Max. simultaneously ON		All inputs can be switched on simultaneously.
Inrush current		—
ON voltage/ON current		≥ 19 V DC / ≥ 3 mA
OFF voltage/OFF current		≤ 11 V DC / ≤ 1.7 mA
Input impedance		approx. 5.6 kΩ
Response time	OFF → ON	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
	ON → OFF	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
Groups of input		1; 16 points/common (common terminal: 17)
Input status display		One LED per input
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		Removable terminal block with spring terminals
Applicable wire size		0.3 to 2.0 mm², core (outside diameter: 1.45 mm max.)
Internal current consumption (5 V DC)		50 mA (all input points ON)
Weight		0.16 kg

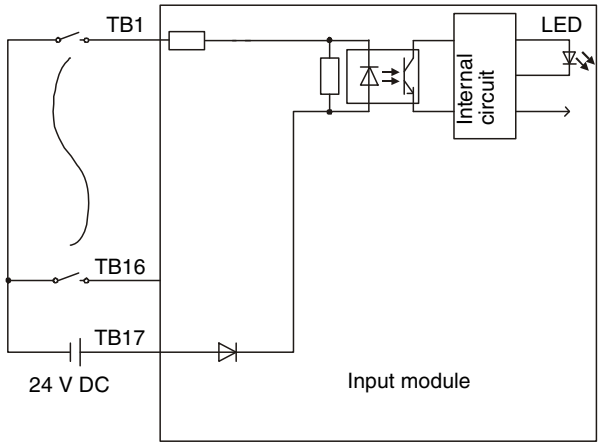
External connections	Terminal block number	Signal
	1	X00
	2	X01
	3	X02
	4	X03
	5	X04
	6	X05
	7	X06
	8	X07
	9	X08
	10	X09
	11	X0A
	12	X0B
	13	X0C
	14	X0D
	15	X0E
	16	X0F
	17	COM
	18	Vacant

Tab. 12-12: *Input module QX40-TS*

① The response times OFF –> ON and ON –> OFF can't be set to different values.

12.3.6 Digital input module QX40-S1

Item			QX40-S1				
Number of input points			16				
Isolation method			Photocoupler				
Rated input voltage			24 V DC (+20/–15 %, ripple ratio within 5 %)				
Rated input current			approx. 6 mA				
Max. simultaneously ON			All inputs can be switched on simultaneously.				
Inrush current			—				
ON voltage/ON current			≥ 19 V DC / ≥ 4 mA				
OFF voltage/OFF current			≤ 11 V DC / ≤ 1.7 mA				
Input impedance			approx. 3.9 kΩ				
Response time	Set value ①		0.1 ms	0.2 ms	0.4 ms	0.6 ms	1 ms
	OFF → ON	typ.	0.05 ms	0.15 ms	0.30 ms	0.55 ms	1.05 ms
		max.	0.10 ms	0.20 ms	0.40 ms	0.60 ms	1.20 ms
	ON → OFF	typ.	0.15 ms	0.20 ms	0.35 ms	0.60 ms	1.10 ms
		max.	0.2 ms	0.30 ms	0.50 ms	0.70 ms	1.30 ms
Groups of input			1; 16 points/common (common terminal: TB17)				
Input status display			One LED per input				
Dielectric withstand voltage			560 V AC rms/3 cycles (altitude 2000 m)				
External connections			18-point removable terminal block with screws (M3x6 screws)				
Applicable wire size			0.3 to 0.75 mm^2 core (outside diameter: 2.8 mm max.)				
Internal current consumption (5 V DC)			60 mA (all input points ON)				
Weight			0.20 kg				

External connections	Terminal block number	Signal
	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	COM
	TB18	Vacant

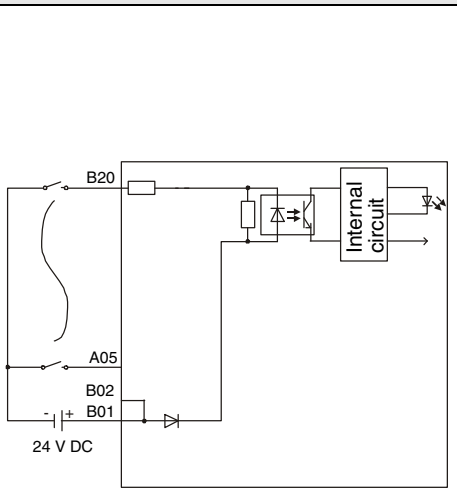
Tab. 12-13: *Input module QX40-S1*

① Response time setting by parameters. Initial setting: 0.2 ms

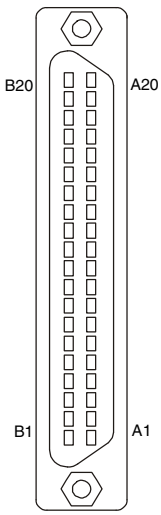
12.3.7 Digital input module QX41

Item		QX41
Number of input points		32
Isolation method		Photocoupler
Rated input voltage		24 V DC (+20/–15 %, ripple ratio within 5 %)
Rated input current		approx. 4 mA
Max. simultaneously ON		refer to the derating chart
Inrush current		—
ON voltage/ON current		≥ 19 V DC / ≥ 3 mA
OFF voltage/OFF current		≤ 11 V DC / ≤ 1.7 mA
Input impedance		approx. 5.6 kΩ
Response time	OFF → ON	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
	ON → OFF	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
Groups of input		1; 32 points/common (common terminal: B01, B02)
Input status display		One LED per input
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		40-pin connector
Applicable wire size		0.3 mm²
Accessories		External wiring connector
Internal current consumption (5 V DC)		75 mA (all input points ON)
Weight		0.15 kg

External connections



Please note, that the connector is no D-sub type.



Pin-Outs
(Module front view)

Pin	Signal	Pin	Signal
B20	X00	A20	X10
B19	X01	A19	X11
B18	X02	A18	X12
B17	X03	A17	X13
B16	X04	A16	X14
B15	X05	A15	X15
B14	X06	A14	X16
B13	X07	A13	X17
B12	X08	A12	X18
B11	X09	A11	X19
B10	X0A	A10	X1A
B09	X0B	A09	X1B
B08	X0C	A08	X1C
B07	X0D	A07	X1D
B06	X0E	A06	X1E
B05	X0F	A05	X1F
B04	Vacant	A04	Vacant
B03	Vacant	A03	Vacant
B02	COM	A02	Vacant
B01	COM	A01	Vacant

Tab. 12-14: *Input module QX41*

① The response times OFF –> ON and ON –> OFF can't be set to different values.

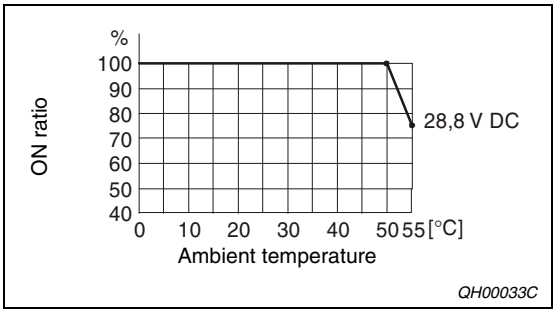
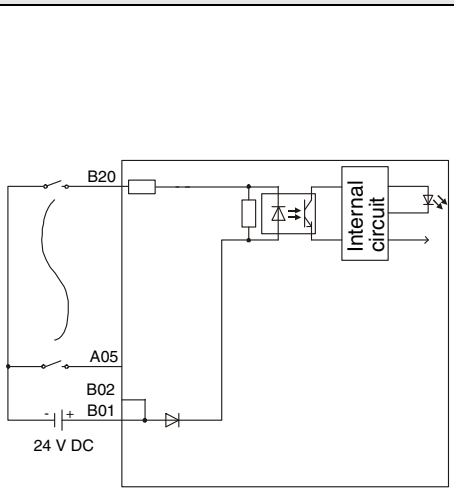


Fig.12-4:
QX41 Derating chart

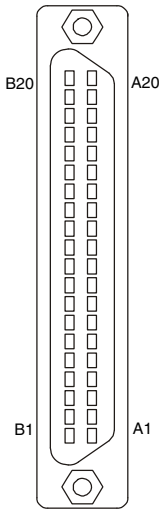
12.3.8 Digital input module QX41-S1

Item			QX41-S1				
Number of input points			32				
Isolation method			Photocoupler				
Rated input voltage			24 V DC (+20/-15 %, ripple ratio within 5 %)				
Rated input current			approx. 4 mA				
Max. simultaneously ON			refer to the derating chart				
Inrush current			—				
ON voltage/ON current			≥ 19 V DC / ≥ 3 mA				
OFF voltage/OFF current			≤ 11 V DC / ≤ 1.7 mA				
Input impedance			approx. 5.6 kΩ				
Response time	Set value ①		0.1 ms	0.2 ms	0.4 ms	0.6 ms	1.0 ms
	OFF → ON	typ.	0.05 ms	0.15 ms	0.30 ms	0.55 ms	1.05 ms
		max.	0.10 ms	0.20 ms	0.40 ms	0.60 ms	1.20 ms
	ON → OFF	typ.	0.15 ms	0.20 ms	0.35 ms	0.60 ms	1.10 ms
		max.	0.20 ms	0.30 ms	0, 50 ms	0.70 ms	1.30 ms
Groups of input			1; 32 points/common (common terminal: B01, B02)				
Input status display			One LED per input				
Dielectric withstand voltage			560 V AC rms/3 cycles (altitude 2000 m)				
External connections			40-pin connector				
Applicable wire size			0.3 mm^2				
Accessories			• Connector A6CON • Assembled cable Q40-CBL-3M/5M with 40 pin plug				
Internal current consumption (5 V DC)			75 mA (all input points ON)				
Weight			0.15 kg				

External connections



Please note, that the connector is no D-sub type.



Pin-Outs
(Module front view)

Pin	Signal	Pin	Signal
B20	X00	A20	X10
B19	X01	A19	X11
B18	X02	A18	X12
B17	X03	A17	X13
B16	X04	A16	X14
B15	X05	A15	X15
B14	X06	A14	X16
B13	X07	A13	X17
B12	X08	A12	X18
B11	X09	A11	X19
B10	X0A	A10	X1A
B09	X0B	A09	X1B
B08	X0C	A08	X1C
B07	X0D	A07	X1D
B06	X0E	A06	X1E
B05	X0F	A05	X1F
B04	Vacant	A04	Vacant
B03	Vacant	A03	Vacant
B02	COM	A02	Vacant
B01	COM	A01	Vacant

Tab. 12-15: *Input module QX41-S1*

① Response time setting by parameters. Initial setting: 0.2 ms

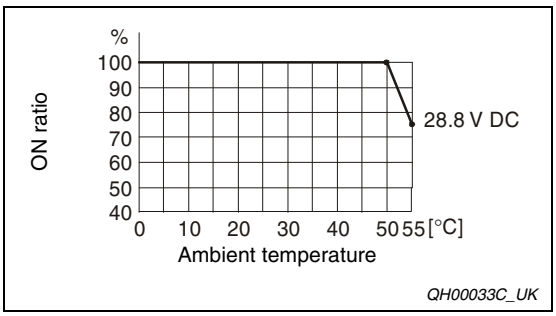
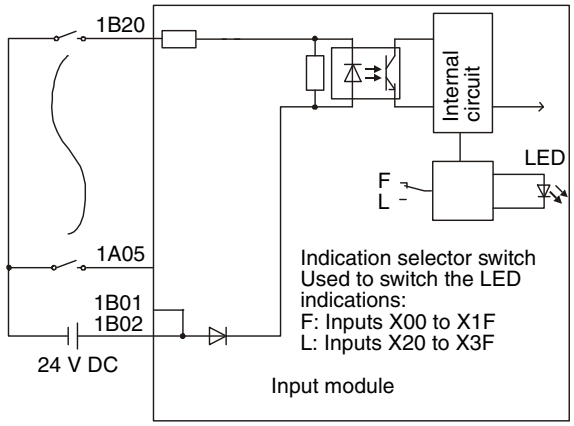


Fig.12-5:
QX41-S1 Derating chart

12.3.9 Digital input module QX42

Item		QX42
Number of input points		64
Isolation method		Photocoupler
Rated input voltage		24 V DC (+20/-15 %, ripple ratio within 5 %)
Rated input current		approx. 4 mA
Max. simultaneously ON		Refer to the derating chart
Inrush current		—
ON voltage/ON current		≥ 19 V DC / ≥ 3 mA
OFF voltage/OFF current		≤ 11 V DC / ≤ 1.7 mA
Input impedance		approx. 5.6 kΩ
Response time	OFF → ON	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
	ON → OFF	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
Groups of input		2; 32 points/common (common terminal: 1B01/1B02 and 2B01/2B02)
Input status display		One LED per input of a group, Groups are switchable
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		Two 40-pin connectors
Applicable wire size		0.3 mm^2
Accessories		External wiring connector
Internal current consumption (5 V DC)		90 mA (all input points ON)
Weight		0.18 kg
External connections		



Tab. 12-16: *Input module QX42*

① The response times OFF –> ON and ON –> OFF can't be set to different values.

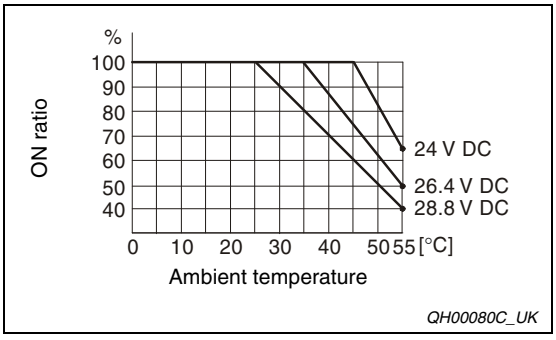
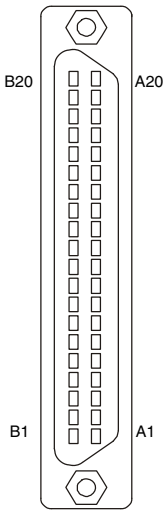


Fig.12-6:
QX42 Derating chart

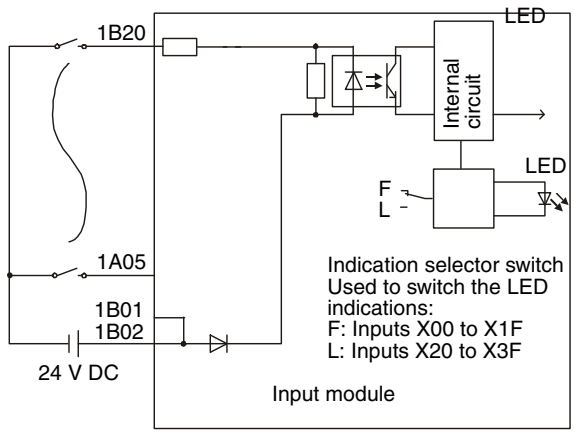
	Left-hand side connector				Right-hand side connector			
	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
 Pin-Outs (Module front view)	1B20	X00	1A20	X10	2B20	X20	2A20	X30
	1B19	X01	1A19	X11	2B19	X21	2A19	X31
	1B18	X02	1A18	X12	2B18	X22	2A18	X32
	1B17	X03	1A17	X13	2B17	X23	2A17	X33
	1B16	X04	1A16	X14	2B16	X24	2A16	X34
	1B15	X05	1A15	X15	2B15	X25	2A15	X35
	1B14	X06	1A14	X16	2B14	X26	2A14	X36
	1B13	X07	1A13	X17	2B13	X27	2A13	X37
	1B12	X08	1A12	X18	2B12	X28	2A12	X38
	1B11	X09	1A11	X19	2B11	X29	2A11	X39
	1B10	X0A	1A10	X1A	2B10	X2A	2A10	X3A
	1B09	X0B	1A09	X1B	2B09	X2B	2A09	X3B
	1B08	X0C	1A08	X1C	2B08	X2C	2A08	X3C
	1B07	X0D	1A07	X1D	2B07	X2D	2A07	X3D
	1B06	X0E	1A06	X1E	2B06	X2E	2A06	X3E
	1B05	X0F	1A05	X1F	2B05	X2F	2A05	X3F
	1B04	Vacant	1A04	Vacant	2B04	Vacant	2A04	Vacant
	1B03	Vacant	1A03	Vacant	2B03	Vacant	2A03	Vacant
	1B02	COM1	1A02	Vacant	2B02	COM2	2A02	Vacant
	1B01	COM1	1A01	Vacant	2B01	COM2	2A01	Vacant

Tab. 12-17: *Connector pin outs of the module QX42*

NOTE The connectors are no D-sub type.

12.3.10 Digital input module QX42-S1

Item			QX42				
Number of input points			64				
Isolation method			Photocoupler				
Rated input voltage			24 V DC (+20/–15 %, ripple ratio within 5 %)				
Rated input current			approx. 4 mA				
Max. simultaneously ON			Refer to the derating chart				
Inrush current			—				
ON voltage/ON current			≥ 19 V DC / ≥ 3 mA				
OFF voltage/OFF current			≤ 9.5 V DC / ≤ 1.5 mA				
Input impedance			approx. 5.6 kΩ				
Response time	Set value ①		0.1 ms	0.2 ms	0.4 ms	0.6 ms	1 ms
	OFF → ON	typ.	0.05 ms	0.15 ms	0.30 ms	0.55 ms	1.05 ms
		max.	0.10 ms	0.20 ms	0.40 ms	0.60 ms	1.20 ms
	ON → OFF	typ.	0.15 ms	0.20 ms	0.35 ms	0.60 ms	1.10 ms
		max.	0.2 ms	0.30 ms	0.50 ms	0.70 ms	1.30 ms
Groups of input			2; 32 points/common (common terminal: 1B01/1B02 and 2B01/2B02)				
Input status display			One LED per input of a group, Groups are switchable				
Dielectric withstand voltage			560 V AC rms/3 cycles (altitude 2000 m)				
External connections			Two 40-pin connectors				
Applicable wire size			0.3 mm^2				
Accessories			• Connector A6CON • Assembled cable Q40-CBL-3M/5M with 40 pin plug				
Internal current consumption (5 V DC)			90 mA (all input points ON)				
Weight			0.18 kg				
External connections							



Tab. 12-18: *Input module QX42-S1*

① Response time setting by parameters. Initial setting: 0.2 ms

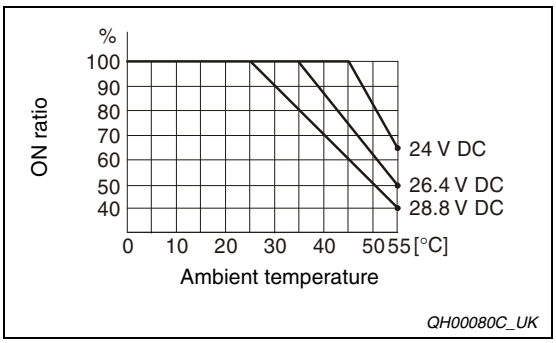
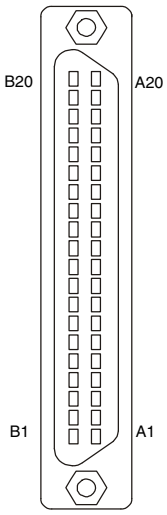


Fig.12-7:
QX42-S1 Derating chart

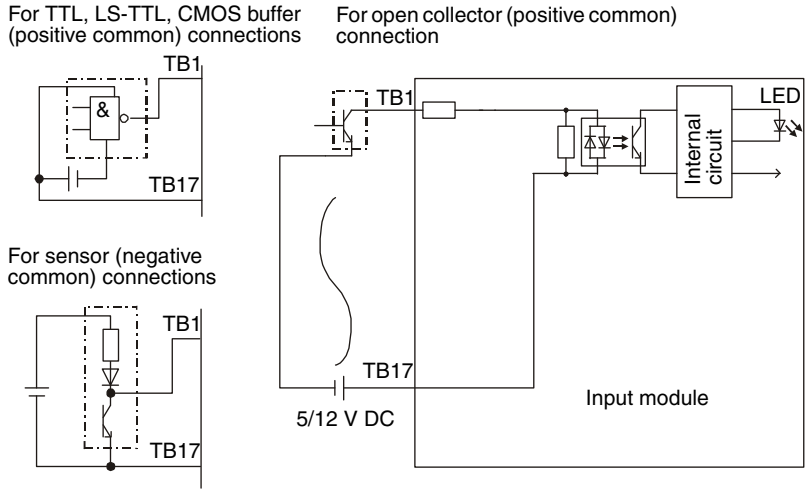
	Left-hand side connector				Right-hand side connector			
	Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
 Pin-Outs (Module front view)	1B20	X00	1A20	X10	2B20	X20	2A20	X30
	1B19	X01	1A19	X11	2B19	X21	2A19	X31
	1B18	X02	1A18	X12	2B18	X22	2A18	X32
	1B17	X03	1A17	X13	2B17	X23	2A17	X33
	1B16	X04	1A16	X14	2B16	X24	2A16	X34
	1B15	X05	1A15	X15	2B15	X25	2A15	X35
	1B14	X06	1A14	X16	2B14	X26	2A14	X36
	1B13	X07	1A13	X17	2B13	X27	2A13	X37
	1B12	X08	1A12	X18	2B12	X28	2A12	X38
	1B11	X09	1A11	X19	2B11	X29	2A11	X39
	1B10	X0A	1A10	X1A	2B10	X2A	2A10	X3A
	1B09	X0B	1A09	X1B	2B09	X2B	2A09	X3B
	1B08	X0C	1A08	X1C	2B08	X2C	2A08	X3C
	1B07	X0D	1A07	X1D	2B07	X2D	2A07	X3D
	1B06	X0E	1A06	X1E	2B06	X2E	2A06	X3E
	1B05	X0F	1A05	X1F	2B05	X2F	2A05	X3F
	1B04	Vacant	1A04	Vacant	2B04	Vacant	2A04	Vacant
	1B03	Vacant	1A03	Vacant	2B03	Vacant	2A03	Vacant
	1B02	COM1	1A02	Vacant	2B02	COM2	2A02	Vacant
	1B01	COM1	1A01	Vacant	2B01	COM2	2A01	Vacant

Tab. 12-19: *Connector pin outs of the module QX42-S1*

NOTE The connectors are no D-sub type.

12.3.11 Digital input module QX70

Item		QX70
Number of input points		16
Isolation method		Photocoupler
Rated input voltage		5 V and 12 V DC (+20/–15 %, ripple ratio within 5 %)
Rated input current		at 5 V DC: approx. 1.2 mA at 12 V DC: approx. 3.3 mA
Max. simultaneously ON		All inputs can be switched on simultaneously.
Inrush current		—
ON voltage/ON current		≥ 3.5 V DC / ≥ 1 mA
OFF voltage/OFF current		≤ 1 V DC / ≤ 0.1 mA
Input impedance		approx. 3.3 kΩ
Response time	OFF → ON	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
	ON → OFF	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
Groups of input		1; 16 points/common (common terminal: TB17)
Input status display		One LED per input
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		18-point removable terminal block with screws (M3x6 screws)
Applicable wire size		Core cable: 0.3 to 0.75 mm^2 , (outside diameter: 2.8 mm max.)
Internal current consumption (5 V DC)		55 mA (all input points ON)
Weight		0.14 kg

External connections	Terminal block number	Signal
	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	COM
	TB18	Vacant

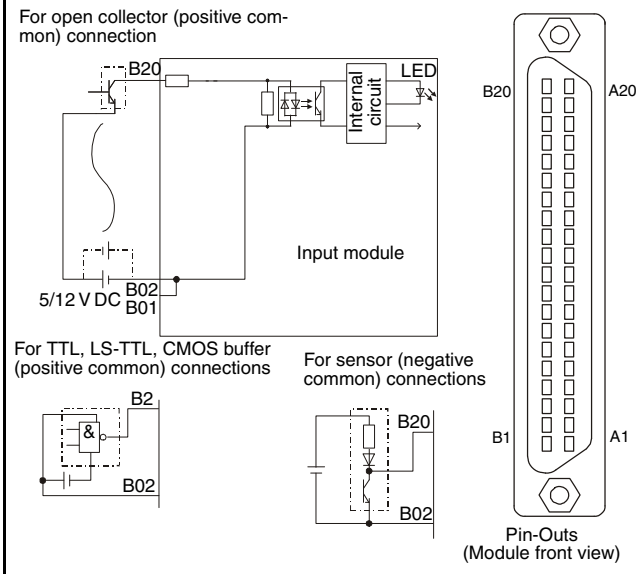
Tab. 12-20: *Input module QX70*

① The response times OFF –> ON and ON –> OFF can't be set to different values.

12.3.12 Digital input module QX71

Item		QX71
Number of input points		32
Isolation method		Photocoupler
Rated input voltage		5 V and 12 V DC (+20/–15 %, ripple ratio within 5 %)
Rated input current		at 5 V DC: approx. 1.2 mA at 12 V DC: approx. 3.3 mA
Max. simultaneously ON		All inputs can be switched on simultaneously.
Inrush current		—
ON voltage/ON current		≥ 3.5 V DC / ≥ 1 mA
OFF voltage/OFF current		≤ 1 V DC / ≤ 0.1 mA
Input impedance		approx. 3.3 kΩ
Response time	OFF → ON	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
	ON → OFF	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
Groups of input		1; 32 points/common (common terminal: B01 and B02)
Input status display		One LED per input
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		40-pin connector
Applicable wire size		0.3 mm^2
Accessories		External wiring connector
Internal current consumption (5 V DC)		70 mA (all input points ON)
Weight		0.12 kg

External connections



Pin	Signal	Pin	Signal
B20	X00	A20	X10
B19	X01	A19	X11
B18	X02	A18	X12
B17	X03	A17	X13
B16	X04	A16	X14
B15	X05	A15	X15
B14	X06	A14	X16
B13	X07	A13	X17
B12	X08	A12	X18
B11	X09	A11	X19
B10	X0A	A10	X1A
B09	X0B	A09	X1B
B08	X0C	A08	X1C
B07	X0D	A07	X1D
B06	X0E	A06	X1E
B05	X0F	A05	X1F
B04	Vacant	A04	Vacant
B03	Vacant	A03	Vacant
B02	COM	A02	Vacant
B01	COM	A01	Vacant

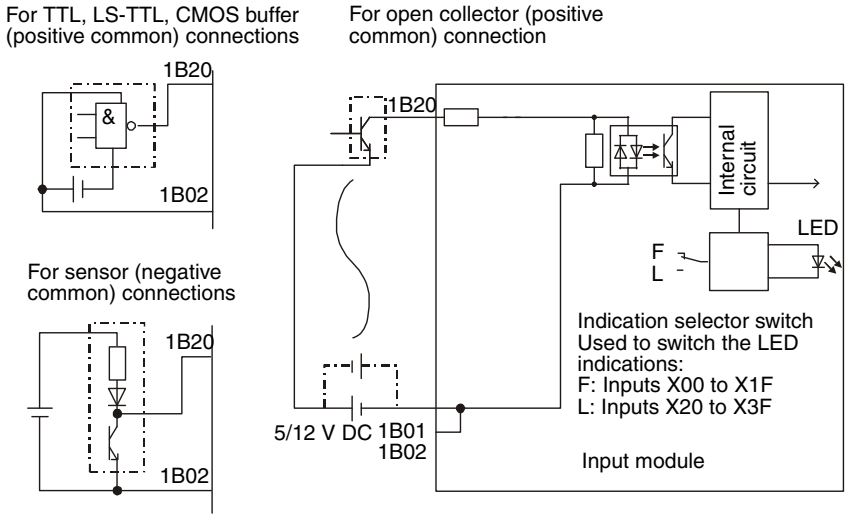
Tab. 12-21: *Input module QX71*

① The response times OFF –> ON and ON –> OFF can't be set to different values.

NOTE The connector is no D-sub type.

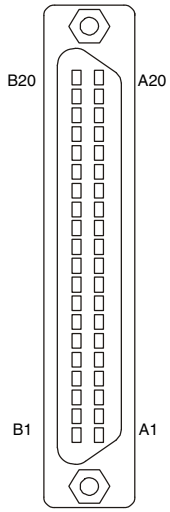
12.3.13 Digital input module QX72

Item		QX72
Number of input points		64
Isolation method		Photocoupler
Rated input voltage		5 V and 12 V DC (+20/–15 %, ripple ratio within 5 %)
Rated input current		at 5 V DC: approx. 1.2 mA at 12 V DC: approx. 3.3 mA
Max. simultaneously ON		All inputs can be switched on simultaneously.
Inrush current		—
ON voltage/ON current		≥ 3.5 V DC / ≥ 3 mA
OFF voltage/OFF current		≤ 1 V DC / ≤ 0.1 mA
Input impedance		approx. 3.3 kΩ
Response time	OFF → ON	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
	ON → OFF	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
Groups of input		2; 32 points/common (common terminal: 1B01/1B02 and 2B01/2B02)
Input status display		One LED per input of a group, Groups are switchable
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		Two 40-pin connectors
Applicable wire size		0.3 mm^2
Accessories		External wiring connector
Internal current consumption (5 V DC)		85 mA (all input points ON)
Weight		0.13 kg
External connections		



Tab. 12-22: *Input module QX72*

① The response times OFF –> ON and ON –> OFF can't be set to different values.

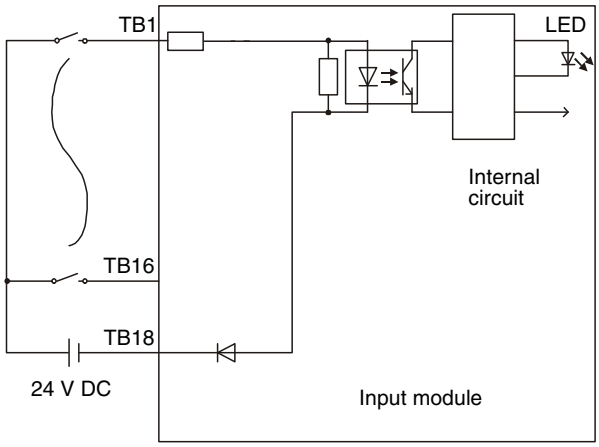
	Left-hand side connector				Right-hand side connector			
	Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
 Pin-Outs (Module front view)	1B20	X00	1A20	X10	2B20	X20	2A20	X30
	1B19	X01	1A19	X11	2B19	X21	2A19	X31
	1B18	X02	1A18	X12	2B18	X22	2A18	X32
	1B17	X03	1A17	X13	2B17	X23	2A17	X33
	1B16	X04	1A16	X14	2B16	X24	2A16	X34
	1B15	X05	1A15	X15	2B15	X25	2A15	X35
	1B14	X06	1A14	X16	2B14	X26	2A14	X36
	1B13	X07	1A13	X17	2B13	X27	2A13	X37
	1B12	X08	1A12	X18	2B12	X28	2A12	X38
	1B11	X09	1A11	X19	2B11	X29	2A11	X39
	1B10	X0A	1A10	X1A	2B10	X2A	2A10	X3A
	1B09	X0B	1A09	X1B	2B09	X2B	2A09	X3B
	1B08	X0C	1A08	X1C	2B08	X2C	2A08	X3C
	1B07	X0D	1A07	X1D	2B07	X2D	2A07	X3D
	1B06	X0E	1A06	X1E	2B06	X2E	2A06	X3E
	1B05	X0F	1A05	X1F	2B05	X2F	2A05	X3F
	1B04	Vacant	1A04	Vacant	2B04	Vacant	2A04	Vacant
	1B03	Vacant	1A03	Vacant	2B03	Vacant	2A03	Vacant
	1B02	COM1	1A02	Vacant	2B02	COM2	2A02	Vacant
	1B01	COM1	1A01	Vacant	2B01	COM2	2A01	Vacant

Tab. 12-23: *Connector pin outs of the module QX72*

NOTE The connectors are no D-sub type.

12.3.14 Digital input module QX80

Item		QX80
Number of input points		16
Isolation method		Photocoupler
Rated input voltage		24 V DC (+20/–15 %, ripple ratio within 5 %)
Rated input current		approx. 4 mA
Max. simultaneously ON		All inputs can be switched on simultaneously.
Inrush current		—
ON voltage/ON current		≥ 19 V DC / ≥ 3 mA
OFF voltage/OFF current		≤ 11 V DC / ≤ 1.7 mA
Input impedance		approx. 5.6 KΩ
Response time	OFF → ON	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
	ON → OFF	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
Groups of input		1; 16 points/common (common terminal: TB18)
Input status display		One LED per input
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		18-point removable terminal block with screws (M3x6 screws)
Applicable wire size		Core cable: 0.3 to 0.75 mm^2 , (outside diameter: 2.8 mm max.)
Internal current consumption (5 V DC)		55 mA (all input points ON)
Weight		0.16 kg

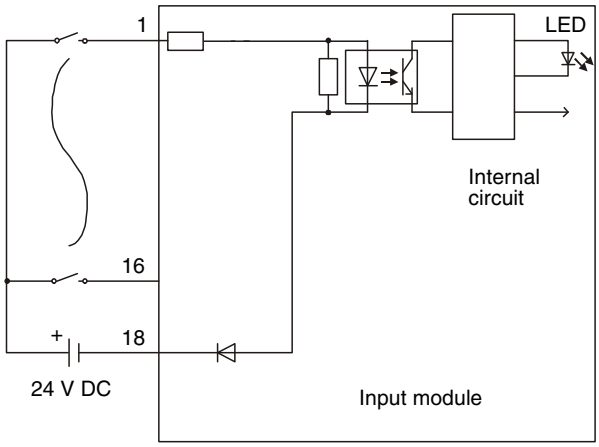
External connections	Terminal block number	Signal
	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	Vacant
	TB18	COM

Tab. 12-24: *Input module QX80*

① The response times OFF –> ON and ON –> OFF can't be set to different values.

12.3.15 Digital input module QX80-TS

Item		QX80-TS
Number of input points		16
Isolation method		Photocoupler
Rated input voltage		24 V DC (+20/–15 %, ripple ratio within 5 %)
Rated input current		approx. 4 mA
Max. simultaneously ON		All inputs can be switched on simultaneously.
Inrush current		—
ON voltage/ON current		≥ 19 V DC / ≥ 3 mA
OFF voltage/OFF current		≤ 11 V DC / ≤ 1.7 mA
Input impedance		approx. 5.6 KΩ
Response time	OFF → ON	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
	ON → OFF	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
Groups of input		1; 16 points/common (common terminal: 18)
Input status display		One LED per input
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		Removable terminal block with spring terminals
Applicable wire size		Core cable: 0.3 to 2.0 mm² (outside diameter: 1.45 mm max.)
Internal current consumption (5 V DC)		55 mA (all input points ON)
Weight		0.16 kg

External connections	Terminal block number	Signal
	1	X00
	2	X01
	3	X02
	4	X03
	5	X04
	6	X05
	7	X06
	8	X07
	9	X08
	10	X09
	11	X0A
	12	X0B
	13	X0C
	14	X0D
	15	X0E
	16	X0F
	17	Vacant
	18	COM

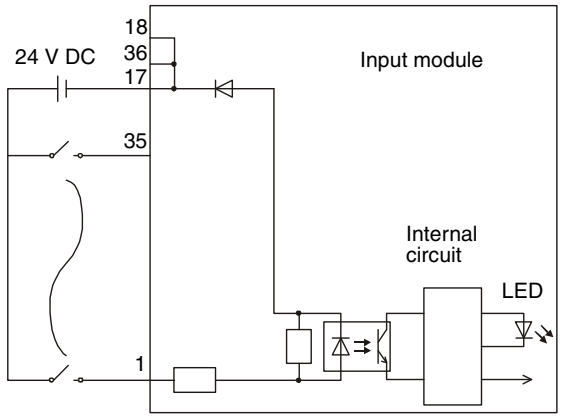
Tab. 12-25: *Input module QX80-TS*

① The response times OFF –> ON and ON –> OFF can't be set to different values.

12.3.16 Digital input module QX81

Item		QX81
Number of input points		32
Isolation method		Photocoupler
Rated input voltage		24 V DC (+20/–15 %, ripple ratio within 5 %)
Rated input current		approx. 4 mA
Max. simultaneously ON		refer to the derating chart
Inrush current		—
ON voltage/ON current		≥ 19 V DC / ≥ 3 mA
OFF voltage/OFF current		≤ 11 V DC / ≤ 1.7 mA
Input impedance		approx. 5.6 KΩ
Response time	OFF → ON	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
	ON → OFF	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
Groups of input		1; 32 points/common (common terminal: 17, 18, 36)
Input status display		One LED per input
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		37-pin D-sub connector
Applicable wire size		0.3 mm^2
Accessories		External wiring connector
Internal current consumption (5 V DC)		75 mA (all input points ON)
Weight		0.16 kg

External connections



Pin	Signal	Pin	Signal
1	X00	9	X10
20	X01	28	X11
2	X02	10	X12
21	X03	29	X13
3	X04	11	X14
22	X05	30	X15
4	X06	12	X16
23	X07	31	X17
5	X08	13	X18
24	X09	32	X19
6	X0A	14	X1A
25	X0B	33	X1B
7	X0C	15	X1C
26	X0D	34	X1D
8	X0E	16	X1E
27	X0F	35	X1F
17	COM	37	Vacant
36	COM	19	Vacant
18	COM		

Tab. 12-26: *Input module QX81*

① The response times OFF –> ON and ON –> OFF can't be set to different values.

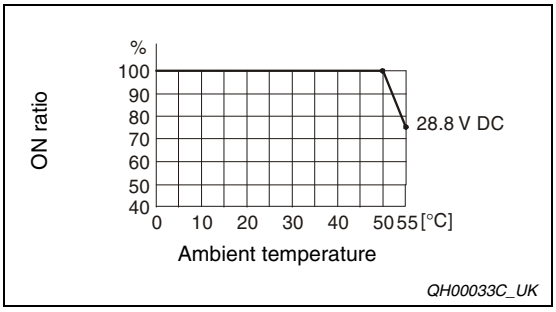
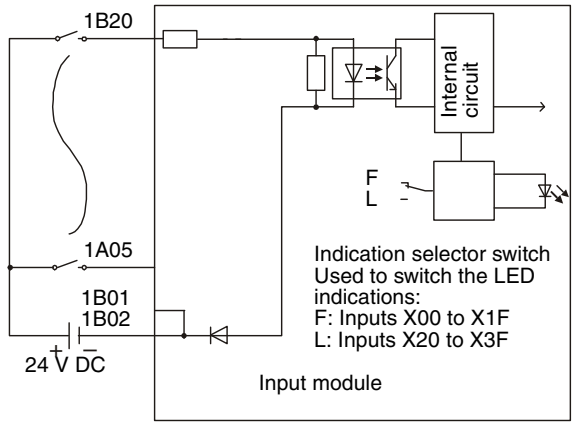


Fig.12-8:
QX81 Derating chart

12.3.17 Digital input module QX82

Item		QX82
Number of input points		64
Isolation method		Photocoupler
Rated input voltage		24 V DC (+20/–15 %, ripple ratio within 5 %)
Rated input current		approx. 4 mA
Max. simultaneously ON		Refer to the derating chart
Inrush current		—
ON voltage/ON current		≥ 19 V DC / ≥ 3 mA
OFF voltage/OFF current		≤ 11 V DC / ≤ 1.7 mA
Input impedance		approx. 5.6 kΩ
Response time	OFF → ON	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
	ON → OFF	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
Groups of input		2; 32 points/common (common terminal: 1B01/1B02 and 2B01/2B02)
Input status display		One LED per input of a group, Groups are switchable
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		Two 40-pin connectors
Applicable wire size		0.3 mm^2
Accessories		• Connector A6CON • Assembled cable Q40-CBL-3M/5M with 40 pin plug
Internal current consumption (5 V DC)		90 mA (all input points ON)
Weight		0.18 kg
External connections		



Tab. 12-27: *Input module QX82*

① The response times OFF –> ON and ON –> OFF can't be set to different values.

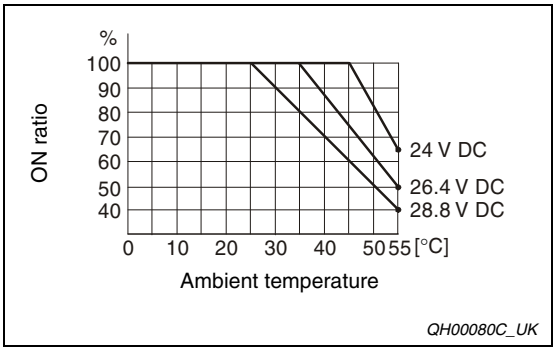
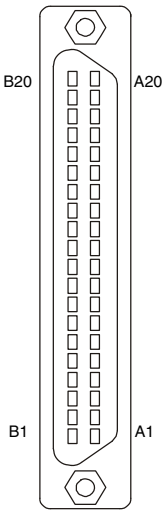


Fig.12-9:
QX82 Derating chart

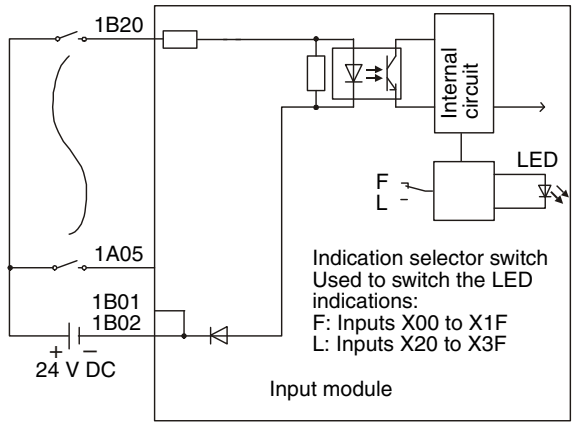
	Left-hand side connector				Right-hand side connector			
	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
 Pin-Outs (Module front view)	1B20	X00	1A20	X10	2B20	X20	2A20	X30
	1B19	X01	1A19	X11	2B19	X21	2A19	X31
	1B18	X02	1A18	X12	2B18	X22	2A18	X32
	1B17	X03	1A17	X13	2B17	X23	2A17	X33
	1B16	X04	1A16	X14	2B16	X24	2A16	X34
	1B15	X05	1A15	X15	2B15	X25	2A15	X35
	1B14	X06	1A14	X16	2B14	X26	2A14	X36
	1B13	X07	1A13	X17	2B13	X27	2A13	X37
	1B12	X08	1A12	X18	2B12	X28	2A12	X38
	1B11	X09	1A11	X19	2B11	X29	2A11	X39
	1B10	X0A	1A10	X1A	2B10	X2A	2A10	X3A
	1B09	X0B	1A09	X1B	2B09	X2B	2A09	X3B
	1B08	X0C	1A08	X1C	2B08	X2C	2A08	X3C
	1B07	X0D	1A07	X1D	2B07	X2D	2A07	X3D
	1B06	X0E	1A06	X1E	2B06	X2E	2A06	X3E
	1B05	X0F	1A05	X1F	2B05	X2F	2A05	X3F
	1B04	Vacant	1A04	Vacant	2B04	Vacant	2A04	Vacant
	1B03	Vacant	1A03	Vacant	2B03	Vacant	2A03	Vacant
	1B02	COM1	1A02	Vacant	2B02	COM2	2A02	Vacant
	1B01	COM1	1A01	Vacant	2B01	COM2	2A01	Vacant

Tab. 12-28: *Connector pin outs of the module QX82*

NOTE The connectors are no D-sub type.

12.3.18 Digital input module QX82-S1

Item		QX82-S1				
Number of input points		64				
Isolation method		Photocoupler				
Rated input voltage		24 V DC (+20/–15 %, ripple ratio within 5 %)				
Rated input current		approx. 4 mA				
Max. simultaneously ON		Refer to the derating chart				
Inrush current		—				
ON voltage/ON current		≥ 19 V DC / ≥ 3 mA				
OFF voltage/OFF current		≤ 9.5 V DC / ≤ 1.5 mA				
Input impedance		approx. 5.6 kΩ				
Response time ①	Setting values ②	0.1 ms	0.2 ms	0.4 ms	0.6 ms	1 ms
Groups of input		2; 32 points/common (common terminal: 1B01/1B02 and 2B01/2B02)				
Input status display		One LED per input of a group, Groups are switchable				
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)				
External connections		Two 40-pin connectors				
Applicable wire size		0.3 mm^2				
Accessories		• Connector A6CON • Assembled cable Q40-CBL-3M/5M with 40 pin plug				
Internal current consumption (5 V DC)		90 mA (all input points ON)				
Weight		0.18 kg				
External connections						



Tab. 12-29: *Input module QX82-S1*

① Refer to the manual of this module for details of the response time.

② Response time setting by parameters. Initial setting: 0.2 ms

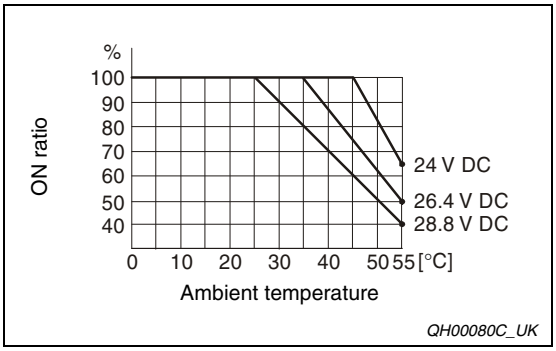
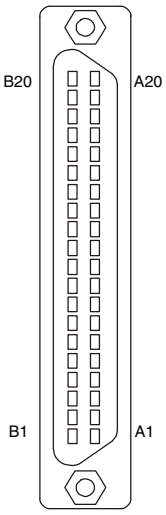


Fig.12-10:
QX82-S1 Derating chart

	Left-hand side connector				Right-hand side connector			
	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
 Pin-Outs (Module front view)	1B20	X00	1A20	X10	2B20	X20	2A20	X30
	1B19	X01	1A19	X11	2B19	X21	2A19	X31
	1B18	X02	1A18	X12	2B18	X22	2A18	X32
	1B17	X03	1A17	X13	2B17	X23	2A17	X33
	1B16	X04	1A16	X14	2B16	X24	2A16	X34
	1B15	X05	1A15	X15	2B15	X25	2A15	X35
	1B14	X06	1A14	X16	2B14	X26	2A14	X36
	1B13	X07	1A13	X17	2B13	X27	2A13	X37
	1B12	X08	1A12	X18	2B12	X28	2A12	X38
	1B11	X09	1A11	X19	2B11	X29	2A11	X39
	1B10	X0A	1A10	X1A	2B10	X2A	2A10	X3A
	1B09	X0B	1A09	X1B	2B09	X2B	2A09	X3B
	1B08	X0C	1A08	X1C	2B08	X2C	2A08	X3C
	1B07	X0D	1A07	X1D	2B07	X2D	2A07	X3D
	1B06	X0E	1A06	X1E	2B06	X2E	2A06	X3E
	1B05	X0F	1A05	X1F	2B05	X2F	2A05	X3F
	1B04	Vacant	1A04	Vacant	2B04	Vacant	2A04	Vacant
	1B03	Vacant	1A03	Vacant	2B03	Vacant	2A03	Vacant
	1B02	COM1	1A02	Vacant	2B02	COM2	2A02	Vacant
	1B01	COM1	1A01	Vacant	2B01	COM2	2A01	Vacant

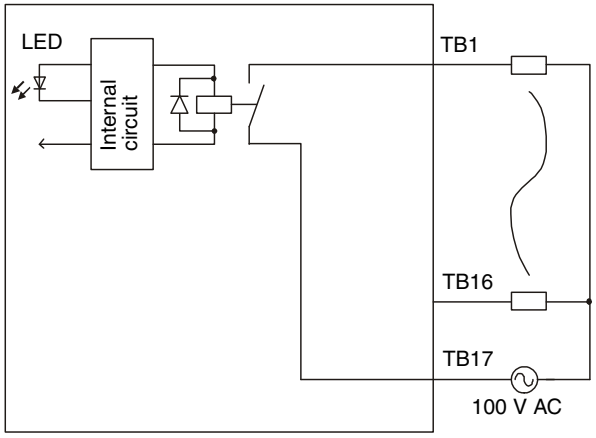
Tab. 12-30: *Connector pin outs of the module QX82-S1*

NOTE The connectors are no D-sub type.

12.3.19 Relay output module QY10

Item		QY10
Number of outputs		16
Isolation method		Relay
Rated switching voltage, current		24 V DC, 2 A (resistive load) per output, 220 V AC, 2 A (cos φ = 1) per output 8 A/group
Minimum switching load		5 V DC, 1 mA
Maximum switching load		264 V AC, 125 V DC
Response time	OFF → ON	≤ 10 ms
	ON → OFF	≤ 12 ms
Life	Mechanical	20 million times or more
	Electrical	Rated switching voltage/current load; 100 thousand times or more
		200 V AC, 1.5 A; 240 V AC, 1 A (cos φ = 0.7) 100 thousand times or more 200 V AC, 0.4 A; 240 V AC, 0.3 A (cos φ = 0.7) 300 thousand times or more
		200 V AC, 1 A; 240 V AC, 0.5 A (cos φ = 0.35) 100 thousand times or more 200 V AC, 0.3 A; 240 V AC, 0.15 A (cos φ = 0.35) 300 thousand times or more
		24 V DC, 1 A; 100 V DC, 0.1 A (L/R = 7 ms) 100 thousand times or more 24 V DC, 0.3 A; 100 V DC, 0.03 A (L/R = 7 ms) 300 thousand times or more
Maximum switching frequency		3600 times/hour
Surge suppressor		—
Fuse		—
Groups of outputs		1; 16 points/common (common terminal: TB17)
Output status display		One LED per output
Dielectric withstand voltage		2830 V AC rms/3 cycles (altitude 2000 m)
External connections		18-point removable terminal block with screws (M3x6)
Applicable wire size		Core cable: 0.3 to 0.75 mm^2 , (outside diameter: 2.8 mm max.)
Internal current consumption (5 V DC)		430 mA (all output points ON)
Weight		0.22 kg

Tab. 12-31: *Relay output module QY10*

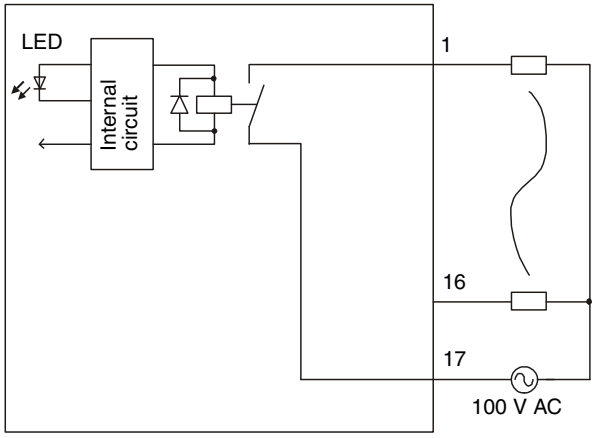
External connections	Terminal block number	Signal
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	COM
	TB18	NC

Tab. 12-32: *Relay output module QY10 connections*

12.3.20 Relay output module QY10-TS

Item		QY10-TS
Number of outputs		16
Isolation method		Relay
Rated switching voltage, current		24 V DC, 2 A (resistive load) per output, 220 V AC, 2 A (cos φ = 1) per output 8 A/group
Minimum switching load		5 V DC, 1 mA
Maximum switching load		264 V AC, 125 V DC
Response time	OFF → ON	≤ 10 ms
	ON → OFF	≤ 12 ms
Life	Mechanical	20 million times or more
	Electrical	Rated switching voltage/current load; 100 thousand times or more
		200 V AC, 1.5 A; 240 V AC, 1 A (cos φ = 0.7) 100 thousand times or more 200 V AC, 0.4 A; 240 V AC, 0.3 A (cos φ = 0.7) 300 thousand times or more
		200 V AC, 1 A; 240 V AC, 0.5 A (cos φ = 0.35) 100 thousand times or more 200 V AC, 0.3 A; 240 V AC, 0.15 A (cos φ = 0.35) 300 thousand times or more
		24 V DC, 1 A; 100 V DC, 0.1 A (L/R = 7 ms) 100 thousand times or more 24 V DC, 0.3 A; 100 V DC, 0.03 A (L/R = 7 ms) 300 thousand times or more
Maximum switching frequency		3600 times/hour
Surge suppressor		—
Fuse		—
Groups of outputs		1; 16 points/common, (common terminal: 17)
Output status display		One LED per output
Dielectric withstand voltage		2830 V AC rms/3 cycles (altitude 2000 m)
External connections		Removable terminal block with spring terminals
Applicable wire size		Core cable: 0.3 to 2.0 mm^2 (outside diameter: 1.45 mm max.)
Internal current consumption (5 V DC)		430 mA (all output points ON)
Weight		0.22 kg

Tab. 12-33: *Relay output module QY10-TS*

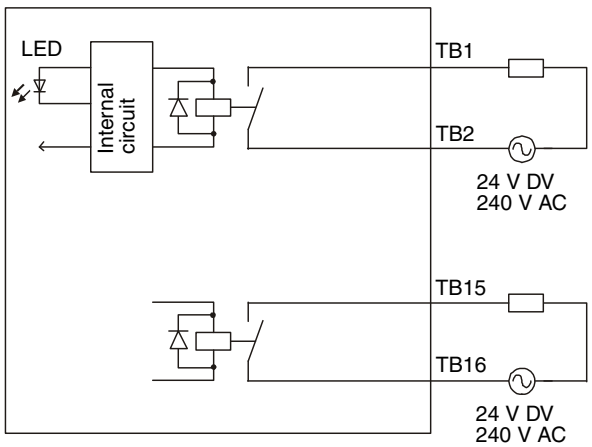
External connections	Terminal block number	Signal
	1	Y00
	2	Y01
	3	Y02
	4	Y03
	5	Y04
	6	Y05
	7	Y06
	8	Y07
	9	Y08
	10	Y09
	11	Y0A
	12	Y0B
	13	Y0C
	T4	Y0D
	15	Y0E
	16	Y0F
	17	COM
	18	NC

Tab. 12-34: *Relay output module QY10-TS connections*

12.3.21 Relay output module QY18A

Item		QY18A
Number of outputs		8
Isolation method		Relay
Rated switching voltage, current		24 V DC, 2 A (resistive load) per output, 220 V AC, 2 A (cos φ = 1) per output
Minimum switching load		5 V DC, 1 mA
Maximum switching load		264 V AC, 125 V DC
Response time	OFF → ON	≤ 10 ms
	ON → OFF	≤ 12 ms
Life	Mechanical	20 million times or more
	Electrical	Rated switching voltage/current load; 100 thousand times or more
		200 V AC, 1.5 A; 240 V AC, 1 A (cos φ = 0.7) 100 thousand times or more 200 V AC, 0.4 A; 240 V AC, 0.3 A (cos φ = 0.7) 300 thousand times or more
		200 V AC, 1 A; 240 V AC, 0.5 A (cos φ = 0.35) 100 thousand times or more 200 V AC, 0.3 A; 240 V AC, 0.15 A (cos φ = 0.35) 300 thousand times or more
		24 V DC, 1 A; 100 V DC, 0.1 A (L/R = 7 ms) 100 thousand times or more 24 V DC, 0.3 A; 100 V DC, 0.03 A (L/R = 7 ms) 300 thousand times or more
Maximum switching frequency		3600 times/hour
Surge suppressor		—
Fuse		—
Groups of outputs		8; 1 point/common (all independent)
Output status display		One LED per output
Dielectric withstand voltage		2830 V AC rms/3 cycles (altitude 2000 m)
External connections		18-point removable terminal block with screws (M3x6)
Applicable wire size		Core cable: 0.3 to 0.75 mm^2 (outside diameter: 2.8 mm max.)
Internal current consumption (5 V DC)		430 mA (all output points ON)
Weight		0.22 kg

Tab. 12-35: *Relay output module QY18A*

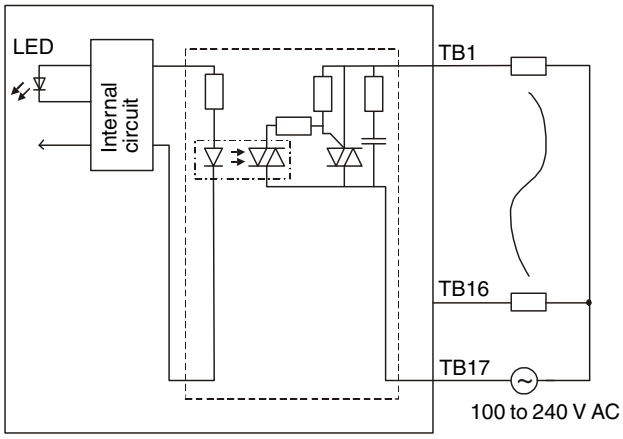
External connections	Terminal block number	Signal
	TB1	Y00
	TB2	
	TB3	Y01
	TB4	
	TB5	Y02
	TB6	
	TB7	Y03
	TB8	
	TB9	Y04
	TB10	
	TB11	Y05
	TB12	
	TB13	Y06
	TB14	
	TB15	Y07
	TB16	
	TB17	Vacant
	TB18	Vacant

Tab. 12-36: *Relay output module QY18A connections*

12.3.22 Triac output module QY22

Item		QY22
Number of outputs		16
Isolation method		Photocoupler
Rated load voltage		100–240 V AC (+20/–15 %)
Maximum load current		0.6 A per output, 4.8 A per module
Minimum switching load		24 V AC (100 mA); 100 V AC (25 mA); 240 V AC (25 mA)
Maximum inrush current		20 A
Leakage current at OFF		≤ 3 mA (120 V AC, 60 Hz), ≤ 1.5 mA (240 V AC, 60 Hz)
Maximum voltage drop at ON		1.5 V
Response time	OFF → ON	1 ms + 0.5 cycles or less (rated load, resistance load)
	ON → OFF	1 ms + 0.5 cycles or less (rated load, resistance load)
Surge suppressor		CR absorber
Fuse		—
Groups of outputs		1; 16 points/common, (common terminal: TB17)
Output status display		One LED per output
Dielectric withstand voltage		2830 V AC rms/3 cycles (altitude 2000 m)
External connections		18-point removable terminal block with screws (M3x6)
Applicable wire size		Core cable: 0.3 to 0.75 mm^2 (outside diameter: 2.8 mm max.)
Internal current consumption (5 V DC)		250 mA (all output points ON)
Weight		0.40 kg

Tab. 12-37: *Triac output module QY22*

External connections	Terminal block number	Signal
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	YDF
	TB17	COM
	TB18	Vacant

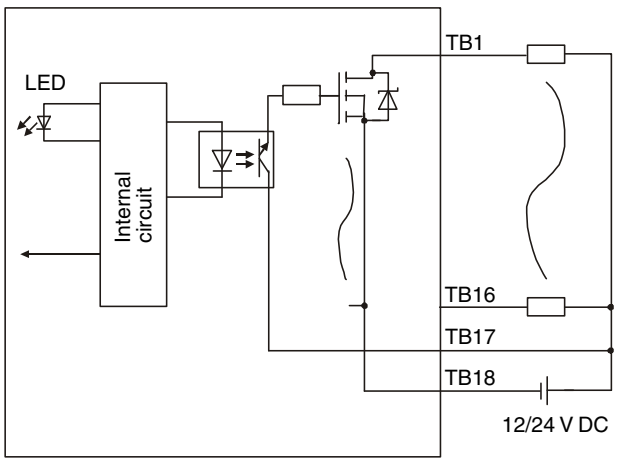
Tab. 12-38: *Triac output module QY22 connections*

12.3.23 Transistor output module QY40P

Item		QY40P ①
Number of outputs		16
Isolation method		Photocoupler
Rated load voltage		12–24 V DC (+20/–15 %)
Maximum load current		0.1 A per output, 1.6 A per module
Maximum inrush current		0.7 A, 10 ms or less
Leakage current at OFF		≤ 0.1 mA
Maximum voltage drop at ON		≤ 0.2 V at 0.1 A
Response time	OFF → ON	≤ 1 ms
	ON → OFF	≤ 1 ms (rated load, resistive load)
Surge suppressor		Zener Diode
Fuse		—
Protection function		Thermal and overload protections Thermal/overload protection is activated in units of 1 point
Groups of outputs		1; 16 points/common, (common terminal: TB18)
Output status display		One LED per output
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		18-point removable terminal block with screws (M3x6)
Applicable wire size		Core cable: 0.3 to 0.75 mm^2 (outside diameter: 2.8 mm max.)
External power supply	Voltage	12–24 V DC (+20/–15 %, ripple ratio within 5 %)
	Current	10 mA (at 24 V DC; all output points ON)
Internal current consumption (5 V DC)		65 mA (all output points ON)
Weight		0.16 kg

Tab. 12-39: *Transistor output module QY40P*

① Sink type

External connections	Terminal block number	Signal
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	12/24 V DC
	TB18	COM

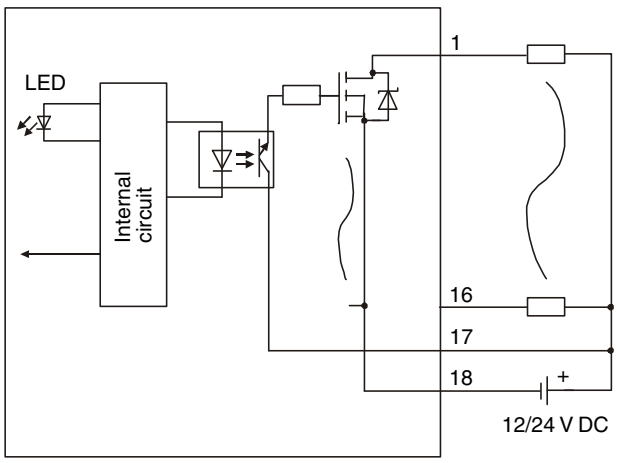
Tab. 12-40: *Transistor output module QY40P connections*

12.3.24 Transistor output module QY40P-TS

Item		QY40P-TS ①
Number of outputs		16
Isolation method		Photocoupler
Rated load voltage		12–24 V DC (+20/–15 %)
Maximum load current		0.1 A per output, 1.6 A per module
Maximum inrush current		0.7 A, 10 ms or less
Leakage current at OFF		≤ 0.1 mA
Maximum voltage drop at ON		≤ 0.2 V at 0.1 A
Response time	OFF → ON	≤ 1 ms
	ON → OFF	≤ 1 ms (rated load, resistive load)
Surge suppressor		Zener Diode
Fuse		—
Protection function		Thermal and overload protections Thermal/overload protection is activated in units of 1 point
Groups of outputs		1; 16 points/common, (common terminal: 18)
Output status display		One LED per output
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		Removable terminal block with spring terminals
Applicable wire size		Core cable: 0.3 to 2.0 mm^2 (outside diameter: 1.45 mm max.)
External power supply	Voltage	12–24 V DC (+20/–15 %, ripple ratio within 5 %)
	Current	10 mA (at 24 V DC; all output points ON)
Internal current consumption (5 V DC)		65 mA (all output points ON)
Weight		0.16 kg

Tab. 12-41: *Transistor output module QY40P-TS*

① Sink type

External connections	Terminal block number	Signal
	1	Y00
	2	Y01
	3	Y02
	4	Y03
	5	Y04
	6	Y05
	7	Y06
	8	Y07
	9	Y08
	10	Y09
	11	Y0A
	12	Y0B
	13	Y0C
	14	Y0D
	15	Y0E
	16	Y0F
	17	12/24 V DC
	18	COM

Tab. 12-42: *Transistor output module QY40P-TS connections*

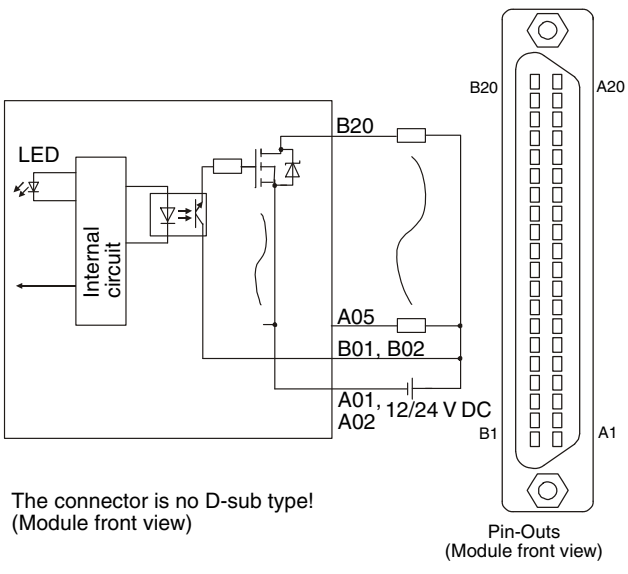
12.3.25 Transistor output module QY41P

Item		QY41P ①
Number of outputs		32
Isolation method		Photocoupler
Rated load voltage		12–24 V DC (+20/–15 %)
Maximum load current		0.1 A per output, 2 A per module
Maximum inrush current		0.7 A, 10 ms or less
Leakage current at OFF		≤ 0.1 mA
Maximum voltage drop at ON		≤ 0.2 V at 0.1 A
Response time	OFF → ON	≤ 1 ms
	ON → OFF	≤ 1 ms (rated load, resistive load)
Surge suppressor		Zener Diode
Fuse		—
Protection function		Thermal and overload protections Thermal/overload protection is activated in units of 1 point
Groups of outputs		1; 32 points/common, (common terminal: A01, A02)
Output status display		One LED per output
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		40-pin connector
Applicable wire size		0.3 mm^2
Accessories		• Connector A6CON • Assembled cable Q40-CBL-3M/5M with 40 pin plug
External power supply	Voltage	12–24 V DC (+20/–15 %, ripple ratio within 5 %)
	Current	20 mA (at 24 V DC; all output points ON)
Internal current consumption (5 V DC)		105 mA (all output points ON)
Weight		0.15 kg

Tab. 12-43: *Transistor output module QY41P*

① Sink type

External connections



Pin	Signal	Pin	Signal
B20	Y00	A20	Y10
B19	Y01	A19	Y11
B18	Y02	A18	Y12
B17	Y03	A17	Y13
B16	Y04	A16	Y14
B15	Y05	A15	Y15
B14	Y06	A14	Y16
B13	Y07	A13	Y17
B12	Y08	A12	Y18
B11	Y09	A11	Y19
B10	Y0A	A10	Y1A
B09	Y0B	A09	Y1B
B08	Y0C	A08	Y1C
B07	Y0D	A07	Y1D
B06	Y0E	A06	Y1E
B05	Y0F	A05	Y1F
B04	Vacant	A04	Vacant
B03	Vacant	A03	Vacant
B02	12/24 V DC	A02	COM
B01	12/24 V DC	A01	COM

Tab. 12-44: *Transistor output module QY41P connections*

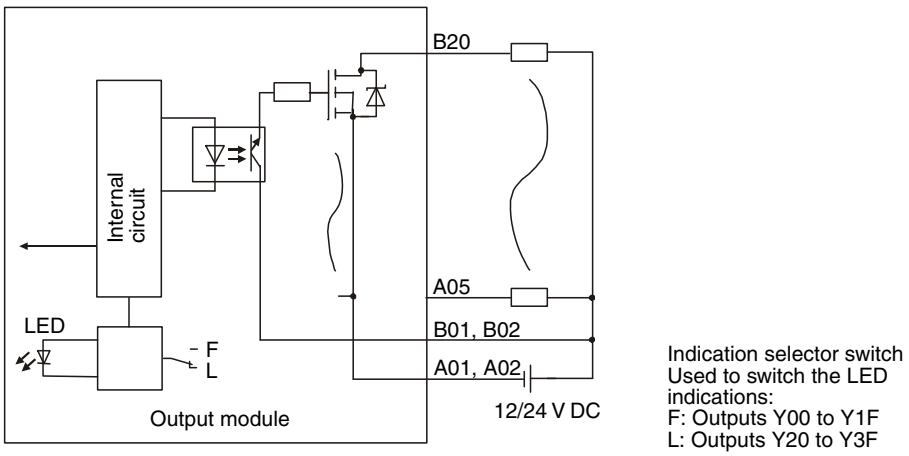
12.3.26 Transistor output module QY42P

Item		QY42P ①
Number of outputs		64
Isolation method		Photocoupler
Rated load voltage		12–24 V DC (+20/–15 %)
Maximum load current		0.1 A per output, 2 A per module
Maximum inrush current		0.7 A, 10 ms or less
Leakage current at OFF		≤ 0.1 mA
Maximum voltage drop at ON		≤ 0.2 V at 0.1 A
Response time	OFF → ON	≤ 1 ms
	ON → OFF	≤ 1 ms (rated load, resistive load)
Surge suppressor		Zener Diode
Fuse		—
Protection function		Thermal and overload protections Thermal/overload protection is activated in units of 1 point
Groups of outputs		2; 32 points/common, (common terminal: 1A01, 1A02, 2A01, 2A02)
Output status display		One LED per output/common, 32 point switch-over using switch
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		Two 40-pin connectors
Applicable wire size		0.3 mm^2
Accessories		• Connector A6CON • Assembled cable Q40-CBL-3M/5M with 40 pin plug
External power supply	Voltage	12–24 V DC (+20/–15 %, ripple ratio within 5 %)
	Current	20 mA (at 24 V DC; all output points ON)
Internal current consumption (5 V DC)		150 mA (all output points ON)
Weight		0.17 kg

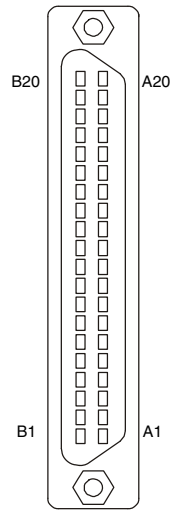
Tab. 12-45: *Transistor output module QY42P*

① Sink type

External connections



Tab. 12-46: *Transistor output module QY42P connections*

	Left-hand side connector				Right-hand side connector			
	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
 Pin-Outs (Module front view)	1B20	Y00	1A20	Y10	2B20	Y20	2A20	Y30
	1B19	Y01	1A19	Y11	2B19	Y21	2A19	Y31
	1B18	Y02	1A18	Y12	2B18	Y22	2A18	Y32
	1B17	Y03	1A17	Y13	2B17	Y23	2A17	Y33
	1B16	Y04	1A16	Y14	2B16	Y24	2A16	Y34
	1B15	Y05	1A15	Y15	2B15	Y25	2A15	Y35
	1B14	Y06	1A14	Y16	2B14	Y26	2A14	Y36
	1B13	Y07	1A13	Y17	2B13	Y27	2A13	Y37
	1B12	Y08	1A12	Y18	2B12	Y28	2A12	Y38
	1B11	Y09	1A11	Y19	2B11	Y29	2A11	Y39
	1B10	Y0A	1A10	Y1A	2B10	Y2A	2A10	Y3A
	1B09	Y0B	1A09	Y1B	2B09	Y2B	2A09	Y3B
	1B08	Y0C	1A08	Y1C	2B08	Y2C	2A08	Y3C
	1B07	Y0D	1A07	Y1D	2B07	Y2D	2A07	Y3D
	1B06	Y0E	1A06	Y1E	2B06	Y2E	2A06	Y3E
	1B05	Y0F	1A05	Y1F	2B05	Y2F	2A05	Y3F
	1B04	Vacant	1A04	Vacant	2B04	Vacant	2A04	Vacant
	1B03	Vacant	1A03	Vacant	2B03	Vacant	2A03	Vacant
	1B02	12/24V DC	1A02	COM1	2B02	12/24V DC	2A02	COM2
	1B01	12/24V DC	1A01	COM1	2B01	12/24V DC	2A01	COM2

Tab. 12-47: *Connector pin outs of the module QY42P*

NOTE The connectors are no D-sub type.

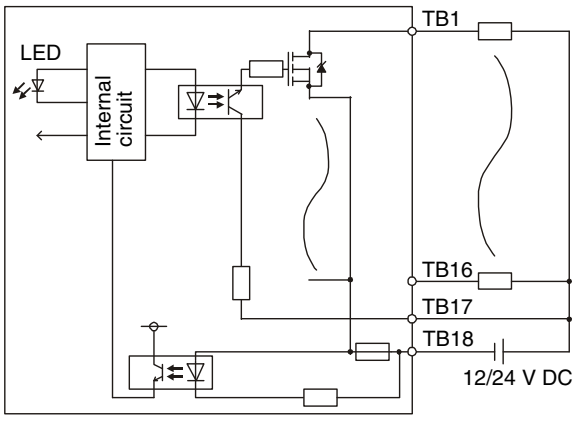
12.3.27 Transistor output module QY50

Item		QY50 ①
Number of outputs		16
Isolation method		Photocoupler
Rated load voltage		12–24 V DC (+20/–15 %)
Maximum load current		0.5 A per output, 4 A per group
Maximum inrush current		4 A, 10 ms or less
Leakage current at OFF		≤ 0.1 mA
Maximum voltage drop at ON		≤ 0.3 V at 0.5 ,
Response time	OFF → ON	≤ 1 ms
	ON → OFF	≤ 1 ms (rated load, resistive load)
Surge suppressor		Zener Diode
Fuse		Two fuses 4 A parallel (nominal fuse current = 6.7 A), unchangeable ②
Fuse blow indication		LED indicates it and signal is output to CPU
Groups of outputs		1; 16 points/common, (common terminal: TB18)
Output status display		One LED per output
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		18-point removable terminal block with screws (M3x6)
Applicable wire size		Core cable: 0.3 to 0.75 mm^2 (outside diameter: 2.8 mm max.)
External power supply	Voltage	12–24 V DC (+20/-15 %, ripple ratio within 5 %)
	Current	20 mA (at 24 V DC; all output points ON)
Internal current consumption (5 V DC)		80 mA (all output points ON)
Weight		0.17 kg

Tab. 12-48: *Transistor output module QY50*

① Sink type

② The fuses inside the output module are unchangeable. They protect the external peripherals, if there occurs a short circuit in the module.
The output module itself has no overload protection.

External connections	Terminal block number	Signal
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	12/24 V DC
	TB18	COM

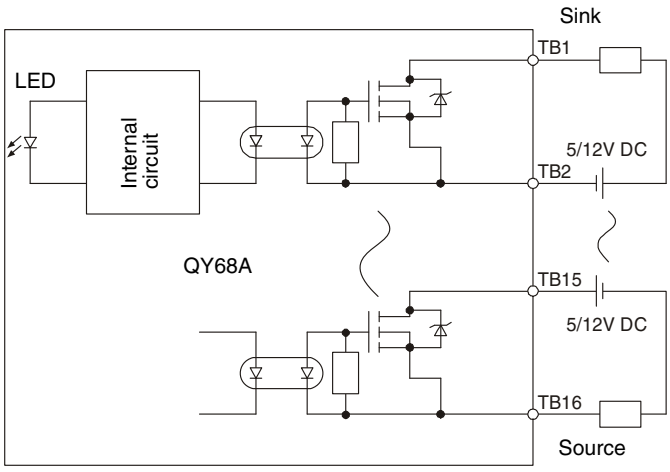
Tab. 12-49: *Transistor output module QY50 connections*

12.3.28 Transistor output module QY68A

Item		QY68A ①
Number of outputs		8
Isolation method		Photocoupler
Rated load voltage		5/12/24 V DC (+20/–10 %)
Maximum load current		2 A per output, 8 A per module
Maximum inrush current		8 A, 10 ms or less
Leakage current at OFF		≤ 0.1 mA
Maximum voltage drop at ON		≤ 0.3 V at 2 A
Response time	OFF → ON	≤ 3 ms
	ON → OFF	≤ 10 ms (resistive load)
Surge suppressor		Zener Diode
Fuse		— Attaching a fuse to external wiring is recommended.
Groups of outputs		8; 1 (all outputs are independent).
Output status display		One LED per output
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		18-point removable terminal block with screws (M3x6)
Applicable wire size		Core cable: 0.3 to 0.75 mm^2 (outside diameter: 2.8 mm max.)
External power supply		Not necessary
Internal current consumption (5 V DC)		110 mA (all output points ON)
Weight		0.14 kg

Tab. 12-50: *Transistor output module QY68A*

① Sink/Source type.

External connections	Terminal block number	Signal
	TB1	Y00
	TB2	
	TB3	Y01
	TB4	
	TB5	Y02
	TB6	
	TB7	Y03
	TB8	
	TB9	Y04
	TB10	
	TB11	Y05
	TB12	
	TB13	Y06
	TB14	
	TB15	Y07
	TB16	
	TB17	Vacant
	TB18	Vacant

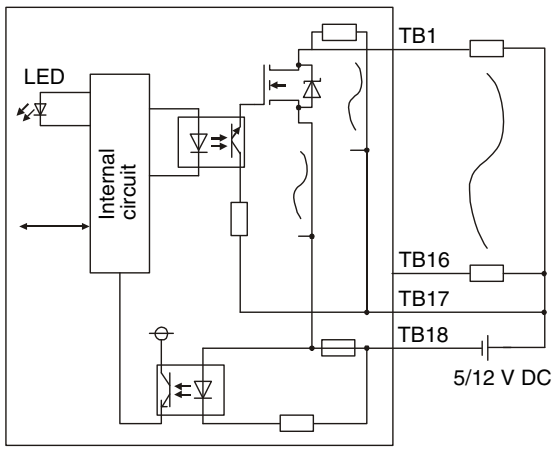
Tab. 12-51: *Transistor output module QY68A connections*

12.3.29 Transistor output module QY70

Item		QY70 ①
Number of outputs		16
Isolation method		Photocoupler
Rated load voltage		5/12 V DC (+25/–10 %)
Maximum load current		16 mA per output, 256 mA per module
Maximum inrush current		40 mA, 10 ms or less
Output voltage at OFF		3.5 V/ 0.4 mA at a switching voltage of 5 V
Maximum voltage drop at ON		≤ 0.3 V DC
Response time	OFF → ON	≤ 0.5 ms
	ON → OFF	≤ 0.5 ms (resistive load)
Surge suppressor		—
Fuse		1.6 A (unchangeable)
Fuse blow indication		LED indicates it and signal is output to CPU
Groups of outputs		1; 16 points/common, (common terminal: TB18)
Output status display		One LED per output
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		18-point removable terminal block with screws (M3x6)
Applicable wire size		Core cable: 0.3 to 0.75 mm² (outside diameter: 2.8 mm max.)
External power supply	Voltage	5/12 V DC (+25/–10 %), ripple ratio within 5 %)
	Current	90 mA (at 12 V DC; all output points ON)
Internal current consumption (5 V DC)		95 mA (all output points ON)
Weight		0.14 kg

Tab. 12-52: *Transistor output module QY70*

① Sink type

External connections	Terminal block number	Signal
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	5/12 V DC
	TB18	COM

Tab. 12-53: *Transistor output module QY470 connections*

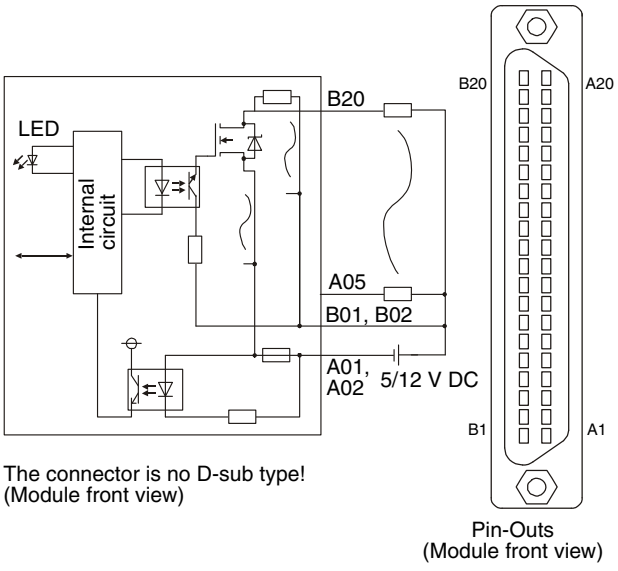
12.3.30 Transistor output module QY71

Item		QY71 ①
Number of outputs		32
Isolation method		Photocoupler
Rated load voltage		5/12 V DC (+25/–10 %)
Maximum load current		16 mA per output, 512 mA per module
Maximum inrush current		40 mA, 10 ms or less
Output voltage at OFF		3.5 V/ 0.4 mA at a switching voltage of 5 V
Maximum voltage drop at ON		≤ 0.3 V DC
Response time	OFF → ON	≤ 0.5 ms
	ON → OFF	≤ 0.5 ms (resistive load)
Surge suppressor		—
Fuse		1.6 A (unchangeable)
Fuse blow indication		LED indicates it and signal is output to CPU
Groups of outputs		1; 32 points/common, (common terminal: A01, A02)
Output status display		One LED per output
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		40-pin connector
Applicable wire size		0.3 mm^2
Accessories		• Connector A6CON • Assembled cable Q40-CBL-3M/5M with 40 pin plug
External power supply	Voltage	5/12 V DC (+25/–10 %), ripple ratio within 5 %)
	Current	170 mA (at 12 V DC; all output points ON)
Internal current consumption (5 V DC)		150 mA (all output points ON)
Weight		0.10 kg

Tab. 12-54: *Transistor output module QY71*

① Sink type

External connections



Pin	Signal	Pin	Signal
B20	Y00	A20	Y10
B19	Y01	A19	Y11
B18	Y02	A18	Y12
B17	Y03	A17	Y13
B16	Y04	A16	Y14
B15	Y05	A15	Y15
B14	Y06	A14	Y16
B13	Y07	A13	Y17
B12	Y08	A12	Y18
B11	Y09	A11	Y19
B10	Y0A	A10	Y1A
B09	Y0B	A09	Y1B
B08	Y0C	A08	Y1C
B07	Y0D	A07	Y1D
B06	Y0E	A06	Y1E
B05	Y0F	A05	Y1F
B04	Vacant	A04	Vacant
B03	Vacant	A03	Vacant
B02	5/12 V DC	A02	COM
B01	5/12 V DC	A01	COM

Tab. 12-55: *Transistor output module QY71 connections*

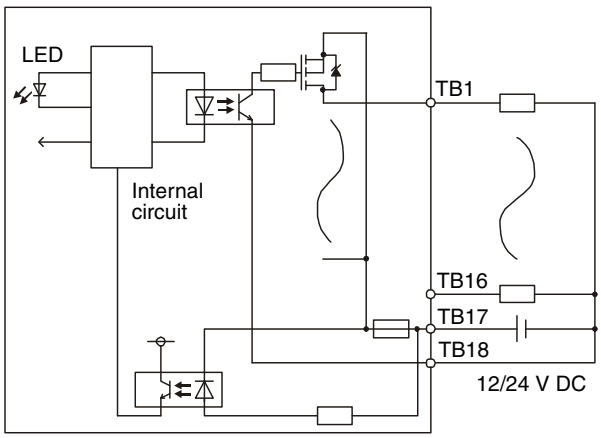
12.3.31 Transistor output module QY80

Item		QY80 ①
Number of outputs		16
Isolation method		Photocoupler
Rated load voltage		12–24 V DC (+20/–15 %)
Maximum load current		0.5 A per output, 4 A per group
Maximum inrush current		4 A, 10 ms or less
Leakage current at OFF		≤ 0.1 mA
Maximum voltage drop at ON		≤ 0.3 V at 0.5 A
Response time	OFF → ON	≤ 1 ms
	ON → OFF	≤ 1 ms (rated load, resistive load)
Surge suppressor		Zener Diode
Fuse		Two fuses 4 A parallel (nominal fuse current = 6.7 A), unchangeable ②
Fuse blow indication		LED indicates it and signal is output to CPU
Groups of outputs		1; 16 points/common, (common terminal: TB17)
Output status display		One LED per output
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		18-point removable terminal block with screws (M3x6)
Applicable wire size		Core cable: 0.3 to 0.75 mm^2 (outside diameter: 2.8 mm max.)
External power supply	Voltage	12–24 V DC (+20/–15 %, ripple ratio within 5 %)
	Current	20 mA (at 24 V DC, all output points ON)
Internal current consumption (5 V DC)		80 mA (all output points ON)
Weight		0.17 kg

Tab. 12-56: *Transistor output module QY80*

① Source type

② The fuses inside the output module are unchangeable. They protect the external peripherals, if there occurs a short circuit in the module. The output module itself has no overload protection.

External connections	Terminal block number	Signal
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	COM
	TB18	0 V

Tab. 12-57: *Transistor output module QY80 connections*

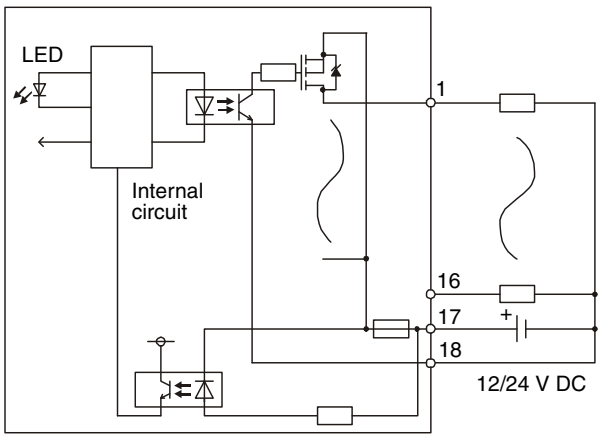
12.3.32 Transistor output module QY80-TS

Item		QY80-TS ①
Number of outputs		16
Isolation method		Photocoupler
Rated load voltage		12–24 V DC (+20/–15 %)
Maximum load current		0.5 A per output, 4 A per group
Maximum inrush current		4 A, 10 ms or less
Leakage current at OFF		≤ 0.1 mA
Maximum voltage drop at ON		≤ 0.3 V at 0.5 A
Response time	OFF → ON	≤ 1 ms
	ON → OFF	≤ 1 ms (rated load, resistive load)
Surge suppressor		Zener Diode
Fuse		Two fuses 4 A parallel (nominal fuse current = 6.7 A), unchangeable ②
Fuse blow indication		LED indicates it and signal is output to CPU
Groups of outputs		1; 16 points/common, (common terminal: 17)
Output status display		One LED per output
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		Removable terminal block with spring terminals
Applicable wire size		Core cable: 0.3 to 2.0 mm^2 (outside diameter: 1.45 mm max.)
External power supply	Voltage	12–24 V DC (+20/–15 %, ripple ratio within 5 %)
	Current	20 mA (at 24 V DC, all output points ON)
Internal current consumption (5 V DC)		80 mA (all output points ON)
Weight		0.17 kg

Tab. 12-58: *Transistor output module QY80-TS*

① Source type

② The fuses inside the output module are unchangeable. They protect the external peripherals, if there occurs a short circuit in the module. The output module itself has no overload protection.

External connections	Terminal block number	Signal
	1	Y00
	2	Y01
	3	Y02
	4	Y03
	5	Y04
	6	Y05
	7	Y06
	8	Y07
	9	Y08
	10	Y09
	11	Y0A
	12	Y0B
	13	Y0C
	14	Y0D
	15	Y0E
	16	Y0F
	17	COM
	18	0 V

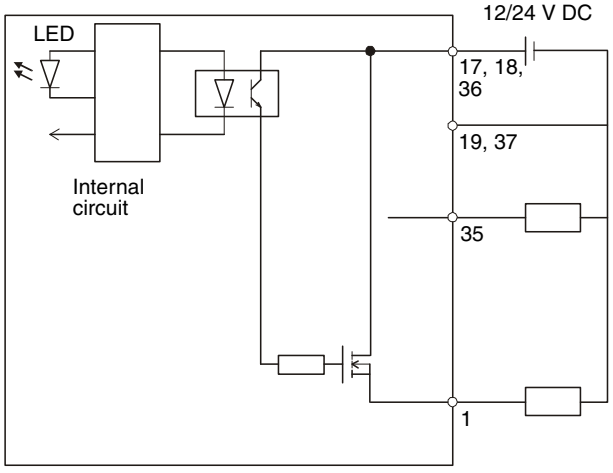
Tab. 12-59: *Transistor output module QY80-TS connections*

12.3.33 Transistor output module QY81P

Item		QY81P ①
Number of outputs		32
Isolation method		Photocoupler
Rated load voltage		12–24 V DC (+20/–15 %)
Maximum load current		0.1 A per output, 2 A per group
Maximum inrush current		0.7 A, 10 ms or less
Leakage current at OFF		≤ 0.1 mA
Maximum voltage drop at ON		≤ 0.1 V at 0.1 A
Response time	OFF → ON	≤ 1 ms
	ON → OFF	≤ 1 ms (rated load, resistive load)
Surge suppressor		Zener Diode
Fuse		—
Protection function		Thermal and overload protections Thermal protection is activated in units of 2 points Overload protection is activated in units of 1 point
Groups of outputs		1; 32 points/common, (common terminal: 17, 18, 36)
Output status display		One LED per output
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		37-pin D-sub connector
Applicable wire size		0.3 mm^2
Accessories		External wiring connector
External power supply	Voltage	12–24 V DC (+20/–15 %, ripple ratio within 5 %)
	Current	40 mA (at 24 V DC, all output points ON)
Internal current consumption (5 V DC)		95 mA (all output points ON)
Weight		0.17 kg

Tab. 12-60: *Transistor output module QY81P*

① Source type

External connections	Pin	Signal	Pin	Signal
	1	Y00	9	Y10
	20	Y01	28	Y11
	2	Y02	10	Y12
	21	Y03	29	Y13
	3	Y04	11	Y14
	22	Y05	30	Y15
	4	Y06	12	Y16
	23	Y07	31	Y17
	5	Y08	13	Y18
	24	Y09	32	Y19
	6	Y0A	14	Y1A
	25	Y0B	33	Y1B
	7	Y0C	15	Y1C
	26	Y0D	34	Y1D
	8	Y0E	16	Y1E
	27	Y0F	35	Y1F
	17	COM	37	0 V
	36	COM	19	0 V
	18	COM		

Tab. 12-61: *Transistor output module QY81P connections*

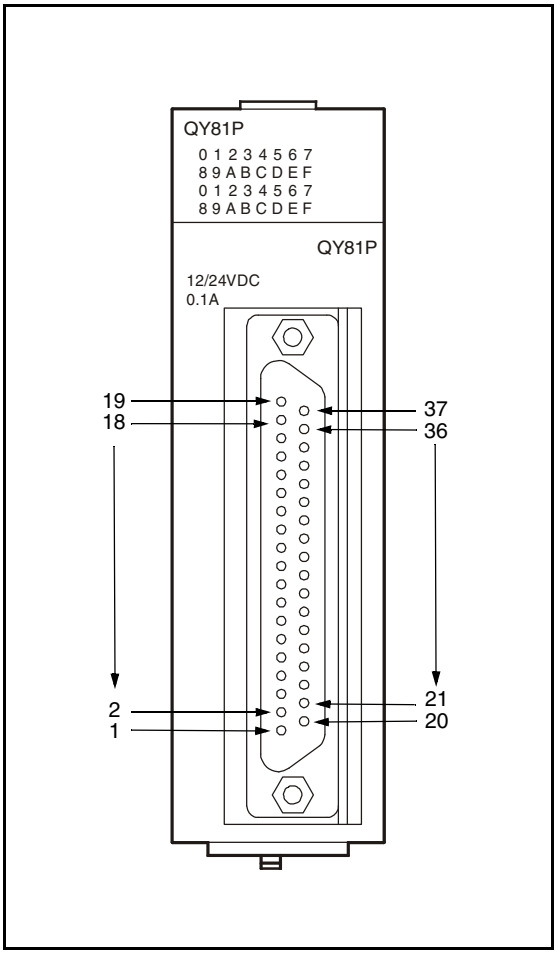


Fig.12-11:
Connector pin outs of D-sub 37-pin connector of the module QY81P

QY81_2d

12.3.34 Combined I/O module QH42P

Item		QH42P
Input Specifications		
Number of input points		32
Isolation method		Photocoupler
Rated input voltage		24 V DC (+20/–15 %, ripple ratio within 5 %)
Rated input current		approx. 4 mA
Max. simultaneously ON		Refer to the derating chart
Inrush current		—
ON voltage/ON current		≥ 19 V DC / ≥ 3 mA
OFF voltage/OFF current		≤ 11 V DC / ≤ 1.7 mA
Input impedance		approx. 5.6 kΩ
Response time	OFF → ON	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
	ON → OFF	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
Groups of input		1; 32 points/common, (common terminal: 1B01 and 1B02)
Output specifications		
Number of outputs		32
Isolation method		Photocoupler
Rated load voltage		12–24 V DC (+20/–15 %)
Maximum load current		0.1 A per output, 2 A per module
Maximum inrush current		0.7 A, 10 ms or less
Leakage current at OFF		≤ 0.1 mA
Maximum voltage drop at ON		≤ 0.2 V at 0.1 A
Response time	OFF → ON	≤ 1 ms
	ON → OFF	≤ 1 ms (rated load, resistive load)
Surge suppressor		Zener Diode
Fuse		—
External power supply	Voltage	12–24 V DC (+20/–15 %, ripple ratio within 5 %)
	Current	15 mA (at 24 VDC, all output points are ON)
Protection function		Thermal and overload protections Thermal/overload protection is activated in units of 1 point
Groups of outputs		1; 32 points/common, (common terminal: 2A01 and 2A02)
Common specifications		
Input/output status display		One LED per input or output (switchable)
Number of I/O occupied points		32 points (Type setting in I/O-assignment: I/O-mix)
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		Two 40-pin connectors Left connector: inputs, right connector: outputs
Applicable wire size		0.3 mm^2
Accessories		External wiring connector
Internal current consumption (5 V DC)		130 mA (all input points are ON)
Weight		0.20 kg

Tab. 12-62: *Combined I/O module QH42P*

① The response times OFF –> ON and ON –> OFF can't be set to different values.

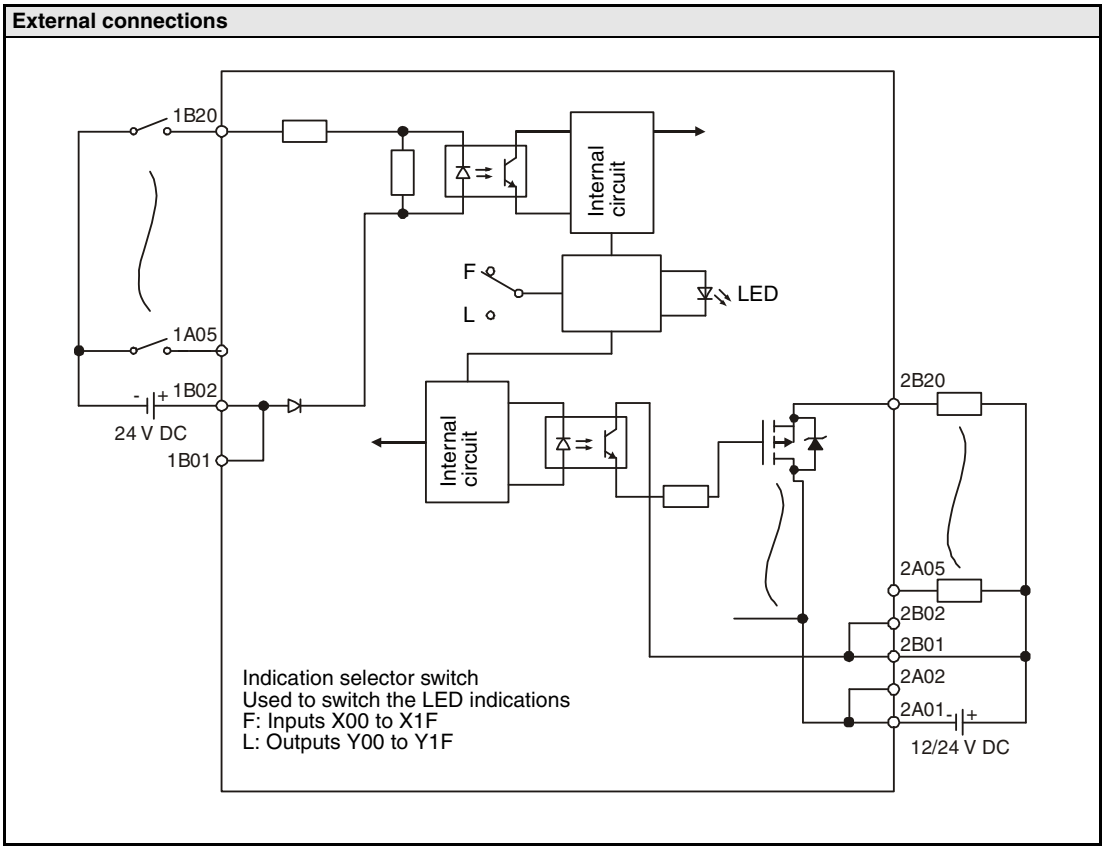


Fig. 12-12: *External connections and circuit diagram of the input/output module QH42P*

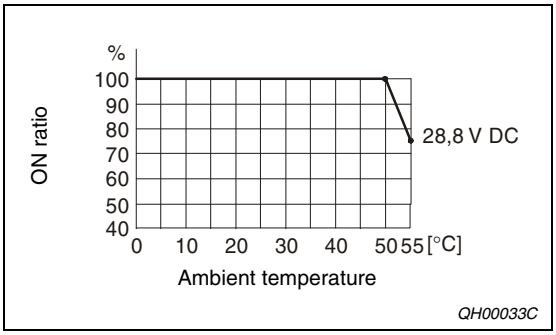
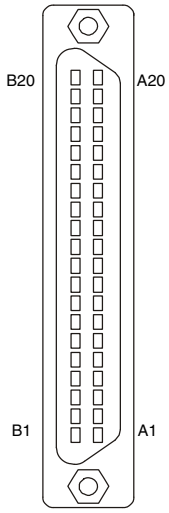


Fig.12-13:
QH42P Derating chart

	Left-hand side connector				Right-hand side connector			
	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
 Pin-Outs (Module front view)	1B20	X00	1A20	X10	2B20	Y00	2A20	Y10
	1B19	X01	1A19	X11	2B19	Y01	2A19	Y11
	1B18	X02	1A18	X12	2B18	Y02	2A18	Y12
	1B17	X03	1A17	X13	2B17	Y03	2A17	Y13
	1B16	X04	1A16	X14	2B16	Y04	2A16	Y14
	1B15	X05	1A15	X15	2B15	Y05	2A15	Y15
	1B14	X06	1A14	X16	2B14	Y06	2A14	Y16
	1B13	X07	1A13	X17	2B13	Y07	2A13	Y17
	1B12	X08	1A12	X18	2B12	Y08	2A12	Y18
	1B11	X09	1A11	X19	2B11	Y09	2A11	Y19
	1B10	X0A	1A10	X1A	2B10	Y0A	2A10	Y1A
	1B09	X0B	1A09	X1B	2B09	Y0B	2A09	Y1B
	1B08	X0C	1A08	X1C	2B08	Y0C	2A08	Y1C
	1B07	X0D	1A07	X1D	2B07	Y0D	2A07	Y1D
	1B06	X0E	1A06	X1E	2B06	Y0E	2A06	Y1E
	1B05	X0F	1A05	X1F	2B05	Y0F	2A05	Y1F
	1B04	Vacant	1A04	Vacant	2B04	Vacant	2A04	Vacant
	1B03	Vacant	1A03	Vacant	2B03	Vacant	2A03	Vacant
	1B02	COM1	1A02	Vacant	2B02	12/24 V DC	2A02	COM2
	1B01	COM1	1A01	Vacant	2B01	12/24 V DC	2A01	COM2

Tab. 12-63: *Connector pin outs of the module QH42P*

NOTE The connectors are no D-sub type.

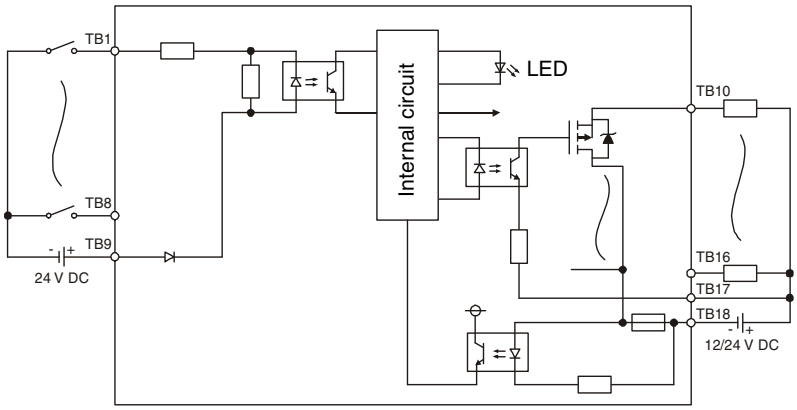
12.3.35 Combined I/O module QX48Y57

Item		QX48Y57
Input Specifications		
Number of input points		8
Isolation method		Photocoupler
Rated input voltage		24 V DC (+20/-15 %, ripple ratio within 5 %)
Rated input current		approx. 4 mA
Max. simultaneously ON		No limitation, all inputs can be switched on simultaneously.
Inrush current		—
ON voltage/ON current		≥ 19 V DC / ≥ 3 mA
OFF voltage/OFF current		≤ 11 V DC / ≤ 1.7 mA
Input impedance		approx. 5.6 kΩ
Response time	OFF → ON	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
	ON → OFF	1, 5, 10, 20, 70 ms (Response time setting by parameters, initial setting: 10 ms) ①
Groups of input		1; 8 points/common, (common terminal: TB9)
Output specifications		
Number of outputs		7
Isolation method		Photocoupler
Rated load voltage		12/24 V DC (+20/-15 %)
Maximum load current		0.5 A per output, 2 A per module
Maximum inrush current		4 A, 10 ms or less
Leakage current at OFF		≤ 0.1 mA
Maximum voltage drop at ON		≤ 0.3 V at 0.5 A
Response time	OFF → ON	≤ 1 ms
	ON → OFF	≤ 1 ms (rated load, resistive load)
Surge suppressor		Zener Diode
Fuse		4 A, unchangeable ②
Fuse blow indication		LED indicates it and signal is output to CPU.
External power supply	Voltage	12/24 V DC (+20/-15 %, ripple ratio within 5 %)
	Current	10 mA (at 24 VDC)
Groups of outputs		1; 7 points/common (common terminal: TB18)
Common specifications		
Input/output status display		One LED per input and output
Number of I/O occupied points		16 points (Type setting in I/O-assignment: I/O-mix)
Dielectric withstand voltage		560 V AC rms/3 cycles (altitude 2000 m)
External connections		18-point removable terminal block with screws (M3x6)
Applicable wire size		Core cable: 0.3 to 0.75 mm^2 (outside diameter: 2.8 mm max.)
Internal current consumption (5 V DC)		80 mA (with all inputs ON)
Weight		0.20 kg

Tab. 12-64: *Combined I/O module QX48Y57*

① The response times OFF –> ON and ON –> OFF can't be set to different values.

② The fuses inside the output module are unchangeable. They protect the external peripherals, if there occurs a short circuit in the module. The output module itself has no overload protection.

External connections	Terminal block number	Signal
	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	COM1
	TB10	Y08
	TB11	Y09
	TB12	Y0A
	TB13	Y0B
	TB14	Y0C
	TB15	Y0D
	TB16	Y0E
	TB17	12/24 V DC
	TB18	COM2

Tab. 12-65: *External connections and circuit diagram of the input/output module QX48Y57*

12.3.36 Dummy module QG60

The module QG60 is a blank cover module used to protect the vacant slot (between I/O modules) of the base unit from dust.

Load the blank cover module with the connector cover of the base module fitted.

Item	QG60
I/O points	Set by parameters
Application	Used to protect any vacant slots on the base unit from dust.
Weight [kg]	0.07
External dimensions (WxHxD) [mm]	27.4x98x9

Tab. 12-66: *Dummy module specifications*

12.4 Power supply module specifications

Power supply modules Q61P-A1, Q61P-A2, Q61P, Q61P-D and Q61SP

Item		Q61P-A1	Q61P-A2	Q61P	Q61P-D	Q61SP
Mounting position		Power supply module mounting slot "POWER"				
Applicable base unit		Q3□B, Q3□DB, Q6□B				Q3□SB
Input power supply	V AC (+10 %, –15 %)	100 to 120	200 to 240	100 to 240	100 to 240	100 to 240
	V DC (+30 %, –35 %)	—	—	—	—	—
Input frequency		50/60 Hz (±5 %)				
Maximum input apparent power		105 VA	105 VA	120 VA	130 VA	40 VA
Inrush current ①		20 A within 8 ms				
Rated output current	5 V DC	6 A	6 A	6 A	6 A	2 A
	24 V DC	—	—	—	—	—
External output voltage		—	—	—	—	—
Overcurrent protection ②	5 V DC	≥ 6.6 A				≥ 2.2 A
	24 V DC	—				
Overvoltage protection ③		5.5 to 6.5 V				
Efficiency		≥ 70 %				
Dielectric withstand voltage (Across primary and secondary connection)		2830 V AC, 1 min				
Operation indication		The "POWER" LED turns on in green, when the output voltage is present.				
Contact output section	Application	Error contact (refer to chapter 7)				
	Rated switching voltage, current	24 V DC; 0.5 A				
	Minimum switching load	5 V DC; 1 mA				
	Response time	OFF → ON: ≤ 10 ms ON → OFF: ≤ 12 ms				
	Life	Mechanical: More than 20 million times Electrical: More than 100 thousand times at rated switching voltage, current				
	Overvoltage protection	—				
	Fuse	The signal output is not protected by fuse.				
Terminal screw size		M3.5x7				M3.5x7
Applicable tightening torque		66 to 89 Ncm				
Applicable wire size		0.75 to 2 mm^2				
External dimensions (HxWxD) [mm]		98x55.2x90				98x27.4x104
Weight		0.31 kg	0.31kg	0.40 kg	0.45 kg	0.18 kg
Allowable momentary power failure period ④		20 ms				

Tab. 12-67: *Power supply module specifications (1)*

① When power is switched on again immediately (within 5 seconds) after power-off, an inrush current of more than the specified value (2 ms or less) may flow.
Reapply power 5 or more seconds after power-off.
When selecting a fuse and breaker in the external circuit, take account of the blowout, detection characteristics etc.

② 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 turns off or turns on in dim green when voltage is lowered. 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.

③ Overvoltage protection
The overvoltage protection device shuts off the 5 V DC circuit and stops the system if a voltage of 5.5 V DC is applied to the circuit.
When this device is activated, the power supply module LED turns 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.

④ If the momentary power failure time is within 20 ms, the system detects an AC down and suspends the operation processing. However, the system continues operations after the power comes back.
If the momentary power failure time exceeds 20 ms, the system either continues or initially starts operations depending on the power supply load. In case that the operation processing is continued, the system operates the same as when the momentary power failure time is within 20 ms.
Supplying the same amount of AC to both the power supply module and the input module (such as QX10) can prevent the sensor connected to the input module from being switched to the OFF status when the power supply turns off.
Note, however, that if only the input module (such as QX10) is connected on the AC line, which is connected to the power supply, an AC down detection in the power supply module may be delayed due to the internal capacitor of the input module. To avoid this, connect a load of approx. 30 mA per input module on the AC line.

Power supply modules Q62P, Q63P, Q64P and Q64PN

Item		Q62P	Q63P	Q64P	Q64PN
Mounting position		Power supply module mounting slot "POWER"			
Applicable base unit		Q3□B, Q3□DB, Q6□B			
Input power supply	V AC (+10 %, -15 %)	100 to 240	—	100 to 120 200 to 240	100 to 240
	V DC (+30 %, -35 %)	—	24	—	
Input frequency		50/60 Hz (±5 %)	—	50/60 Hz (±5 %)	
Maximum input apparent power		105 VA	45 W	160 VA	
Inrush current ①		20 A within 8 ms	100 A within 1 ms	20 A within 8 ms	
Rated output current	5 V DC	3 A	6 A	8.5 A	
	24 V DC	0.6 A	—	—	
External output voltage		24 V DC (±10 %)	—	—	
Overcurrent protection ②	5 V DC	≥ 3.3 A	≥ 6.6 A	≥ 9.9 A	
	24 V DC	≥ 0.66 A	—	—	
Overvoltage protection ③		5.5 to 6.5 V			
Efficiency		≥ 65 %	≥ 70 %	≥ 70 %	
Dielectric withstand voltage (Across primary and secondary connection)		2830 V AC, 1 min	500 V AC, 1 min	2830 V AC, 1 min	
Operation indication		The "POWER" LED turns on in green, when the output voltage is present.			
Contact output section	Application	Error contact (refer to chapter 7)			
	Rated switching voltage, current	24 V DC; 0.5 A			
	Minimum switching load	5 V DC; 1 mA			
	Response time	OFF → ON: ≤ 10 ms ON → OFF: ≤ 12 ms			
	Life	Mechanical: More than 20 million times Electrical: More than 100 thousand times at rated switching voltage, current			
	Overvoltage protection	—			
	Fuse	The signal output is not protected by fuse.			
Terminal screw size		M3.5x7		M3.5	
Applicable wire size		0.75 to 2 mm^2			
Applicable tightening torque		66 to 89 Ncm			
External dimensions (HxWxD) [mm]		98x55.2x90		98x55.2x115	
Weight		0.39 kg	0.33 kg	0.40 kg	0.47 kg
Allowable momentary power failure period ④		20 ms	10 ms (at 24 V DC)	20 ms	

Tab. 12-68: *Power supply module specifications (2)*

① When power is switched on again immediately (within 5 seconds) after power-off, an inrush current of more than the specified value (2 ms or less) may flow.
Reapply power 5 or more seconds after power-off.
When selecting a fuse and breaker in the external circuit, take account of the blowout, detection characteristics etc.

② Overcurrent protection
The overcurrent protection device shuts off the 5 V, 24 V DC circuit and stops the system if the current flowing in the circuit exceeds the specified value.
The LED of the power supply module turns off or turns on in dim green when voltage is lowered. 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.

③ Overvoltage protection
The overvoltage protection device shuts off the 5 V DC circuit and stops the system if a voltage of 5.5 V DC is applied to the circuit.
When this device is activated, the power supply module LED turns 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.

④ If the momentary power failure time is within the period given in the table above, the system detects an AC down and suspends the operation processing.
If the momentary power failure time exceeds the period given in the table above, the system either continues or initially starts operations depending on the power supply load. In case that the operation processing is continued, the system operates the same as when the momentary power failure time is within 20 ms (resp. 10 ms for Q63RP).

For AC input power supply:
Supplying the same amount of AC to both the power supply module and the input module (such as QX10) can prevent the sensor connected to the input module from being switched to the OFF status when the power supply turns off.
Note, however, that if only the input module (such as QX10) is connected on the AC line, which is connected to the power supply, an AC down detection in the power supply module may be delayed due to the internal capacitor of the input module. To avoid this, connect a load of approx. 30 mA per input module on the AC line.

For DC input power supply:
The allowable momentary power failure period is the time when 24 V DC is input. If the input is less than 24 V DC, the time will be shorter.)

Redundant power supply modules Q63RP and Q64RP

Item		Q63RP	Q64RP
Mounting position		Power supply module mounting slot "POWER"	
Applicable base unit		Q3□RB, Q6□RB, Q6□WRB,	
Input power supply	V AC (+10 %, -15 %)	—	100 to 240
	V DC (+30 %, -35 %)	24	—
Input frequency		—	50/60 Hz (±5 %)
Maximum input apparent power		65 W	160 VA
Inrush current ①		150 A within 1 ms	20 A within 8 ms
Rated output current	5 V DC	8.5 A	8.5 A
	24 V DC	—	—
External output voltage		—	—
Overcurrent protection ②	5 V DC	≥ 9.35 A	
	24 V DC	—	
Overvoltage protection ③		5.5 to 6.5 V	
Efficiency		≥ 65 %	
Dielectric withstand voltage (Across primary and secondary connection)		500 V AC, 1 min	2830 V AC, 1 min
Operation indication		The "POWER" LED turns on in green, when the output voltage is present.	
Contact output section	Application	Error contact (refer to chapter 7)	
	Rated switching voltage, current	24 V DC; 0.5 A	
	Minimum switching load	5 V DC; 1 mA	
	Response time	OFF → ON: ≤ 10 ms ON → OFF: ≤ 12 ms	
	Life	Mechanical: More than 20 million times Electrical: More than 100 thousand times at rated switching voltage, current	
	Overvoltage protection	—	
	Fuse	The signal output is not protected by fuse.	
Terminal screw size		M3.5	
Applicable wire size		0.75 to 2 mm^2	
Applicable tightening torque		66 to 89 Ncm	
External dimensions (HxWxD) [mm]		98x83x115	
Weight		0.60 kg	0.47 kg
Allowable momentary power failure period ④		10 ms	20 ms

Tab. 12-69: *Redundant power supply module of MELSEC System Q specifications*

① When power is switched on again immediately (within 5 seconds) after power-off, an inrush current of more than the specified value (2 ms or less) may flow.
Reapply power 5 or more seconds after power-off.
When selecting a fuse and breaker in the external circuit, take account of the blowout, detection characteristics etc.

② Overcurrent protection
The overcurrent protection device shuts off the 5 V, 24 V DC circuit and stops the system if the current flowing in the circuit exceeds the specified value.
The LED of the power supply module turns off or turns on in dim green when voltage is lowered. 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.

③ Overvoltage protection
The overvoltage protection device shuts off the 5 VDC circuit and stops the system if a voltage of 5.5 V DC is applied to the circuit.
When this device is activated, the power supply module LED turns on in red. 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 red.

④ If the momentary power failure time is within the period given in the table above, the system detects an AC down and suspends the operation processing. However, the system continues operations after the power comes back.
In the system operating with two redundant power supply modules, the system does not initially start operations when the momentary power failure exceeding 20 ms occurs in only one of the input power supplies. The system, however, may initially start operations when the momentary power failure exceeding 20 ms occurs simultaneously in both input power supplies.

Q64RP only (AC input power supply):
Supplying the same amount of AC to both the power supply module and the input module (such as QX10) can prevent the sensor connected to the input module from being switched to the OFF status when the power supply turns off.
Note, however, that if only the input module (such as QX10) is connected on the AC line, which is connected to the power supply, an AC down detection in the power supply module may be delayed due to the internal capacitor of the input module. To avoid this, connect a load of approx. 30 mA per input module on the AC line.

Q63RP only (DC input power supply):
The allowable momentary power failure period is the time when 24 V DC is input. If the input is less than 24 V DC, the time will be shorter.)

Power supplies are integrated into Q00JCPU and Q00UJCPU

Item		Q00JCPU	Q00UJCPU
Input power supply		100 to 240 V AC (+10 %, –15 %)	
Input frequency		50/60 Hz (±5 %)	
Maximum input apparent power		105 VA	
Inrush current ①		40 A within 8 ms	
Rated output current	5 V DC	3 A	
	24 V DC	—	—
External output voltage		—	—
Overcurrent protection ②	5 V DC	≥ 3.3 A	
	24 V DC	—	
Overvoltage protection ③		5.5 to 6.5 V	
Efficiency		≥ 65 %	
Dielectric withstand voltage (Across primary and secondary connection)		2830 V AC, 1 min	
Operation indication		The POWER LED of the CPU part: Normal: On (green), Error: Off	
Contact output section		—	
Terminal screw size		M3.5x7	
Applicable wire size		0.75 to 2 mm^2	
Applicable tightening torque		66 to 89 Ncm	
External dimensions (HxWxD) [mm]		Integrated into a combination of base unit, power supply and CPU	
Weight			
Allowable momentary power failure period ④		20 ms	

Tab. 12-70: *Power supply modules of Q00J- and Q00UJCPU specifications*

① When power is switched on again immediately (within 5 seconds) after power-off, an inrush current of more than the specified value (2 ms or less) may flow.
Reapply power 5 or more seconds after power-off.
When selecting a fuse and breaker in the external circuit, take account of the blowout, detection characteristics etc.

② 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 turns off or turns on in dim green when voltage is lowered. 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.

③ Overvoltage protection
The overvoltage protection device shuts off the 5 VDC circuit and stops the system if a voltage of 5.5 VDC is applied to the circuit.
When this device is activated, the power supply module LED turns 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.

④ If the momentary power failure time is within 20 ms, the system detects an AC down and suspends the operation processing. However, the system continues operations after the power comes back.
If the momentary power failure time exceeds 20 ms, the system either continues or initially starts operations depending on the power supply load. In case that the operation processing is continued, the system operates the same as when the momentary power failure time is within 20 ms.
Supplying the same amount of AC to both the power supply module and the input module (such as QX10) can prevent the sensor connected to the input module from being switched to the OFF status when the power supply turns off.
Note, however, that if only the input module (such as QX10) is connected on the AC line, which is connected to the power supply, an AC down detection in the power supply module may be delayed due to the internal capacitor of the input module. To avoid this, connect a load of approx. 30 mA per input module on the AC line.

12.5 Base unit specifications

Slim type main base units Q32SB, Q33SB, Q35SB

Item	Q32SB	Q33SB	Q35SB
Slots for power supply modules	1	1	1
Slots for I/O modules	2	3	5
Installation	Installation holes ∅ 4.5 mm, M4 screws Use special adapters, when mounting the base unit on a DIN rail.		
Internal current consumption (5 V DC)	90 mA	90 mA	100 mA
External dimensions (HxWxD) mm	98x114x18.5	98x142x18.5	98x197.5x18.5
Weight kg	0.12	0.15	0.21
Accessories	DIN rail mounting adapter Q6DIN3		

Tab. 12-71: *Slim type main base units Q3□SB*

Main base units Q33B-E, Q35B-E, Q38B-E, Q38RB-E, Q312B-E

Item	Q33B-E	Q35B-E	Q38B-E	Q38RB-E	Q312B-E
Slots for power supply modules	1	1	1	2	1
Slots for I/O modules	3	5	8	8	12
Installation	Installation holes ∅ 4,5 mm, M4 screws Use special adapters, when mounting the base unit on a DIN rail.				
Internal current consumption (5 V DC)	110 mA	110 mA	120 mA	120 mA	130 mA
External dimensions (HxWxD) mm	98x189x44.1	98x245x44.1	98x328x44.1	98x439x44.1	98x439x44.1
Weight kg	0.21	0.25	0.35	0.45	0.45
Accessories	DIN rail mounting adapter				

Tab. 12-72: *Main base units Q3□B-E and Q3□RB-E*

Main base units Q38DB and Q312DB

Item	Q38DB	Q312DB
Slots for power supply modules	1	1
Slots for I/O modules	8	12
Installation	Installation holes ∅ 4,5 mm, M4 screws Use special adapters, when mounting the base unit on a DIN rail.	
Internal current consumption (5 V DC)	230 mA	240 mA
External dimensions (HxWxD) mm	98x328x44.1	98x439x44.1
Weight kg	0.41	0.54
Accessories	DIN rail mounting adapter Q6DIN1	

Tab. 12-73: *Main base unit Q3□DB*

Extension base units Q52B, Q55B

Item	Q52B	Q55B
Slots for power supply modules	—	—
Slots for I/O modules	2	5
Power supply module	Not necessary Power supplied by the power supply of the main base unit.	
Installation	Installation holes ∅ 4,5 mm, M4 screws Use special adapters, when mounting the base unit on a DIN rail.	
Internal current consumption (5 V DC)	80 mA	100 mA
External dimensions (HxWxD) mm	98x106x44.1	98x189x44.1
Weight kg	0.14	0.23
Accessories	DIN rail mounting adapter Q6DIN3	

Tab. 12-74: *Extension base unit (type not requiring power supply module)*

Extension base units Q63B, Q65B, Q68B, Q612B

Item	Q63B	Q65B	Q68B	Q612B
Slots for power supply modules	1	1	1	1
Slots for I/O modules	3	5	8	12
Power supply module	Necessary			
Installation	Installation holes ∅ 4,5 mm, M4 screws Use special adapters, when mounting the base unit on a DIN rail.			
Internal current consumption (5 V DC)	110 mA	110 mA	120 mA	130 mA
External dimensions (HxWxD) mm	98x189x44.1	98x245x44.1	98x328x44.1	98x439x44.1
Weight kg	0.23	0.28	0.38	0.48
Accessories	DIN rail mounting adapter			

Tab. 12-75: *Extension base unit (type requiring power supply module)*

Extension base units Q65WRB and Q68RB

Item	Q65WRB	Q68RB
Slots for power supply modules	2	2
Slots for I/O modules	5	8
Power supply module	Necessary	
Installation	Installation holes ∅ 4,5 mm, M4 screws Use special adapters, when mounting the base unit on a DIN rail.	
Internal current consumption (5 V DC)	160 mA	120 mA
External dimensions (HxWxD) mm	98x439x44.1	98x439x44.1
Weight kg	0.52	0.49
Accessories	DIN rail mounting adapter Q6DIN1	

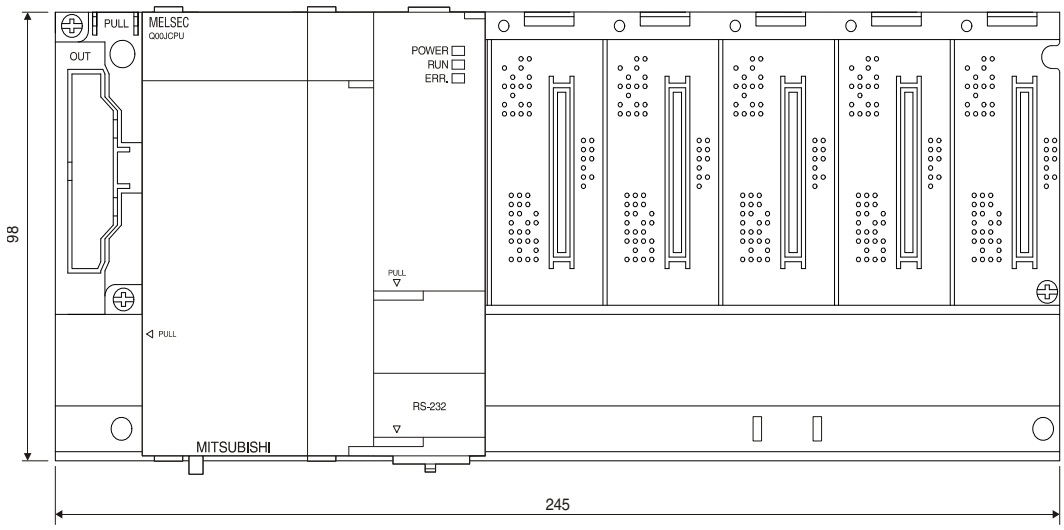
Tab. 12-76: *Extension base unit Q65WRB and Q68RB*

A Appendix

A.1 External dimensions

A.1.1 CPU modules

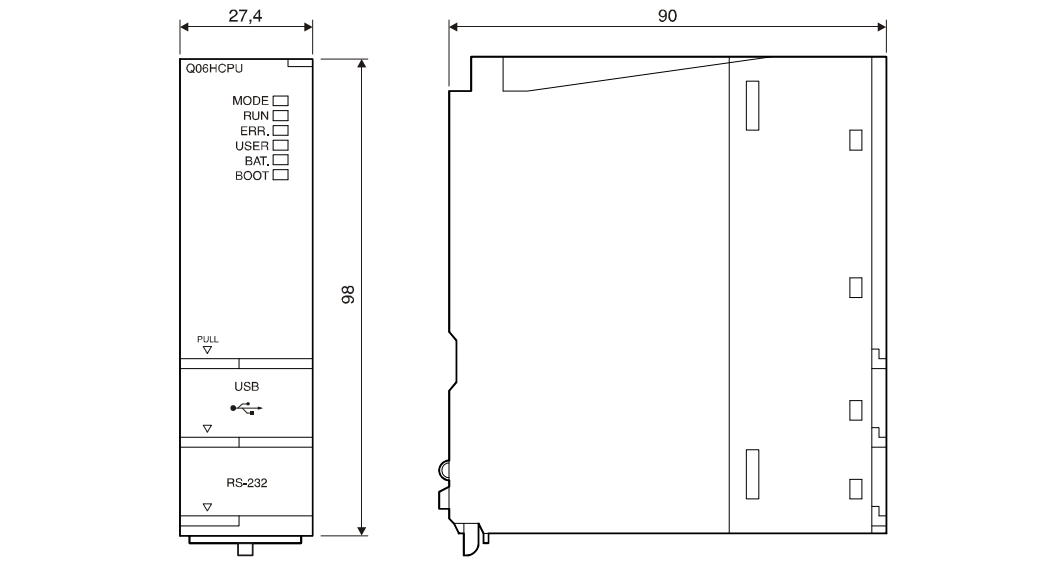
Q00JCPU and Q00UJCPU



Unit: mm

Q00JCPU_dim

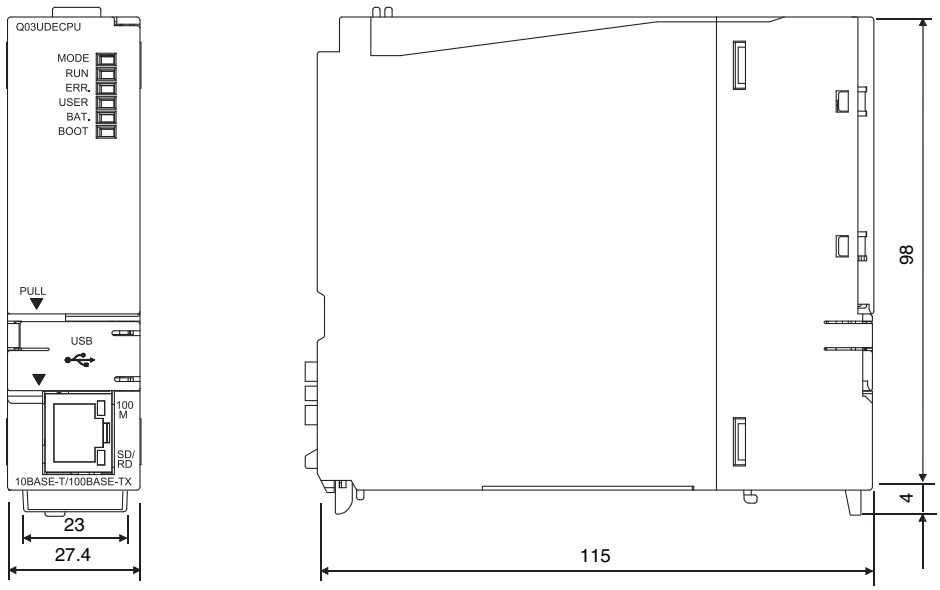
Q00CPU, Q01CPU, Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU, Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU



Unit: mm

Q06HCPU_m

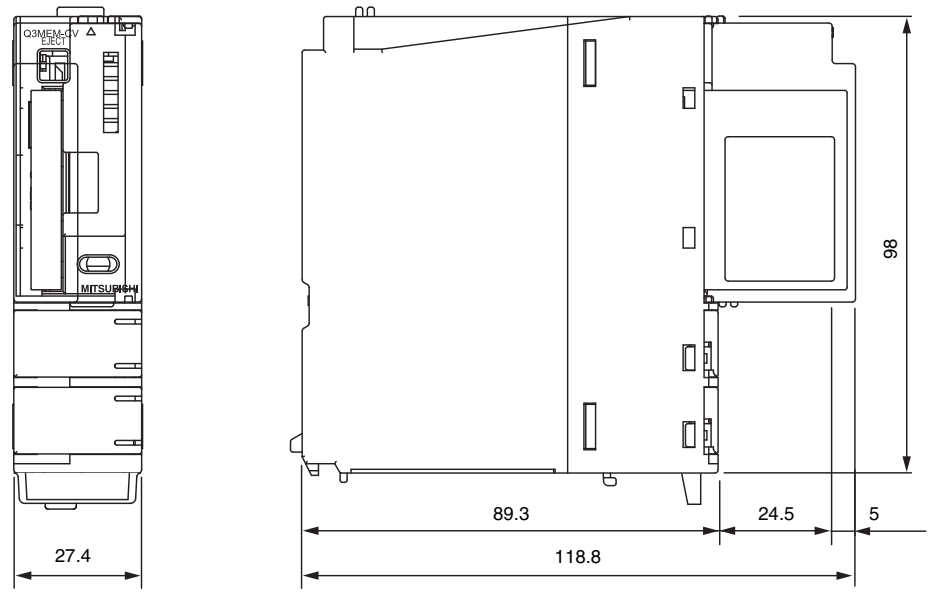
Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU



Unit: mm

QnUDEHCPU_Abmessungen

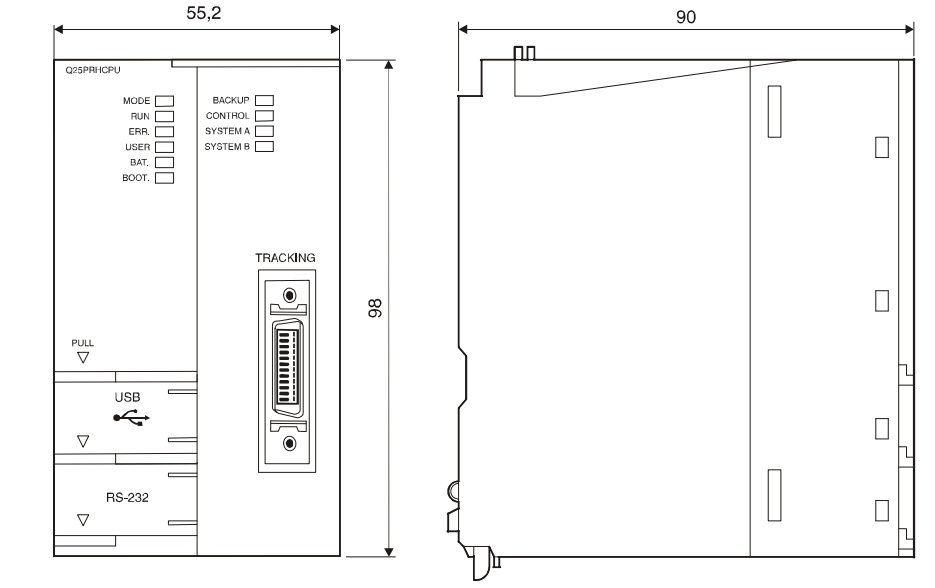
Q02UCPU, Q03UD(E)CPU, Q04UD(E)HCPU, Q06UD(E)HCPU, Q10UD(E)HCPU, Q13UD(E)HCPU, Q20UD(E)HCPU, Q26UD(E)HCPU when battery Q3MEM-4MBS or Q3MEM-8MBS is mounted on the CPU module



Unit: mm

QnUD(E)HCPU_mit_Q3MEM

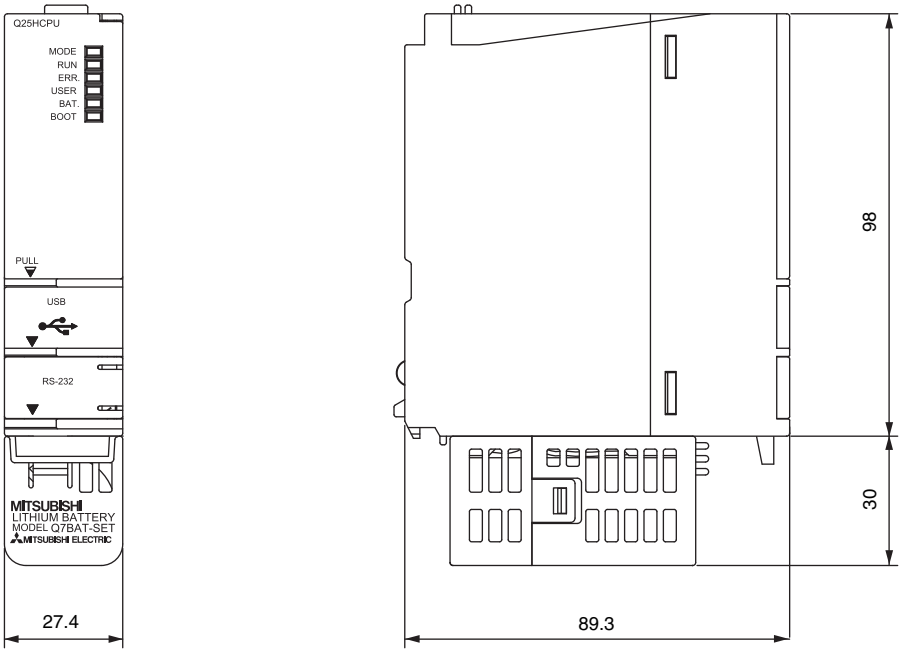
Q12PRHCPU, Q25PRHCPU



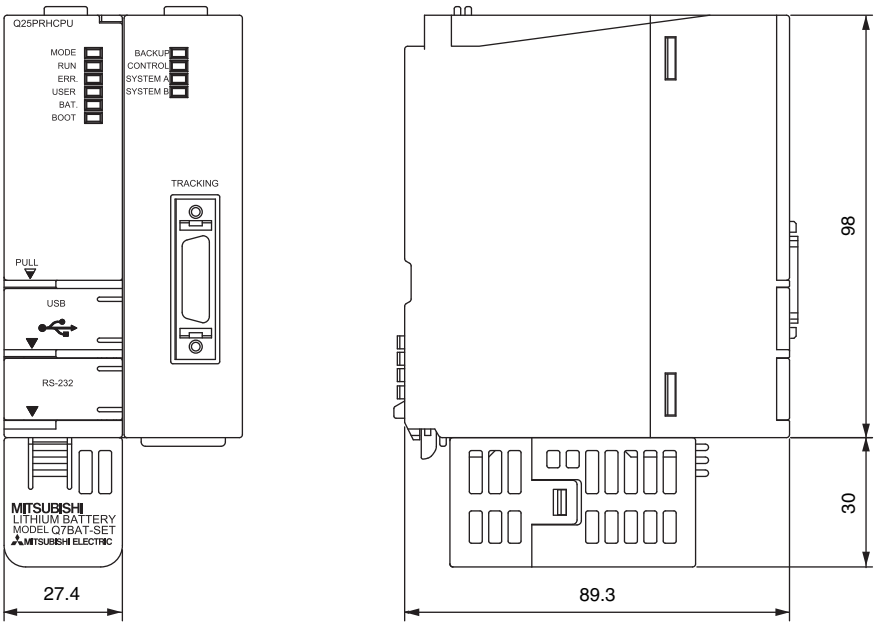
Unit: mm

q12prhcpu_m

When Q7BAT-SET is mounted on the CPU module



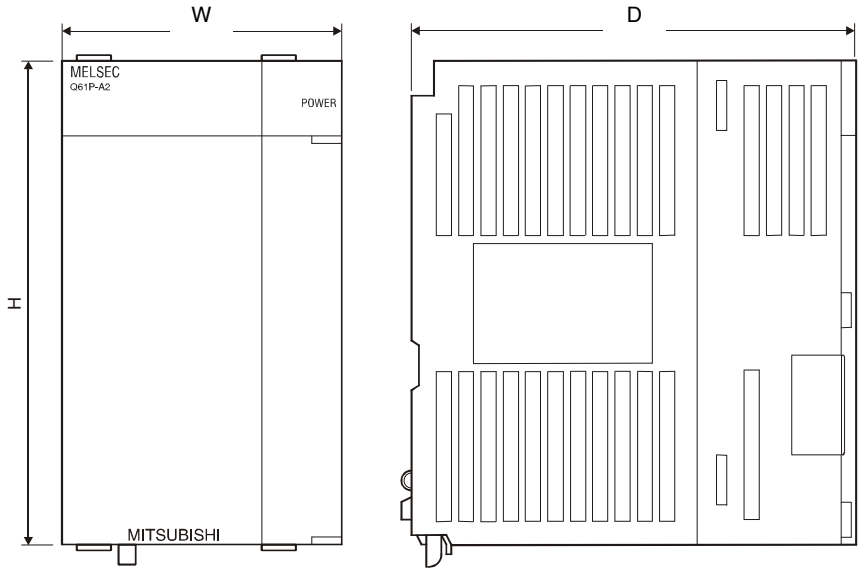
Q12PRHCPU and Q25PRHCPU



Unit: mm

QnCPU_mit_Q7BAT

A.1.2 Power supply modules

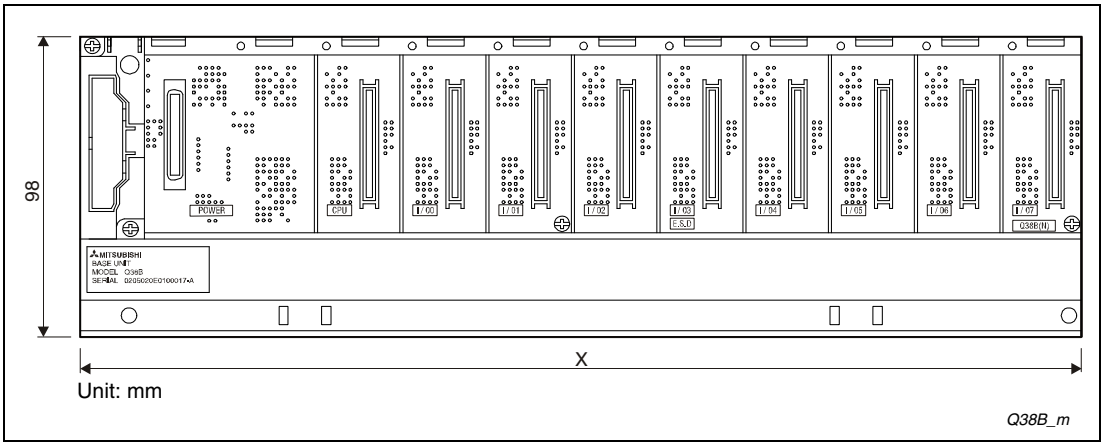


Power supply module	Width (W)	Height (H)	Depth (D)
Q61P-A1	55.2 mm	98 mm	90 mm
Q61P-A2			
Q61P			
Q61P-D			
Q61SP	27.4 mm		90 mm (+ 14 mm for terminals)
Q62P	55.2 mm		90 mm
Q63P			
Q63RP	83 mm		115 mm
Q64P	55.2 mm		
Q64PN			
Q64RP	83 mm		

Tab. A-1:

External dimensions of Melsec System Q power supply modules

A.1.3 Main base units and extension base units

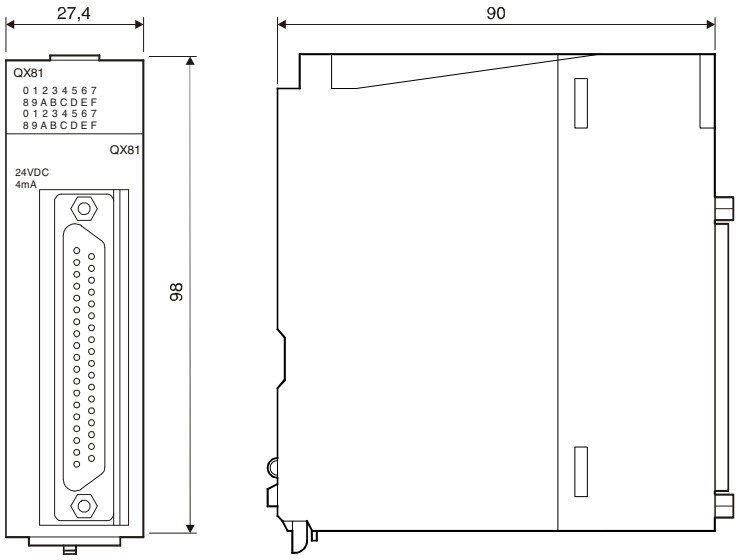


Type	X (mm)
Q32SB	114
Q33SB	142
Q33B-E	189
Q35B-E	245
Q35SB	197.5
Q38B-E	328
Q38DB	
Q38RB-E	439
Q312B-E	
Q312DB	
Q52B	106
Q55B	189
Q63B	189
Q65B	245
Q65WRB	439
Q68B	328
Q68RB	439
Q612B	

Tab. A-2:

External dimensions of Melsec System Q main base units and extension base units

A.1.4 I/O modules and dummy module



Unit: mm

QX81_dim

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