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MITSUBISHI

Q2AS(H)CPU(S1)

Mitsubishi Programmable Controller

User's Manual

(Hardware)

Thank you for purchasing the Mitsubishi programmable logic controller MELSEC-QnA series.

Prior to use, please read both this and relevant manual thoroughly to fully understand the product.

QnA

MELSEC

MODEL	Q2ASCPU-U(H/W)-E
MODEL CODE	13J857
IB(NA)-66677-H(0810)MEE	

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● SAFETY PRECAUTIONS ●

(Be sure to read these instructions before use.)

Before using the product, read this and relevant manuals carefully and handle the product correctly with full attention to safety.
In this manual, ● SAFETY PRECAUTIONS ●are classified into 2 levels: "DANGER" and "CAUTION".

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

Under some circumstances, failure to observe the ⚠**CAUTION** level instructions may also lead to serious results.
Be sure to observe the instructions of both levels to ensure the safety.
Please keep this manual in a safe place for future reference and also pass this manual on to the end user.

[DESIGN PRECAUTIONS]

⚠ DANGER
● Create a safety circuit outside the programmable controller to ensure the whole system will operate safely even if an external power failure or a programmable controller failure occurs. Otherwise, incorrect output or malfunction may cause an accident. (1) For an emergency stop circuit, protection circuit and interlock circuit that is designed for incompatible actions such as forward/reverse rotation or for damage prevention such as the upper/lower limit setting in positioning, any of them must be created outside the programmable controller. Install the emergency stop switch outsid the controlpanel so that workers can operate it easily.

[DESIGN PRECAUTIONS]

⚠ DANGER

(2) When the programmable controller detects the following error conditions, it stops the operation and turn off all the outputs.
- The overcurrent protection device or overvoltage protection device of the power supply module is activated.
- The programmable controller CPU detects an error such as a watchdog timer error by the self-diagnostics function.

In the case of an error of a part such as an I/O control part that cannot be detected by the programmable controller CPU, all the outputs may turn on. In order to make all machines operate safely in such a case, set up a fail-safe circuit or a specific mechanism outside the programmable controller.
Refer to "LOADING AND INSTALLATION" in this manual for example fail safe circuits.

(3) Depending on the failure of the output module's relay or transistor, the output status may remain ON or OFF incorrectly. For output signals that may lead to a serious accident, create an external monitoring circuit.
- If load current more than the rating or overcurrent due to a short circuit in the load has flowed in the output module for a long time, it may cause a fire and smoke. Provide an external safety device such as a fuse.
- Design a circuit so that the external power will be supplied after power-up of the programmable controller.
  Activating the external power supply prior to the programmable controller may result in an accident due to incorrect output or malfunction.
- For the operation status of each station at a communication error in data link, refer to the respective data link manual.
  The communication error may result in an accident due to incorrect output or malfunction.

[DESIGN PRECAUTIONS]

⚠ DANGER

- When controlling a running programmable controller (data modification) by connecting a peripheral device to the CPU module or a PC to a special function module, create an interlock circuit on sequence programs so that the whole system functions safely all the time.
  Also, before performing any other controls (e.g. program modification, operating status change (status control)), read the manual carefully and ensure the safety.
  In these controls, especially the one from an external device to a programmable controller in a remote location, some programmable controller side problem may not be resolved immediately due to failure of data communications.
  To prevent this, create an interlock circuit on sequence programs and establish corrective procedures for communication failure between the external device and the programmable controller CPU.
- When setting up the system, do not allow any empty slot on the base unit. If any slot is left empty, be sure to use a blank cover (A1SG60) or a dummy module (A1SG62) for it.
  When using the extension base unit, A1S52B(S1), A1S55B(S1) or A1S58B(S1), attach the included dustproof cover to the module in slot 0. Otherwise, internal parts of the module may be flied in the short circuit test or when an overcurrent or overvoltage is accidentally applied to external I/O section.

⚠ CAUTION

- Do not install the control lines or communication cables together with the main circuit or power lines, or bring them close to each other.
  Keep a distance of 100mm (3.94inch) or more between them.
  Failure to do so may cause malfunctions due to noise.
- If having read register R outside the allowable range with the MOV instruction, the file register data will be FFFFH. Using this as it is may cause malfunctions. Pay attention not to use any out-of-range file register when designing sequence programs. For instruction details, refer to the programming manual.
- When an output module is used to control the lamp load, heater, solenoid valve, etc., a large current (ten times larger than the normal one) may flow at the time that the output status changes from OFF to ON. Take some preventive measures such as replacing the output module with the one of a suitable current rating.

[INSTALLATION PRECAUTIONS]

⚠ CAUTION

- Use the programmable controller under the environment specified in the user's manual.
  Otherwise, it may cause electric shocks, fires, malfunctions, product deterioration or damage.
- Insert the module fixing projection into the fixing hole in the base unit and then tighten the module mounting screw within the specified torque.
  When no screw is tightened, even if the module is installed correctly, it may cause malfunctions, a failure or a drop of the module.
  Tightening the screw excessively may damage the screw and/or the module, resulting in a drop of the module, a short circuit or malfunctions.
- Connect the extension cable to the connector of the base unit or module.
  Check the cable for incomplete connection after connecting it.
  Poor electrical contact may cause incorrect inputs and/or outputs.
- Insert the memory card and fully press it to the memory card connector.
  Check for incomplete connection after installing it.
  Poor electrical contact may cause malfunctions.
- Be sure to shut off all phases of the external power supply used by the system before mounting or removing the module. Failure to do so may damage the module.
- Do not directly touch the conductive part or electronic components of the module.
  Doing so may cause malfunctions or a failure of the module.

[WIRING PRECAUTIONS]

⚠ DANGER

- Be sure to shut off all phases of the external power supply used by the system before wiring.
  Failure to do so may result in an electric shock or damage of the product.
- Before energizing and operating the system after wiring, be sure to attach the terminal cover supplied with the product.
  Failure to do so may cause an electric shock.

⚠ CAUTION

- Always ground the FG and LG terminals to the protective ground conductor.
  Failure to do so may cause an electric shock or malfunctions.
- Wire the module correctly after confirming the rated voltage and terminal layout.
  Connecting a power supply of a different voltage rating or incorrect wiring may cause a fire or failure.
- Do not connect multiple power supply modules to one module in parallel.
  The power supply modules may be heated, resulting in a fire or failure.
- Press, crimp or properly solder the connector for external connection with the specified tool.
  Incomplete connection may cause a short circuit, fire or malfunctions.
- Tighten terminal screws within the specified torque range. If the screw is too loose, it may cause a short circuit, fire or malfunctions.
  If too tight, it may damage the screw and/or the module, resulting in a short circuit or malfunctions.
- Carefully prevent foreign matter such as dust or wire chips from entering the module.
  Failure to do so may cause a fire, failure or malfunctions.
- Install our programmable controller in a control panel for use.
  Wire the main power supply to the power supply module installed in a control panel through a distribution terminal block.
  Furthermore, the wiring and replacement of a power supply module have to be performed by a maintenance worker who acquainted with shock protection.
  (For the wiring methods, refer to Type Q2AS(H)CPU(S1) User's Manual.)

[STARTUP AND MAINTENANCE PRECAUTIONS]

⚠ DANGER

- Do not touch any terminal during power distribution.
  Doing so may cause an electric shock.
- Properly connect batteries. Do not charge, disassemble, heat or throw them into the fire and do not make them short-circuited and soldered. Incorrect battery handling may cause personal injuries or a fire due to exothermic heat, burst and/or ignition.
- Be sure to shut off all phases of the external power supply used by the system before cleaning or retightening the terminal screws or module mounting screws.
  Failure to do so may result in an electric shock.
  If they are too loose, it may cause a short circuit or malfunctions.
  If too tight, it may cause damage to the screws and/or module, resulting in an accidental drop of the module, short circuit or malfunctions.

⚠ CAUTION

- When performing online operations (especially, program modification, forced output or operating status change) by connecting a peripheral device to the running CPU module, read the manual carefully and ensure the safety.
  Incorrect operation will cause mechanical damage or accidents.
- Do not disassemble or modify each of modules.
  Doing so may cause failure, malfunctions, personal injuries and/or a fire.
- When using a wireless communication device such as a mobile phone, keep a distance of 25cm (9.84inch) or more from the programmable controller in all directions.
  Failure to do so may cause malfunctions.
- Be sure to shut off all phases of the external power supply used by the system before mounting or removing the module.
  Failure to do so may result in failure or malfunctions of the module.
- Do not drop or apply any impact to the battery.
  Doing so may damage the battery, resulting in electrolyte spillage inside the battery.
  If any impact has been applied, discard the battery and never use it.
- Do not install/remove the terminal block more than 50 times after the first use of the product. (IEC 61131-2 compliant)
- Before handling modules, touch a grounded metal object to discharge the static electricity from the human body.
  Failure to do so may cause failure or malfunctions of the module.

[DISPOSAL PRECAUTIONS]

⚠ CAUTION
● When disposing of the product, treat it as an industrial waste. When disposing of batteries, separate them from other wastes according to the local regulations. (For details of the battery directive in EU member states, refer to the Q2AS(H)CPU(S1) User's Manual.)

[TRANSPORTATION PRECAUTIONS]

⚠ CAUTION
● When transporting lithium batteries, make sure to treat them based on the transportation regulations. (Refer to Chapter 7 for details of the relevant models.)

REVISIONS

*The manual number is given on the bottom right of the front cover.

Print Date	*Manual Number	Revision
Jan., 1996	IB(NA) 66677-A	First edition
Sep., 1998	IB(NA) 66677-B	Correction SAFETY PRECAUTIONS, Section 4.5.2 Addition Specifications, Performance specifications, EMC standards, Low-Voltage instruction Deletion I/O module specifications and connections
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Jul., 2005	IB(NA) 66677-E	Correction SAFETY PRECAUTIONS, Section 1.1, Chapter 3, Section 3.1, 3.1.1, 3.1.2, 3.1.3, 3.2, 3.2.4, 3.2.7, 4.1.1, 4.2, 4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.4, 6.2, 6.3 Section change Section 6.1, 6.2 are changed to Section 6.2, 6.3, respectively.

*The manual number is given on the bottom right of the front cover.

Print Date	*Manual Number	Revision
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Oct., 2008	IB(NA) 66677-H	Partial Correction SAFETY PRECAUTIONS, Section 1.1, 3.1, 3.1.1, 3.1.2, 3.1.3, 3.2, 3.2.1, 3.2.2, 3.2.3, 3.2.4, 3.2.5, 3.2.6, 3.2.7, 4.1.3, 4.2, 4.3.3, 4.3.4, 4.5.2, 5.1.1, 5.2.1, Chapter 6

Japanese Manual Version IB(NA)68653-J

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This manual explains safety precautions, I/O module wiring, and error codes regarding the Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, and Q2ASHCPU-S1 (hereinafter, these are all referred to as Q2ASCPU).

About this manual

The following tables show the manuals relevant to this product. Refer to these tables when you order a manual, if necessary.

Detailed Manual

Manual title	Manual number (Type code)
type Q2AS(H)CPU(S1) User's Manual This manual explains performance, functions, and handling of the Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, and Q2ASHCPU-S1, power supply, memory card, specifications, and handling of the base unit. (sold separately)	SH-3599 (13J858)

Relavant Manuals

Manual title	Manual number (Type code)
QnACPU-GUIDEBOOK This manual explains how to create a program, write the program using the CPU module, and debug the program. This manual is designed for first-time users of the QnACPU. It also explains some applications of the QnACPU. (sold separately)	IB-66606 (13JF10)
QnACPU PROGRAMMING MANUAL (Fundamentals) This manual describes programming methods, device names, and parameters required to create a program. It also describes various types of programs. (sold separately)	IB-66614 (13JF46)
QCPU(Q mode)/QnACPU PROGRAMMING MANUAL (Common Instructions) This manual explains how to use sequence instructions, basic instructions, and application instructions. (sold separately)	SH080039 (13JF58)
QnACPU PROGRAMMING MANUAL (Special Function) This manual describes specific instructions for a special function module for the QnACPU. (sold separately)	SH-4013 (13JF56)
QnACPU PROGRAMMING MANUAL (AD57 Instructions) This manual describes specific instructions for controlling the AD57(S1) type CRT controller module from the QnACPU. (sold separately)	IB-66617 (13JF49)

Manual title	Manual number (Type code)
QCPU(Q mode)/QnACPU PROGRAMMING MANUAL (PID Control Instructions) This manual describes specific instructions for PID control for the QnACPU. (sold separately)	SH-080040 (13JF59)
QCPU(Q mode)/QnACPU PROGRAMMING MANUAL (SFC) This manual describes the system configuration, performance specifications functions, programming, debugging procedures, and the error codes of the SW0SRX-SAP3 and SW0NX-SAP3. (sold separately)	SH-080041 (13JF60)
Ans Module type I/O User's Manual This manual describes the specifications for the compact building block type I/O modules. (sold separately)	IB-66541 (13JF81)

1. SPECIFICATIONS

1.1 SPECIFICATIONS

Table 1.1 General specification

<table>
<tr><th>Item</th><th colspan="6">Specifications</th></tr>
<tr><td>Ambient operating temperature</td><td colspan="6">0 to 55 °C</td></tr>
<tr><td>Ambient storage temperature</td><td colspan="6">−20 to 75 °C</td></tr>
<tr><td>Ambient operating humidity</td><td colspan="6">10 to 90 % RH, No-condensing</td></tr>
<tr><td>Ambient storage humidity</td><td colspan="6">10 to 90 % RH, No-condensing</td></tr>
<tr><td rowspan="5">Vibration resistance</td><td rowspan="5">Conforming to JIS B 3502, IEC 61131-2</td><td></td><td>Frequency</td><td>Acceleration</td><td>Amplitude</td><td>No. of sweeps</td></tr>
<tr><td rowspan="2">Under intermittent vibration</td><td>10 to 57Hz</td><td>——</td><td>0.075mm (0.003in.)</td><td rowspan="3">10 times each in X, Y, Z directions (for 80min.)</td></tr>
<tr><td>57 to 150Hz</td><td>9.8m/s^2</td><td>——</td></tr>
<tr><td rowspan="2">Under continuous vibration</td><td>10 to 57Hz</td><td>——</td><td>0.035mm (0.001in.)</td></tr>
<tr><td>57 to 150Hz</td><td>4.9m/s^2</td><td>——</td></tr>
<tr><td>Shock resistance</td><td colspan="6">Conforming to JIS B 3502, IEC 61131-2
(147 m/s^2, 3 times in each of 3 directions X Y Z)</td></tr>
<tr><td>Operating ambience</td><td colspan="6">No corrosive gases</td></tr>
<tr><td>Operating elevation *3</td><td colspan="6">2000m (6562ft.) max.</td></tr>
<tr><td>Installation location</td><td colspan="6">Control panel</td></tr>
<tr><td>Over voltage category *1</td><td colspan="6">II max.</td></tr>
<tr><td>Pollution level *2</td><td colspan="6">2 max.</td></tr>
<tr><td>Equipment category</td><td colspan="6">Class I</td></tr>
</table>

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

*2: This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used. Pollution level 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected occasionally.

*3: Do not use or store the programmable controller in the environment when the pressure is higher than the atmospheric pressure at sea level. Otherwise, malfunction may result. To use the programmable controller in high-pressure environment, contact your nearest Mitsubishi representative.

2. PERFORMANCE SPECIFICATION

2.1 QnASCPU Module Performance Specification

Performance specification of Q2ASCPU module is as follows:

Item		Model				Remark
		Q2ASCPU	Q2ASCPU-S1	Q2ASHCPU	Q2ASHCPU-S1	
Control method		Repetitive operation of stored program				
I/O control method		Refresh mode				I/O enabled by specifying direct I/O (DX□, DY□)
Programming language		Sequence control dedicated language				
		Relay symbol language, logic symbolic language, MELSAP3 (SFC)				
Processing speed (sequence instructions)	LD	0.2 μs/step		0.075 μs/step		
	MOV	0.6 μs/step		0.225 μs/step		
Constant scan (Function that makes scan time constant)		5 to 2000 ms (configurable in multiple of 5 ms module)				Set parameter values to specify
Memory capacity		Capacity of loading memory cards (2036 kbyte maximum)				
Program capacity	Number of steps	28 k steps maximum	60 k steps maximum	28 k steps maximum	60 k steps maximum	
	Number of files	28 files	60 files	28 files	60 files	
I/O device points		8192 points (X/Y0 to 1FFF)				Number of usable points in program
I/O points		512 points (X/Y0 to 1FF)	1024 points (X/Y0 to 3FF)	512 points (X/Y0 to 1FF)	1024 points (X/Y0 to 3FF)	Number of points accessible to actual I/O modules
Clock function		Year, month, date, hour, minute, second, day of week (auto-detects leap years) Accuracy : -1.7 to +4.9s (TYP. +1.7s) / d at 0 depress centigrade Accuracy : -1.0 to +5.2s (TYP. +2.2s) / d at 25 depress centigrade Accuracy : -7.3 to +2.5s (TYP. -1.9s) / d at 55 depress centigrade				
Allowable momentary power failure period		By power supply module				
5 VDC Internal current consumption		0.3 A	0.3 A	0.7 A	0.7 A	
Mass		0.5 kg	0.5 kg	0.5 kg	0.5 kg	
External dimension		130(H) × 54.5(W) × 110(D) (5.12 × 2.15 × 4.33) mm (inch)				

3. EMC DIRECTIVES AND LOW VOLTAGE DIRECTIVES

The products sold in the European countries have been required by law to comply with the EMC Directives and Low Voltage Directives of the EU Directives since 1996 and 1997, respectively.
The manufacturers must confirm by self-declaration that their products meet the requirements of these directives, and put the CE mark on the products.

3.1 Requirements for Compliance with EMC Directives

The EMC Directives specifies emission and immunity criteria and requires the products to meet both of them, i.e., not to emit excessive electromagnetic interference (emission): to be immune to electromagnetic interference outside (immunity).
Guidelines for complying the machinery including MELSEC-QnA series programmable controller with the EMC Directives are provided in Section 3.1.1 to 3.1.6 below.
The guidelines are created based on the requirements of the regulations and relevant standards, however, they do not guarantee that the machinery constructed according to them will not comply with the Directives.
Therefore, the manufacturer of the machinery must finally determine how to make it comply with the EMC Directives: if it is actually compliant with the EMC Directives.

3.1.1 EMC standards

When the programmable controller is installed following the directions given in this manual its EMC performance is compliant to the following standards and levels as required by the EMC directive.

Specifications	Test Item	Test Description	Standard Values
EN61000-6-4 (2001)	EN55011 *2 Radiated noise	Measure the emission released by the product.	30M-230 M Hz QP: 30dBμ V/m (30m measurement) *1 230M-1000MHz QP: 37dBμ V/m (30m measurement) *1
	EN55011 *2 Conduction noise	Measure the emission released by the product to the power line.	150k-500kHz QP: 79dB, Mean: 66dB*1 500k-30MHz QP: 73dB, Mean: 60dB *1
EN61131-2/A12 (2000)	EN61000-4-2 *2 Static electricity immunity	Immunity test by applying static electricity to the module enclosure.	4kV contact discharge 8kV air discharge
	EN61000-4-4 *2 First transient burst noise	Immunity test by applying burst noise to the power line and signal line.	2kV Power line 1kv Signal line
	EN61000-4-12 *2 Damped oscillatory wave	Immunity test in which a damped oscillatory wave is superimposed on the power line.	1kv
	EN61000-4-3 *2 Radiated electromagnetic field	Immunity test by applying a radiated electric field to the product.	10V/m, 26-1000MHz
EN61000-6-2 (2001)	EN61000-4-6 *2 Conduction noise	Immunity test by inducting an electromagnetic field in the power line signal line.	10 V/ms, 0.15-80MHZ, 80% AM modulation@1kHz

∗1: QP: Quasi-peak value, Mean: Average value

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

3.1.2 Installation instructions for EMC Directive

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

* : Also, each network remote station needs to be installed inside the control panel.
However, the waterproof type remote station can be installed outside the control panel.

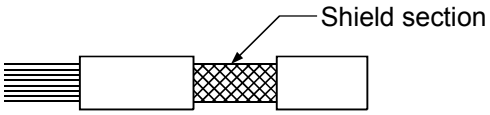
(1) Control cabinet
- (a) Use a conductive control cabinet.
- (b) When attaching the control cabinet's top plate or base plate, mask painting and weld so that good surface contact can be made between the cabinet and plate.
- (c) To ensure good electrical contact with the control cabinet, mask the paint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

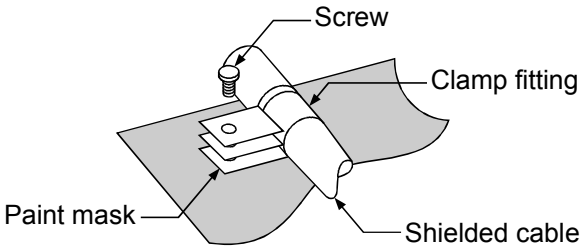
(2) Connection of power and earth wires
Earthing and power supply wires for the programmable controller system must be connected as described below.
- (a) Provide an earthing point near the power supply module. Earth the power supply's LG and FG terminals (LG: Line Ground, FG: Frame Ground) with the thickest and shortest wire possible. (The wire length must be 30 cm (11.81 in.) or shorter.) The LG and FG terminals function is to pass the noise generated in the programmable controller system to the ground, so an impedance that is as low as possible must be ensured. In addition, make sure to wire the ground cable short as the wires are used to relieve the noise, the wire itself carries large noise content and thus short wiring means that the wire is prevented from acting as an antenna.
- (b) The earth wire led from the earthing point must be twisted with the power supply wires. By twisting with the earthing wire, noise flowing from the power supply wires can be relieved to the earthing. However, if a filter is installed on the power supply wires, the wires and the earthing wire may not need to be twisted.

3.1.3 Cables

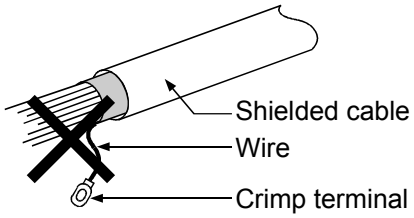
The cables pulled out of the control panel contain a high frequency noise component. On the outside of the control panel, therefore, they serve as antennas to emit noise.
Ensure to use shielded cables for the cables, which are connected to the I/O modules, special modules and those pulled out to outside of the control panel. Mounting ferrite core is not required except some types of CPU however, noise emanated via the cable can be restrained using it.
The use of a shielded cable also increases noise resistance. The signal lines (including common line) connected to the programmable controller input/output modules and intelligent modules use shielded cables to assure noise resistance, as a condition, standardized on EN61131-2/A12 (2000).
If a shielded cable is not used or not earthed correctly, the noise resistance will be less than the rated value

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



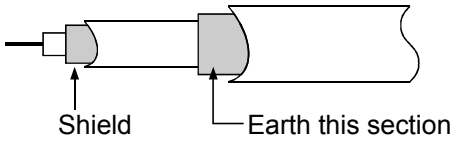


Note) The method of earthing by soldering a wire onto the shield section of the shielded cable as shown below is not recommended. The high frequency impedance will increase and the shield will be ineffective.



(2) MELSECNET (II) and MELSECNET/10 units

(a) Use a double-shielded coaxial cable for the MELSECNET unit which uses coaxial cables. Noise in the range of 30 MHz or higher in radiation noise can be suppressed by the use of double-shielded coaxial cables (Mitsubishi Cable: 5C-2V-CCY). Earth the outer shield to the ground. The precautions on shielding to be followed are the same as those stated in item (1) above.

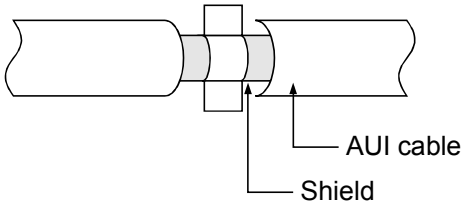


(b) Ensure to attach a ferrite core to the double-shielded coaxial cable connected to the MELSECNET unit. In addition, position the ferrite core on each cable near the outlet of the control panel. TDK-make ZCAT3035 ferrite core is recommended.

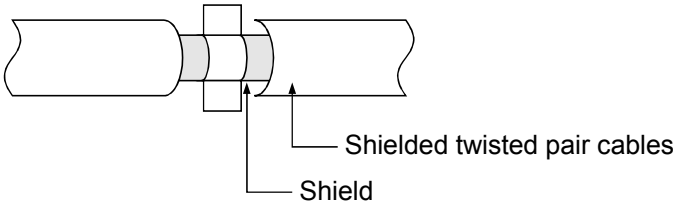
(3) Ethernet module

Precautions to be followed when AUI cables and coaxial cables are used are described below.

(a) Ensure to earth also the AUI cables connected to the 10BASE5 connectors of the A1SJ71QE71-B5. Because the AUI cable is of the shielded type, as shown in the figure below, partly remove the outer cover of it, and earth the exposed shield section to the ground on the widest contact surface.



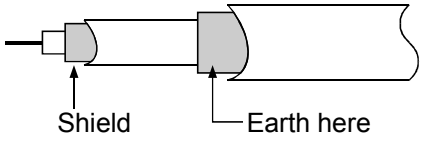
(b) Use shielded twisted pair cables as the twisted pair cables*1 connected to the 10BASE-T connectors. For the shielded twisted pair cables, strip part of the outer cover and earth the exposed shield section to the ground on the widest contact surface as shown below.



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

*1: Make sure to install a ferrite core for the cable.
As a ferrite core, ZCAT2035 manufactured by TDK is recommended.

(c) Always use double-shielded coaxial cables as the coaxial cables*2 connected to the 10BASE2 connectors. Earth the double-shielded coaxial cable by connecting its outer shield to the ground.



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

*2: Make sure to install a ferrite core for the cable.
As a ferrite core, ZCAT2035 manufactured by TDK is recommended.

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

(4) I/O and other communication cables

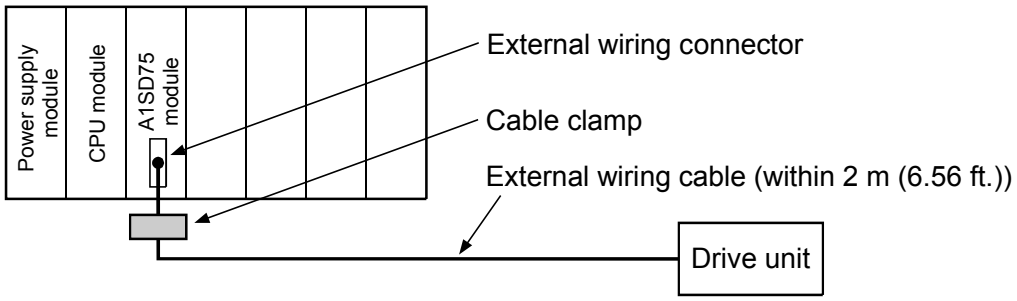
For the I/O signal lines (including common line) and other communication cables (RS-232, RS-422, etc), if extracted to the outside of the control panel, also ensure to earth the shield section of these lines and cables in the same manner as in item (1) above.

(5) Positioning Modules

Precautions to be followed when the machinery conforming to the EMC Directive is configured using the A1SD75P□-S3 are described below.

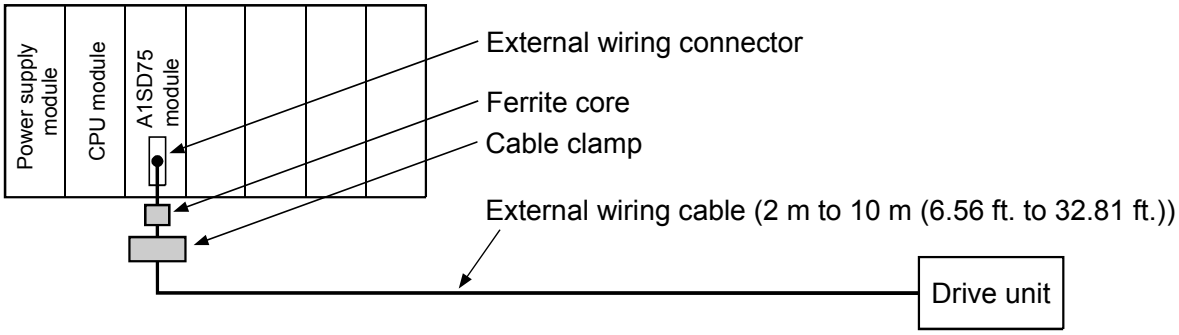
(a) When wiring with a 2 m (6.56 ft.) or less cable

- Ground the shield section of the external wiring cable with the cable clamp.
  (Ground the shield at the closest location to the A1SD75 external wiring connector.)
- Wire the external wiring cable to the drive unit and external device with the shortest practicable length of cable.
- Install the drive unit in the same panel.



(b) When wiring with cable that exceeds 2 m (6.56 ft.), but is 10 m (32.81 ft.) or less

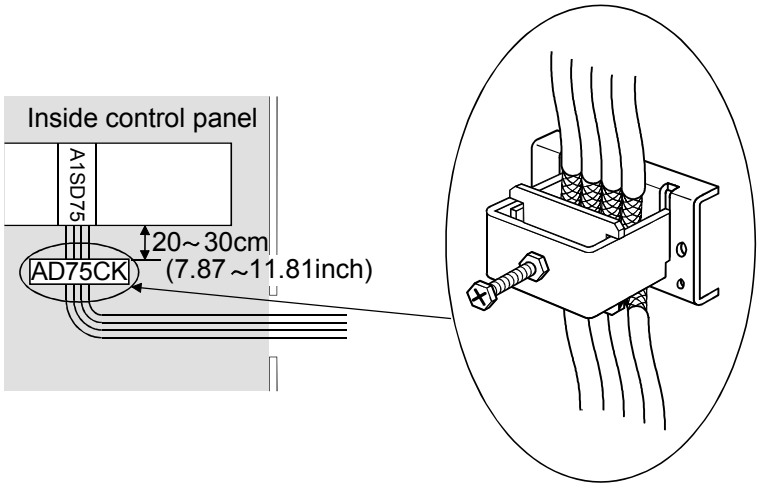
- Ground the shield section of the external wiring cable with the cable clamp.
  (Ground the shield at the closest location to the A1SD75 external wiring connector.)
- Install a ferrite core.
- Wire the external wiring cable to the drive unit and external device with the shortest practicable length of cable.



(c) Ferrite core and cable clamp types and required quantities

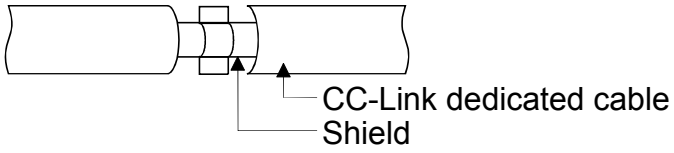
- Cable clamp
  Type: AD75CK (Mitsubishi Electric)
- Ferrite core
  Type: ZCAT3035-1330 (TDK ferrite core)
- Required quantity

Cable length	Prepared part	Required Qty		
		1 axis	2 axes	3 axes
Within 2 m (6.56 ft.)	AD75CK	1	1	1
2 m (6.56 ft.) to 10m (32.81 ft.)	AD75CK	1	1	1
	ZCAT3035-1330	1	2	3



(6) CC-Link Module

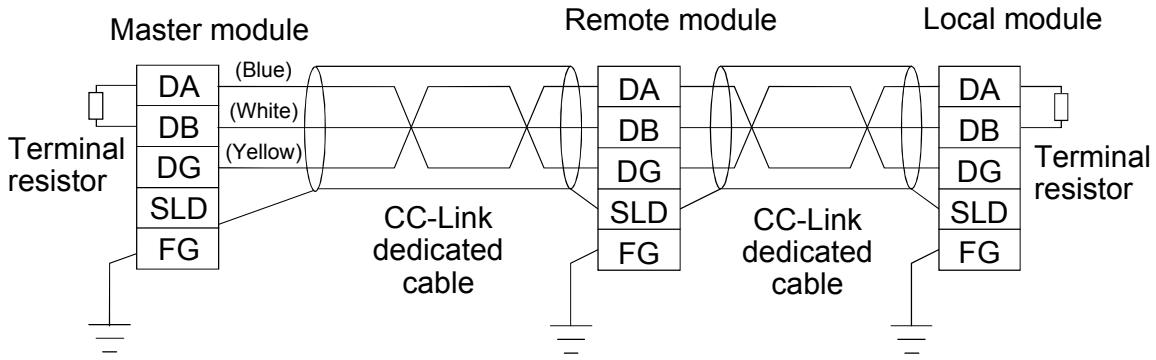
(a) Be sure to ground the cable shield that is connected to the CC-Link module close to the exit of control panel or to any of the CC-Link stations within 30 cm (11.81 in.) from the module or stations.
The CC-Link dedicated cable is a shielded cable. As shown in the illustration below, remove a portion of the outer covering and ground as large a surface area of the exposed shield part as possible.



(b) Always use the specified CC-Link dedicated cable.

(c) The CC-Link module, the CC-Link stations and the FG line inside the control panel should be connected at the FG terminal as shown in the diagram below.

[Simplified diagram]



(d) Power line connecting to the external power supply terminal (compliant with I/O power port of CE standard) should be 30m (98.43 ft.) or less. Power line connecting to module power supply terminal (compliant with main power port of CE standard) should be 10m (32.81 ft.) or less.

(e) A power line connecting to the analog input of the following modules should be 30cm or less.
- AJ65BT-64RD3
- AJ65BT-64RD4
- AJ65BT-68TD

(7) Measures against static electricity

When using an insulation displacement connector without connector cover, a connected cable for the connector is thin in applicable wire size and coating. Therefore, note that the module may cause an electric discharge failure.

As measures against the failure, using pressure-displacement type connector whose applicable wire size is thick or soldering type connector is recommended.

3.1.4 Power supply module

The precautions required for each power supply module are described below. Always observe the items noted as precautions.

Model	Precautions
A1S61PN, A1S62PN	Make sure to short and ground the LG and FG terminals.∗2
A1S63P∗1	Use the 24VDC panel power equipment conforming to the EU Directive.

∗1: If sufficient filter circuitry is built into the 24 VDC external power supply module, the noise generated by A1S63P will be absorbed by that filter circuit, so a line filter may not be required.
Filtering circuitry of version F or later of A1S63P is improved so that a external line filter is not required.

∗2: To ensure the compliance with CE (EN6111-21/A11), make sure to short the LG and FG terminals using a wire of 6 to 7cm.

3.1.5 Base unit

The following table shows models of base units that are compatible with EMC instructions.

Type	Model name	Applicability
Main base unit	A1S38HBEU	Applicable
	A1S3□B, A1S38HB	Not applicable
Extension base unit	A1S5□B(S1), A1S6□B(S1)	Applicable

3.1.6 Ferrite core

Use of ferrite cores is effective in reducing the conduction noise in the band of about 10 MHz and radiated noise in 30 to 100 MHz band.
It is recommended to attach ferrite cores when the shield of the shielded cable coming out of control panel does not work effectively, or when emission of the conduction noise from the power line has to be suppressed.*1 The ferrite cores used in our tests are TDK's ZCAT3035.
It should be noted that the ferrite cores should be fitted to the cables in the position immediately before they are pulled out of the enclosure. If the fitting position is improper, the ferrite will not produce any effect.

∗ 1:To response with CE (EN61131-2/A12), make sure to mount 2 or more ferrite cores onto the power supply line. The mounting position should be as near the power supply module as possible.
Ferrite core
Type: ZCAT2235-1030A (TDK ferrite core)

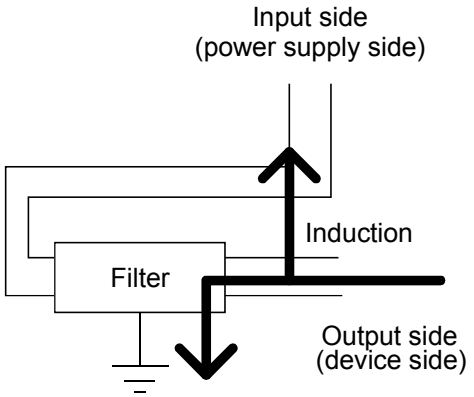
3.1.7 Noise filter (power supply line filter)

A noise filter is a component which has an effect on conducted noise. With the exception of some models, it is not required to fit the noise filter to the power supply line, but fitting it can further suppress noise. (The noise filter has the effect of reducing conducted noise of 10 M Hz or less.) Use any of the following noise filters (double π type filters) or equivalent.

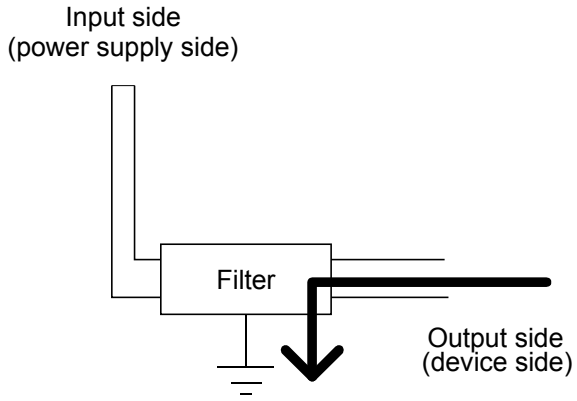
Model name	FN343-3/01	FN660-6/06	ZHC2203-11
Manufacturer	SCHAFFNER	SCHAFFNER	TDK
Rated current	3 A	6 A	3 A
Rated voltage	250 V		

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

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



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



(b) Separate and lay the input and output wires.

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

3.2 Requirements for Compliance with Low Voltage Directives

The Low Voltage Directives apply to the electrical equipment operating from 50 to 1000VAC or 75 to 1500VDC; the manufacturer must ensure the adequate safety of the equipment.
Guidelines for installation and wiring of MELSEC-QnA series programmable controller are provided in Section 3.2.1 to 3.2.7 for the purpose of compliance with the EMC Directives.
The guidelines are created based on the requirements of the regulations and relevant standards, however, they do not guarantee that the machinery constructed according to them will comply with the Directives.
Therefore, the manufacturer of the machinery must finally determine how to make it comply with the EMC Directives: if it is actually compliant with the EMC Directives.

3.2.1 Standard applied for MELSEC-QnA series programmable controller

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

For the modules which operate with the rated voltage of 50 VAC/75 VDC or above, we have developed new models that conform to the above standard.
For the modules which operate with the rated voltage under 50 VAC/75 VDC, the conventional models can be used, because they are out of the low voltage directive application range.

3.2.2 Precautions when using the MELSEC-QnA series programmable controller

Module selection

(1) Power module
For a power module with rated input voltage of 100/200 VAC, select a model in which the internal part between the first order and second order is intensively insulated, because it generates hazardous voltage (voltage of 42.4 V or more at the peak) area.
For a power module with 24 VDC rated input, a conventional model can be used.

(2) I/O module
For I/O module with rated input voltage of 100/200 VAC, select a model in which the internal area between the first order and second order is intensively insulated, because it has hazardous voltage area.
For I/O module with 24 VDC rated input, a conventional model can be used.

(3) CPU module, memory cassette, base unit
Conventional models can be used for these modules, because they only have a 5 VDC circuit inside.

(4) Special function module
Conventional models can be used for the special modules including analog module, network module, and positioning module, because the rated voltage is 24 VDC or smaller.

(5) Display device
Use the CE-marked product.

3.2.3 Power supply

The insulation specification of the power module was designed assuming installation category II. Be sure to use the installation category II power supply to the programmable controller.

The installation category indicates the durability level against surge voltage generated by a thunderbolt. Category I has the lowest durability; category IV has the highest durability.

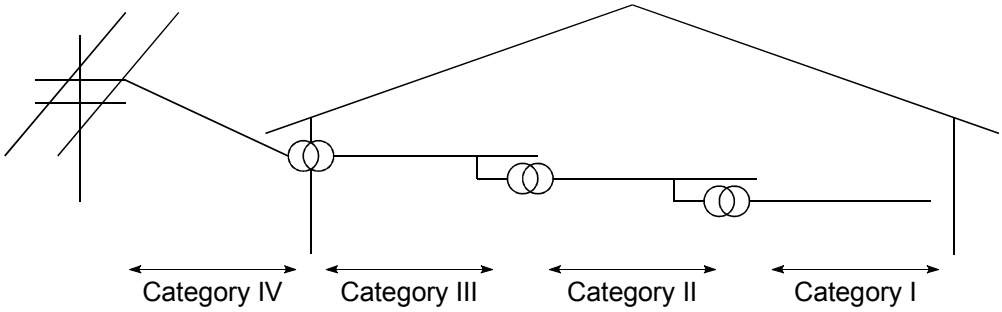


Figure 1.: Installation Category

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

3.2.4 Control panel

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

(1) Electrical shock prevention
In order to prevent persons who are not familiar with the electric facility such as the operators from electric shocks, the control panel must have the following functions:

(a) The control panel must be equipped with a lock so that only the personnel who has studied about the electric facility and have enough knowledge can open it.

(b) The control panel must have a structure which automatically stops the power supply when the box is opened.

(c) For electric shock protection, use IP20 or greater control panel.

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

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

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

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

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

As shown above, the programmable controller can realize the pollution level 2 when stored in a control panel equivalent to IP54.

3.2.5 Module installation

(1) Installing modules contiguously

In Q2AS series programmable controllers, the left side of each I/O module is left open. When installing an I/O module to the base, do not make any open slots between any two modules. If there is an open slot on the left side of a module with 100/200 VAC rating, the printed board which contains the hazardous voltage circuit becomes bare. When it is unavoidable to make an open slot, be sure to install the blank module (A1SG60).

3.2.6 Grounding

There are two kinds of grounding terminals as shown below. Either grounding terminal must be used grounded.
Be sure to ground the protective grounding for the safety reasons.

Protective grounding : Maintains the safety of the programmable controller and improves the noise resistance.
Functional grounding : Improves the noise resistance.

3.2.7 External wiring

(1) Module power supply and external power supply

For the remote module which requires 24VDC as module power supply, the 5/12/24/48VDC I/O module, and the intelligent function module (special function module) which requires the external power supply, use the 5/12/24/48VDC circuit which is doubly insulated from the hazardous voltage circuit or use the power supply whose insulation is reinforced.

(2) External devices

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

(3) Intensive insulation

Intensive insulation refers to the insulation with the dielectric withstand voltage shown in Table 1.

Table 1: Intensive Insulation Withstand Voltage
(Installation Category II, source: IEC664)

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

4.1 Installing the Module

4.1.1 Notes on handling the module

This section explains some notes on handling the CPU module, I/O module, special function module, power supply module, and base unit.

(1) Do not drop or allow any impact to the modules case, memory card, terminal block cover, or pin connector.

(2) Do not remove the module printed wiring board from the case. Otherwise, a malfunction may occur.

(3) Use caution to prevent foreign matter, such as wire chips, falling into the module during wiring. If foreign matter enters the module, remove it.

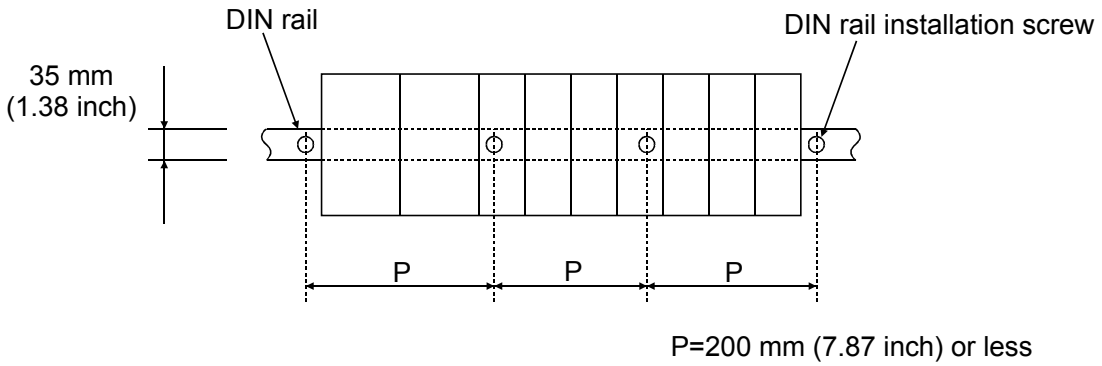
(4) Use the fallowing torque range to tighten the module fixing screws and terminal block screws:

Screw portion	Tightening torque range
Module fixing screw (M4 screw)	78 to 118 N·cm
I/O module (M3.5 screw)	59 to 88 N·cm
Power supply module terminal screws (M3.5 screw)	59 to 78 N·cm

(5) Observe the following points when you are installing the DIN rail:

(a) Applicable DIN rail type (JIS C 2812)
TH35-7.5Fe
TH35-7.5Al
TH35-15Fe

(b) DIN rail installation screw interval
When you are using the TH35-7.5Fe or TH35-7.5Al DIN rail, tighten the DIN rail installation screw with a pitch of 200 mm (7.87 inch) or less to maintain the strength.



P=200 mm (7.87 inch) or less

(6) When installing the base unit to DIN rail in an environment with large vibration, use a vibration-proofing bracket (A1S-PLT-D). Mounting the vibration-proofing bracket (A1S-PLT-D) enhances the resistance to vibration. Depending on the environment to set up the base unit, it is also recommended to fix the base unit to the control panel directly.

4.1.2 Installation environment

Avoid the following environment when you install the CPU system:

(1) A location in which the ambient temperature falls outside the range of 0 to 55 degrees Celsius.

(2) A location in which the ambient humidity falls outside the range of 10 to 90%RH.

(3) A location in which condensation may occur due to drastic changes in temperature.

(4) A location in which corrosive gas or flammable gas exists.

(5) A location in which the system is easily exposed to conductive powder, such as dust and iron filings, oil mist, salt, or organic solvent.

(6) A location exposed to direct sunlight.

(7) A location in which strong electrical or magnetic fields are generated.

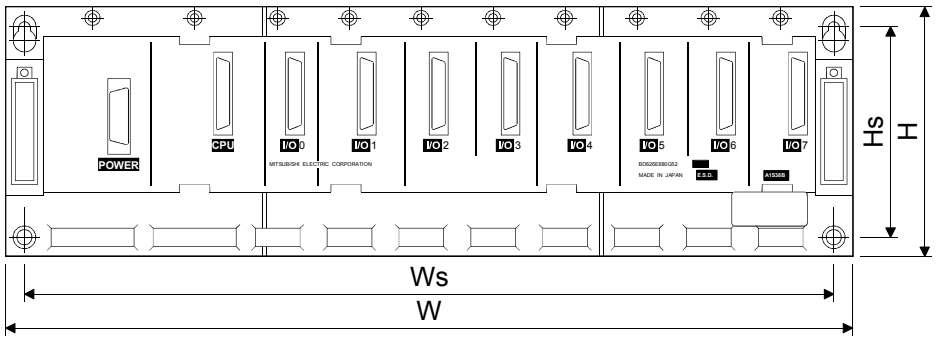
(8) A location in which the module is exposed to direct vibration or impact.

4.1.3 Notes on installing the base unit

Take ease of operation, ease of maintenance, and environmental durability into consideration when you are installing the programmable controller on the panel.

(1) Mounting dimension

Mounting dimensions of each base unit are as follows:



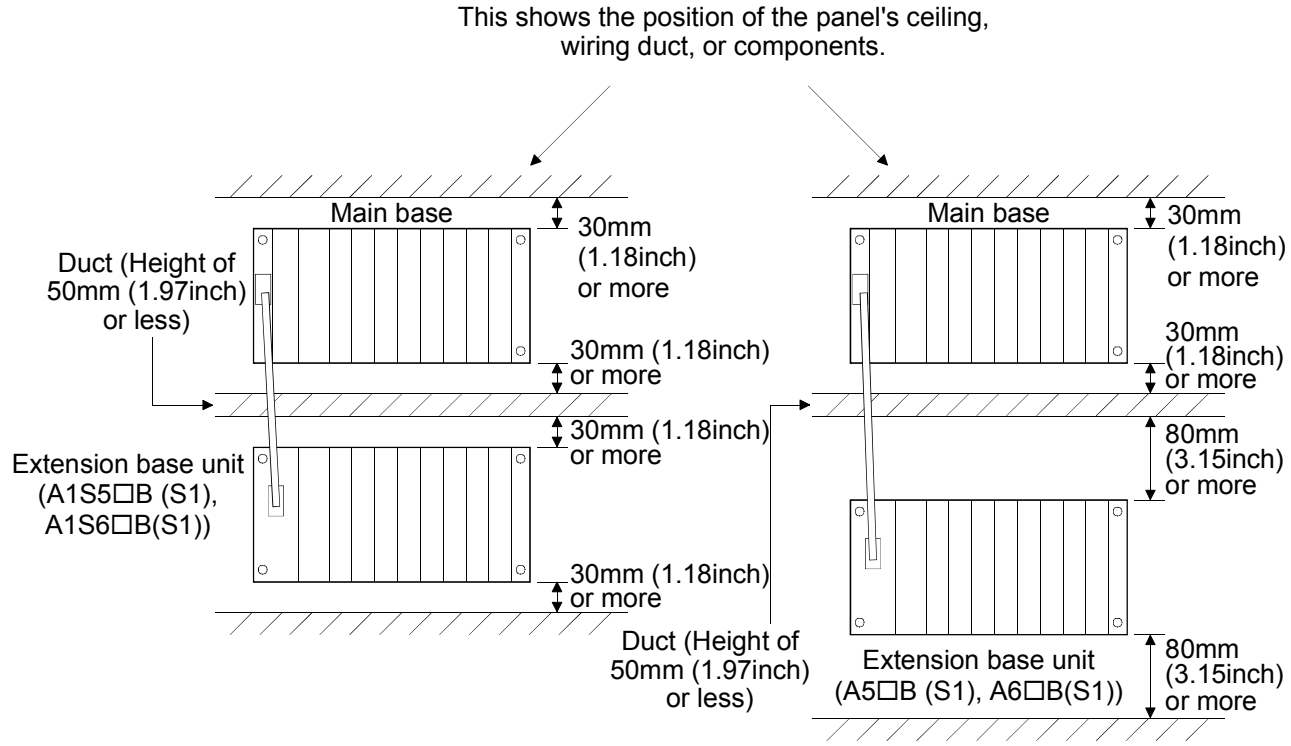
	A1S32B	A1S33B	A1S35B	A1S38B A1S38HB A1S38HBEU	A1S52B (S1)	A1S55B (S1)	A1S58B (S1)	A1S65B (S1)	A1S68B (S1)
W	220 (8.66)	255 (10.04)	325 (12.80)	430 (16.93)	155 (6.10)	260 (10.24)	365 (14.37)	315 (12.40)	420 (16.54)
Ws	200 (7.87)	235 (9.25)	305 (12.01)	410 (16.14)	135 (5.31)	240 (9.45)	345 (13.58)	295 (11.61)	400 (15.75)
H	130 (5.12)								
Hs	110 (4.33)								

Dimensions: mm (inch)

(2) Module installation position

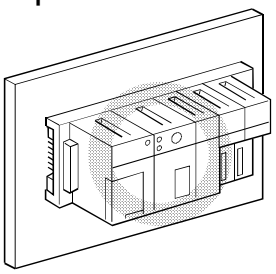
To maintain good ventilation and make it easy to replace the module, keep the following distances between the top and bottom of the module and the structure or other components.

- A1S3□B, A1S38HB, A1S38HBEU, A1S5□B(S1), A1S6□B(S1) .....30 mm (1.18 inch) or over
- A5□B, A6□B .....80 mm (3.15 inch) or over

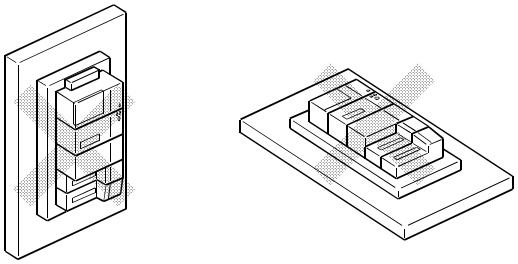


(3) Module installation direction

(a) Use the programmable controller in the following position for better ventilation and heat dissipation:



(b) Do not use the programmable controller in the following positions:



Vertical position Horizontal position

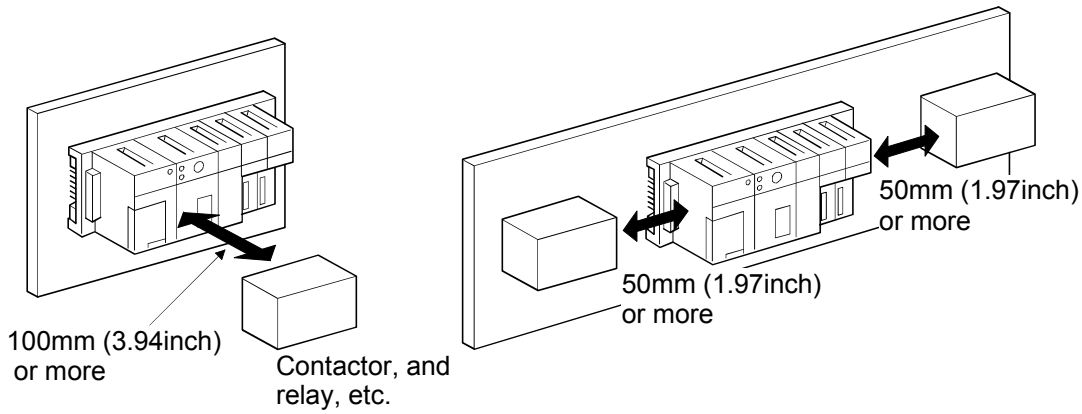
(4) Install the base unit on a level surface.

If the surface is not level, force may be applied to the printed wiring board, causing a malfunction.

(5) Install the unit far from any source of vibration, such as a large magnetic contactor and a no-fuse breaker on the same panel, or install it on a separate panel.

(6) Keep the following distance between the programmable controller and other devices (such as a contactor and a relay) in order to avoid the influence of radiated noise and heat:

- a device installed in front of the programmable controller
  ..... 100mm (3.94 inch) or more
- a device installed on the right or left of the programmable controller
  ..... 50mm (1.97 inch) or more



4.2 Fail-Safe Circuit Concept

When the programmable controller is powered ON and then OFF, improper outputs may be generated temporarily depending on the delay time and start-up time differences between the programmable controller power supply and the external power supply for the control target (especially, DC).

For example, if the external power supply for the control target is powered ON and then the programmable controller is powered ON, the DC output module may generate incorrect outputs temporarily upon the programmable controller power-ON. Therefore, it is required to build the circuit that energizes the programmable controller by priority.

The external power failure or programmable controller failure may lead to the system error.
In order to eliminate the possibility of the system error and ensure fail-safe operation, build the following circuit outside the programmable controller: emergency circuit, protection circuit and interlock circuit, as they could cause machine damages and accidents due to the abovementioned failures.

An example of system design, which is based on fail-safe concept, is provided on the next page.

⚠ DANGER

- Create a safety circuit outside the programmable controller to ensure the whole system will operate safely even if an external power failure or a programmable controller failure occurs.
  Install the emergency stop switch outsaid the controlpanel so that workers can operation it easily.
  Otherwise, incorrect output or malfunction may cause an accident.
  (1) For an emergency stop circuit, protection circuit and interlock circuit that is designed for incompatible actions such as forward/reverse rotation or for damage prevention such as the upper/lower limit setting in positioning, any of them must be created outside the programmable controller.
  (2) When the programmable controller detects the following error conditions, it stops the operation and turn off all the outputs.
  - The overcurrent protection device or overvoltage protection device of the power supply module is activated.
  - The programmable controller CPU detects an error such as a watchdog timer error by the self-diagnostics function.

  In the case of an error of a part such as an I/O control part that cannot be detected by the programmable controller CPU, all the outputs may turn on. In order to make all machines operate safely in such a case, set up a fail-safe circuit or a specific mechanism outside the programmable controller.
  (3) Depending on the failure of the output module's relay or transistor, the output status may remain ON or OFF incorrectly. For output signals that may lead to a serious accident, create an external monitoring circuit.
- Design a circuit so that the external power will be supplied after power-up of the programmable controller.
  Activating the external power supply prior to the programmable controller may result in an accident due to incorrect output or malfunction.
- If load current more than the rating or overcurrent due to a short circuit in the load has flowed in the output module for a long time, it may cause a fire and smoke. Provide an external safety device such as a fuse.

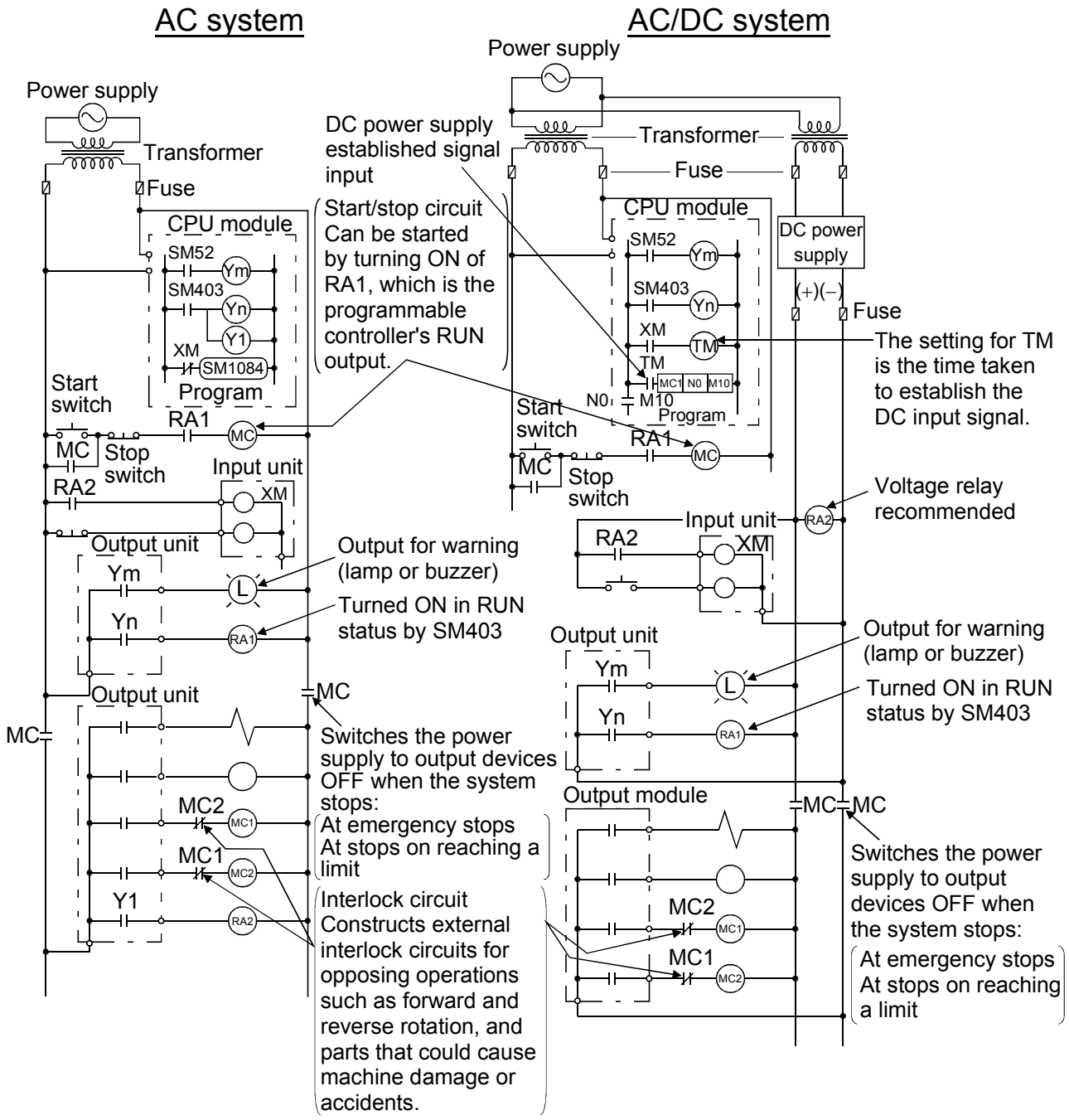
DANGER

- For the operation status of each station at a communication error in data link, refer to the respective data link manual. The communication error may result in an accident due to incorrect output or malfunction.
- When controlling a running programmable controller (data modification) by connecting a peripheral device to the CPU module or a PC to a special function module, create an interlock circuit on sequence programs so that the whole system functions safely all the time.
  Also, before performing any other controls (e.g. program modification, operating status change (status control)), read the manual carefully and ensure the safety.
  In these controls, especially the one from an external device to a programmable controller in a remote location, some programmable controller side problem may not be resolved immediately due to failure of data communications.
  To prevent this, create an interlock circuit on sequence programs and establish corrective procedures for communication failure between the external device and the programmable controller CPU.
- When setting up the system, do not allow any empty slot on the base unit.
  If any slot is left empty, be sure to use a blank cover (A1SG60) or a dummy module (A1SG62) for it.
  When using the extension base unit, A1S52B(S1), A1S55B(S1) or A1S58B(S1), attach the included dustproof cover to the module in slot 0.
  Otherwise, internal parts of the module may be flied in the short circuit test or when an overcurrent or overvoltage is accidentally applied to external I/O section.

CAUTION

- Do not install the control lines or communication cables together with the main circuit or power lines, or bring them close to each other.
  Keep a distance of 100mm (3.9inch) or more between them.
  Failure to do so may cause malfunctions due to noise.
- When an output module is used to control the lamp load, heater, solenoid valve, etc., a large current (ten times larger than the normal one) may flow at the time that the output status changes from OFF to ON. Take some preventive measures such as replacing the module with the one of a suitable current rating.

(1) System design circuit example



The procedures used to switch on the power supply are indicated below.

AC system

[1] Switch the power supply ON.
[2] Set the CPU module to RUN.
[3] Switch the start switch ON.
[4] The output devices are driven in accordance with program when the magnetic contactor (MC) turns ON.

AC/DC system

[1] Switch the power supply ON.
[2] Set the CPU module to RUN.
[3] Switch RA2 ON when the DC power supply starts.
[4] Switch the timer (TM) ON when the DC power supply reaches working voltage. (The set value for TM must be the time it takes for 100% establishment of the DC power after RA2 is switched ON. Make this set value 0.5 seconds.)
[5] Switch the start switch ON.
[6] The output devices are driven in accordance with the program when the magnetic contactor (MC) comes ON. (If a voltage relay is used at RA2, no timer (TM) is necessary in the program.)

(2) Fail-safe measures to cover the possibility of programmable controller failure

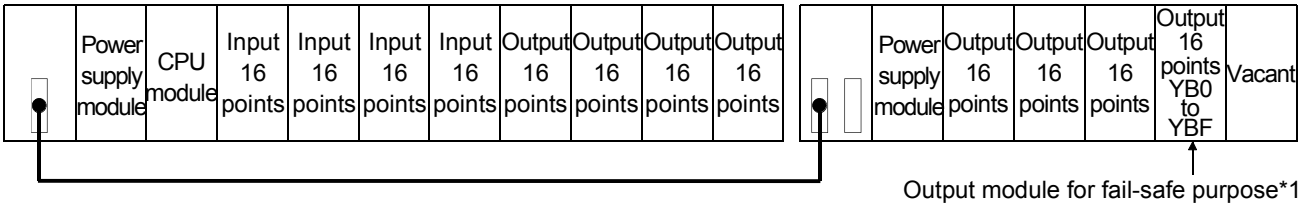
Problems with a CPU module and memory can be detected by the self diagnostics function. However, problems with I/O control area may not be detected by the CPU module.

In such cases, all I/O points turn ON or OFF depending on the problem, and normal operation and safety cannot be maintained.

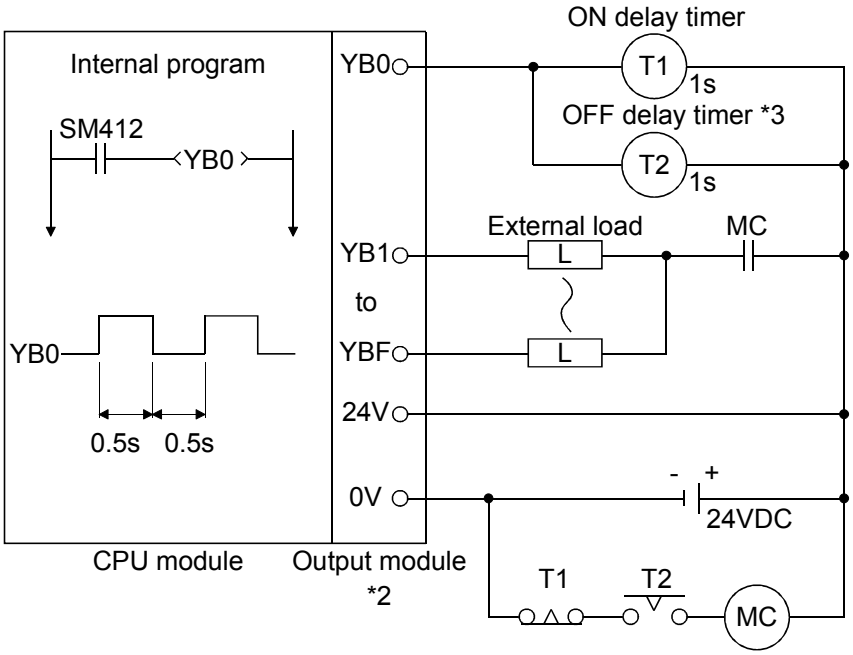
Though Mitsubishi programmable controllers are manufactured under strict quality control, they may fail or malfunction due to unspecified reasons. To prevent the whole system failure, machine breakdown, and accidents, build a fail-safe circuit outside the programmable controller.

Examples of a system and its fail-safe circuitry are described below:

<System example>



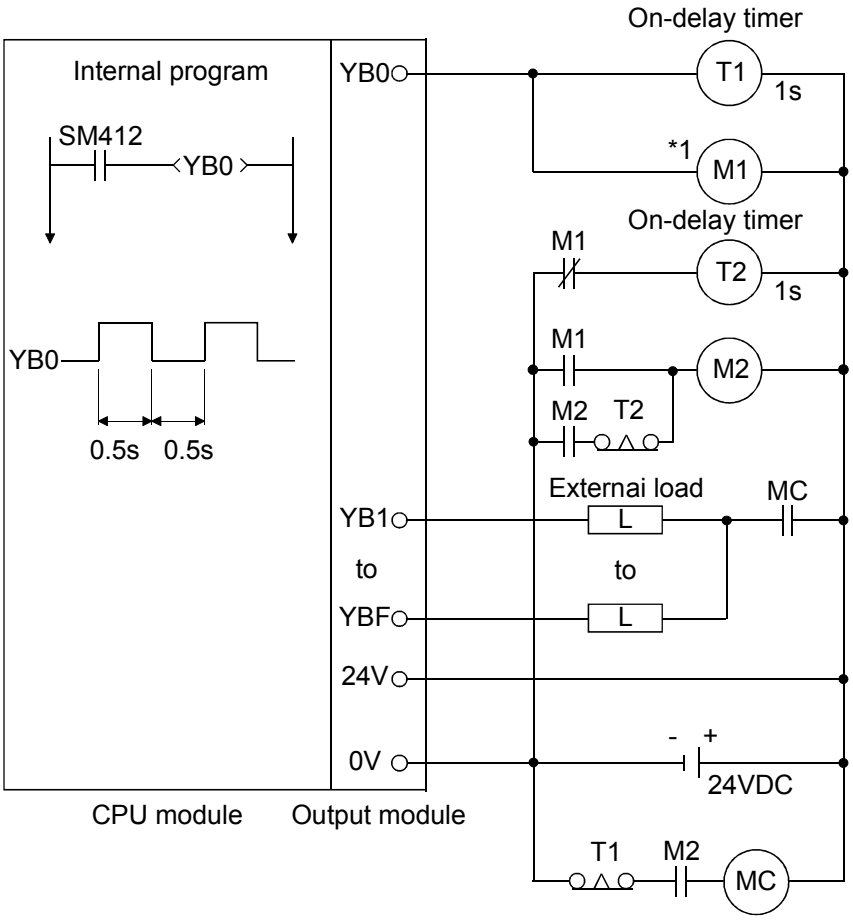
*1: The output module for fail-safe purpose should be mounted on the last slot of the system. (YB0 to YBF in the above system.)



*2: Since YB0 turns ON and OFF alternatively at 0.5 second intervals, use a contactless output module (a transistor is used in the above example).

*3: If an offdelay timer (especially miniature timer) is not available, construct the failsafe circuit using an ondelay timer shown on the next page.

When constructing a failsafe circuit using ondelay timers only



*1: Use a solid state relay for the M1 relay.

4.3 Wiring

4.3.1 Power supply module specifications

(1) Table 4.1 shows the specifications of the power supply modules.

Table 4.1 Power supply module specifications

Item		Specifications		
		A1S61PN	A1S62PN	A1S63P
Base unit position		Power supply module slot		
Rated input voltage		100 to 240 V AC (+10 %/-15 %) (85 to 264 V AC)		24 V DC (+30 %/-35 %) (15.6 to 31.2 V DC)
Rated input frequency		50/60 Hz ± 5 %		——
Input voltage distortion factor		Within 5 % (Refer to Section 4.4)		——
Max. input apparent power		105 V A		41 W
Inrush current		20 A 8 ms or lower *4		81 A 1 ms or lower
Rated output current	5 V DC	5 A	3 A	5 A
	24 V DC ± 10 %	——	0.6 A	——
Overcurrent protection *1	5 V DC	5.5 A or higher	3.3 A or higher	5.5 A or higher
	24 V DC	——	0.66 A or higher	——
Overvoltage protection *2	5 V DC	5.5 to 6.5 V		
	24 V DC	——		
Efficiency		65 % or higher		
Allowable momentary power failure time *3		20 ms or higher		1 ms or lower
Dielectric withstand voltage	Between primary and 5 V DC	AC across input/LG and output/FG 2830 V AC rms/3 cycle (2000 m (6562 ft.))		500 V AC
	Between primary and 24 V DC			——
Insulation resistor		AC across input/LG and output/FG 10 MΩ or higher, measures with a 500 V DC insulation resistance tester		
Noise durability		(1) Noise voltage 1500 Vp-p, Noise width 1 μs, Noise frequency 25 to 60 Hz (noise simulator condition) (2) Noise voltage IEC801-4, 2 kV		Noise voltage 500 Vp-p, Noise width 1 μs, Noise frequency 25 to 60 Hz (noise simulator condition)
Power indication		Power LED indication (light at the time of output of 5 V DC)		
Terminal screw size		M3.5 × 7		
Applicable wire size		0.75 to 2 mm^2 (AWG 18 to 14)		
Applicable solderless terminal		RAV 1.25 to 3.5, RAV 2 to 3.5		
Applicable tightening torque		59 to 88 N·cm		
External dimension		130 × 55 × 93.6 (5.12 × 2.17 × 3.69) mm (inch)		
Weight		0.60 kg		0.50 kg

POINT

*1: Overcurrent protection

The overcurrent proctection device shuts off the 5VDC and/or 24VDC circuit(s) and stops the system if the current exceeding the specified value flows in the circuit(s).

As this results in voltage drop, the power supply module LED turns OFF or is dimly lit.

After that, eliminate the causes of overcurrent, e.g., insufficient current capacity and short circuit, and then start the system.

When the current has reached the normal value, the initial start up of the system will be performed.

*2: Overvoltage protection

The overvoltage protection shuts off the 5VDC circuit and stops the system if the overvoltage of 5.5 to 6.5V is applied to the circuit.

This results in the power supply module LED turning OFF.

When restarting the system, power OFF and ON the input power supply, and the initial start up of the system will be performed.

If the system is not booted and the LED remains off, this means that the power supply module has to be replaced.

*3: Allowable momentary power failure period

The programmable controller CPU allowable momentary power failure period varies with the power supply module used.

In case of the A1S63P power supply module, the allowable momentary power failure period is defined as the time from when the primary side of the stabilized power supply for supplying 24VDC to the A1S63P is turned OFF until when the voltage (secondary side) has dropped from 24VDC to the specified value (15.6VDC) or less.

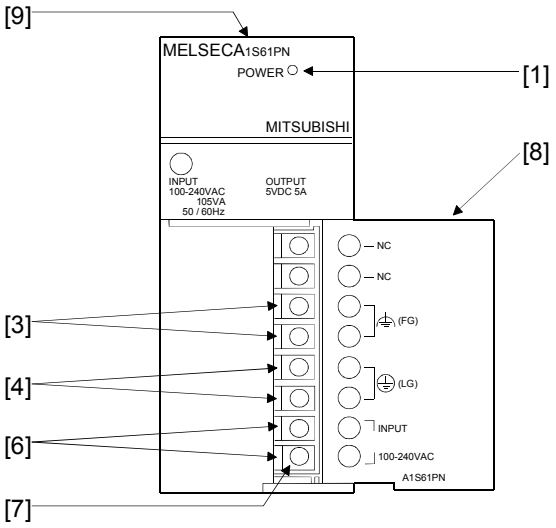
*4: Inrush current

If the power supply module is re-powered ON right after powered OFF (within 5seconds), the inrush current exceeding the specified value (2ms or less) may be generated. Therefore, make sure to re-power ON the module 5seconds after power off.

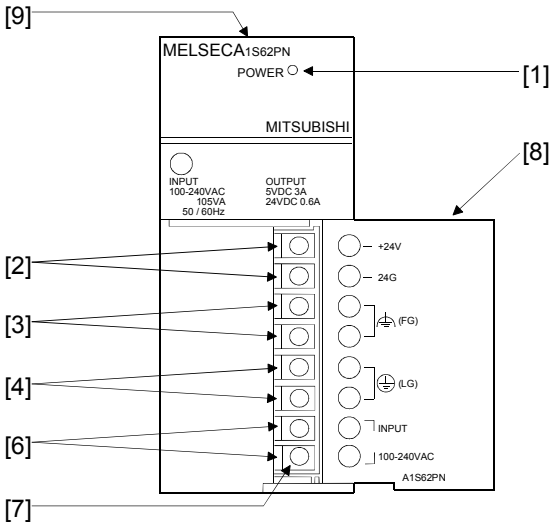
When selecting a fuse or breaker for external circuit, consider the above point as well as meltdown and detection characteristics.

4.3.2 Parts names

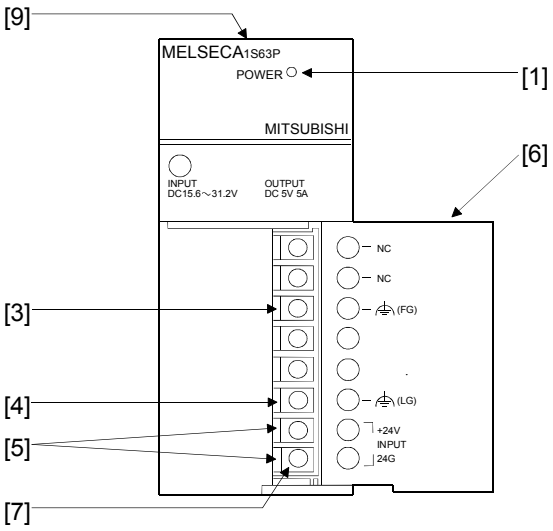
The following gives the names and description of the parts of the power supply modules:



(1) A1S61PN



(2) A1S62PN



(3) A1S63P

No.	Name	Description
[1]	POWER LED	The indicator LED for the 5 V DC power.
[2]	24 V and 24 G terminals	Used to supply 24 V DC to inside the output module (using external wiring).
[3]	FG terminal	The grounding terminal connected to the shield pattern of the printed circuit board.
[4]	LG terminal	Grounding for the power supply filter. The potential of A1S61PN or A1S62PN terminal is 1/2 of the input voltage.
[5]	Power supply input terminals	Used to connect a 24 V DC power supply.
[6]	Power supply input terminals	Used to connect 100 V AC to 200 V AC power supply.
[7]	Terminal screw	M3.5 × 7
[8]	Terminal cover	The protective cover of the terminal block.
[9]	Module fixing screw	Used to fix the module to the base unit. (M4 screw, tightening torque: 78 to 118 N·cm)

POINT

(1) Do not cable to the unused terminals such as FG and LG on the terminal block (terminals whose name is not printed on the terminal cover).
(2) Be sure to ground the terminal ⏚ LG to the protective ground conductor with class D (class-3) grounding or above.

4.3.3 Wiring instructions

Instructions for wiring the power supply cable and I/O cable.

⚠ DANGER

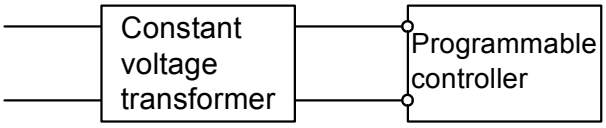
- Be sure to shut off all phases of the external power supply used by the system before wiring.
  Failure to do so may result in an electric shock or damage of the product.
- Before energizing and operating the system after wiring, be sure to attach the terminal cover supplied with the product.
  Failure to do so may cause an electric shock.

⚠ CAUTION

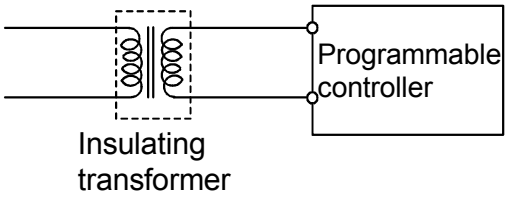
- Always ground the FG and LG terminals to the protective ground conductor.
  Failure to do so may cause an electric shock or malfunctions.
- Wire the module correctly after confirming the rated voltage and terminal layout.
  Connecting a power supply of a different voltage rating or incorrect wiring may cause a fire or failure.
- Do not connect multiple power supply modules to one module in parallel. The power supply modules may be heated, resulting in a fire or failure.
- Press, crimp or properly solder the connector for external connection with the specified tool.
  Incomplete connection may cause a short circuit, fire or malfunctions.
- Tighten terminal screws within the specified torque range. If the screw is too loose, it may cause a short circuit, fire or malfunctions.
  If too tight, it may damage the screw and/or the module, resulting in a short circuit or malfunctions.
- Carefully prevent foreign matter such as dust or wire chips from entering the module.
  Failure to do so may cause a fire, failure or malfunctions.
- Install our programmable controller in a control panel for use.
  Wire the main power supply to the power supply module installed in a control panel through a distribution terminal block.
  Furthermore, the wiring and replacement of a power supply module have to be performed by a maintenance worker who acquainted with shock protection.
  (For the wiring methods, refer to Type Q2AS(H)CPU(S1) User's Manual.)

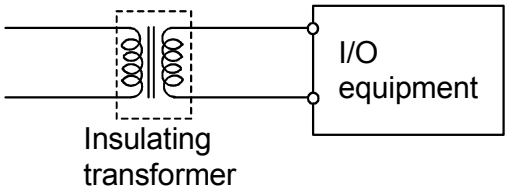
(1) Wiring of power supply

(a) When voltage fluctuations are larger than the specified value, connect a constant-voltage transformer.



(b) Use a power supply which generates minimal noise between wires and between the programmable controller and ground. If excessive noise is generated, connect an insulating transformer.





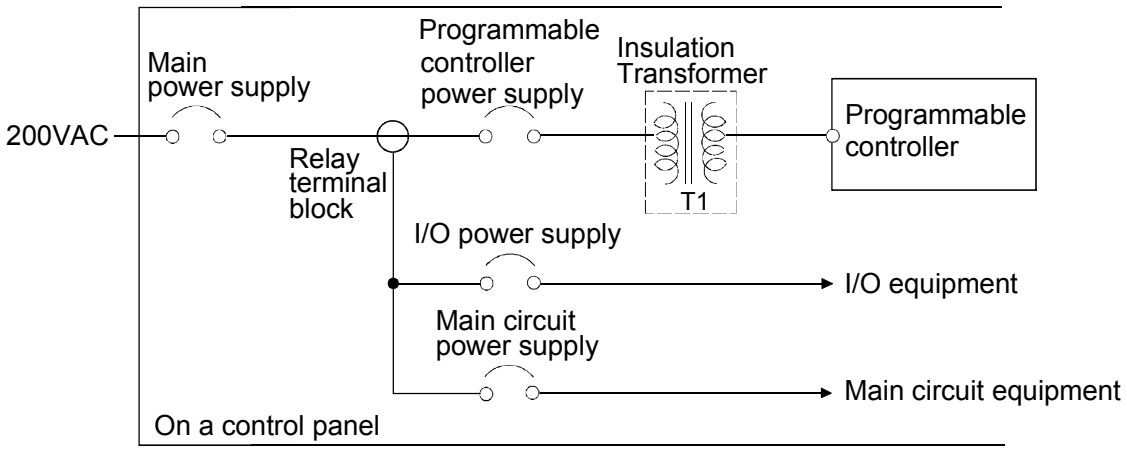
(c) When a power transformer or insulating transformer is employed to reduce the voltage from 200 VAC to 100 VAC, use one with a capacity greater than those indicated in the following table.

Power Supply Module	Transformer Capacity
A1S61PN	110VA × n
A1S62PN	110VA × n

n: Stands for the number of power supply modules.

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

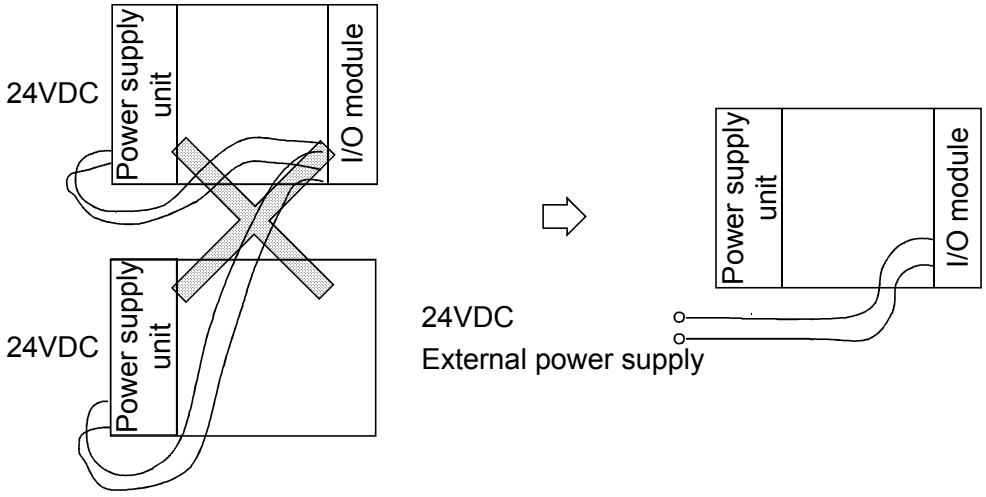
(e) Taking rated current or inrush current into consideration when wiring the power supply, be sure to connect a breaker or an external fuse that have proper blown and detection.
When using a single programmable controller, a 10A breaker or an external fuse are recommended for wiring protection.



(f) Note on using the 24 VDC output of the A1S62PN power supply module.

> **CAUTION** ● Do not connect multiple power supply modules to one module in parallel. The power supply modules may be heated, resulting in a fire or failure.

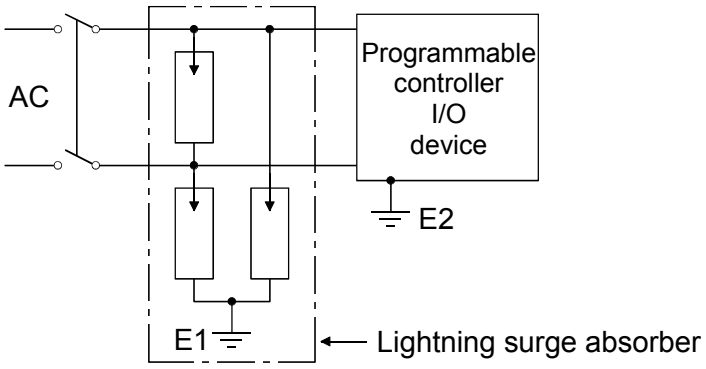
If the 24 VDC output capacity is insufficient for one power supply module, supply 24 VDC from the external 24 VDC power supply as shown below:



(g) 100 V AC, 200 V AC and 24 V DC wires should be twisted as dense as possible. Connect the modules with the shortest distance.
Also, to reduce the voltage drop to the minimum, use the thickest wires possible (maximum 2mm^2).

(h) Do not bind 100VAC and 24VDC wires together with main circuit (high tension and large current) wires or I/O signal wires (including common line) nor place them near each other. Provide 100mm (3.94 inch) clearance between the wires if possible.

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



POINT

(1) Separate the ground of the surge absorber for lightening (E1) from that of the programmable controller (E2).
(2) Select a surge absorber for lightening whose power supply voltage does no exceed the maximum allowable circuit voltage even at the time of maximum power supply voltage elevation.

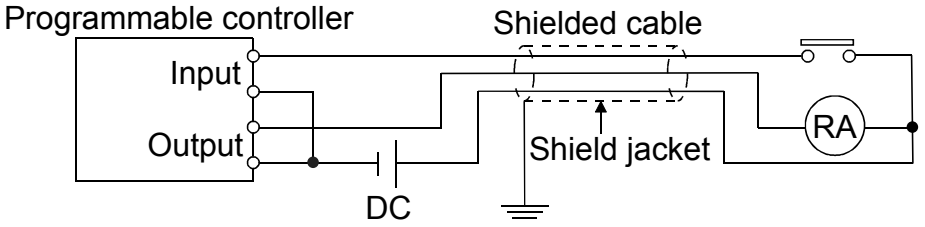
(2) Wiring to I/O device

(a) The solderless terminal with insulation sleeve is inapplicable to a terminal block.
It is advisable to cover the wire connection part of a terminal with a mark tube or insulation tube.

(b) Install wiring to a terminal block using the cable of core diameter 0.3 to 0.75mm^2, and outside diameter 2.8mm or less.

(c) Run the I/O line and output line away from each other.

(d) When the main circuit line and power line cannot be separated, use a shielding cable and ground it on the programmable controller side. However, ground it on the opposite side in some cases.



(e) When cables are run through pipes, securely ground the pipes.

(f) Run the 24VDC input line away from the 100VAC and 200 VAC lines.

(g) The cabling of 200m (656.2ft.) or longer distance may produce leakage current depending on the capacity between lines and result in an accident.

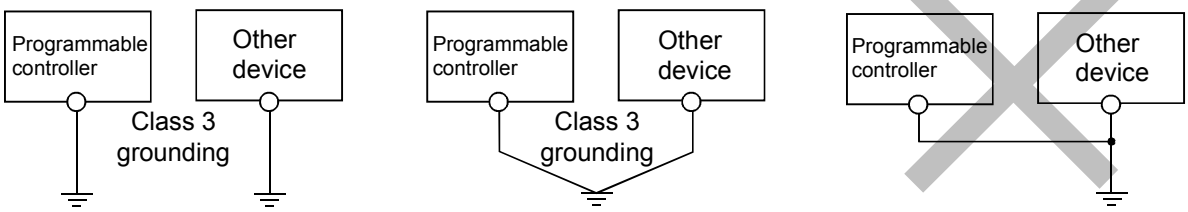
(h) As a countermeasure against the power surge due to lightning, separate the AC wiring and DC wiring and connect a surge absorber for lightning as shown in (i) of item (1).
Failure to do so increases the risk of I/O device failure due to lightning.

(3) Grounding

CAUTION ● Be sure to ground the FG terminals and LG terminals to the protective ground conductor. Not doing so could result in electric shock or erroneous operation.

(a) Carry out the independent grounding if possible. (Grounding resistance 100Ω or less.)

(b) If the independent grounding is impossible, carry out the shared grounding (2) as shown below.



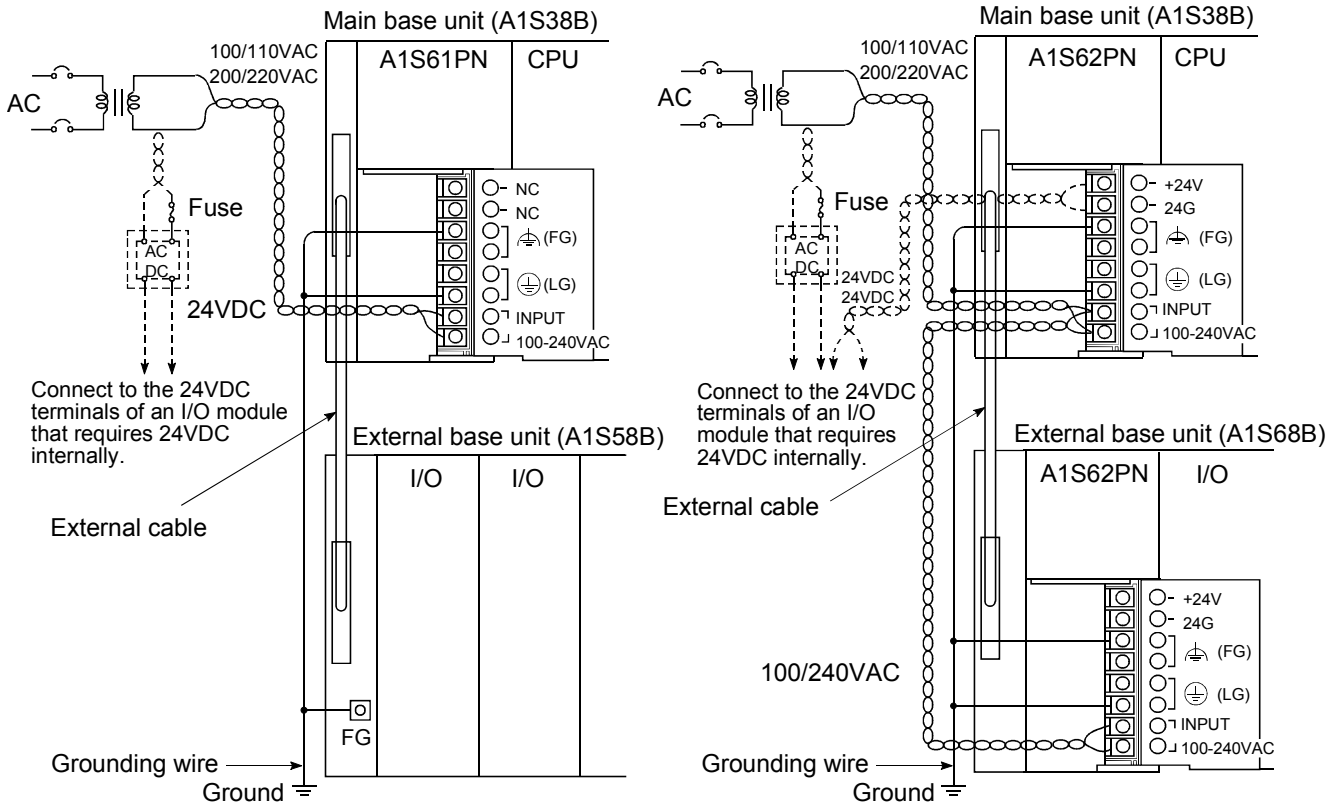
(1) Independent grounding.....Best (2) Shared grounding.....Good (3) Common grounding.....Not allowed

(c) Use the cable of 2mm^2 or more for grounding.
Set the grounding point closer to the programmable controller to make the grounding cable short as possible.

(d) If a malfunction occurs due to earthling, separate either LG or FG of the base module, the device combination, or all the connection from the earthling.

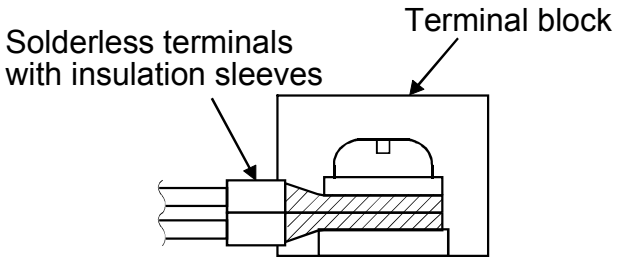
4.3.4 Wiring to module terminals

This section explains the wiring of power lines and grounding lines to the main and extension bases.



POINT

(1) Use the thickest possible (max. 2 mm^2 (14 AWG)) wires for the 100/200 VAC and 24 VDC power cables. Be sure to twist these wires starting at the connection terminals. For wiring a terminal block, be sure to use a solderless terminal. To prevent short-circuit due to loosening screws, use the solderless terminals with insulation sleeves of 0.8 mm (0.03 inch) or less thick. The number of the solderless terminals to be connected for one terminal block are limited to 2.



(2) Be sure to ground the LG and FG terminals. Failure to do so may cause the programmable controller to be susceptible to noise. Note that LG terminals include the potential as half as that of input voltage; you might get an electric shock when you touch them.

(3) A1S61PN and A1S62PN do not need to be switched as the are 100 to 240VAC wide-range.

4.4 Precautions when Connecting the Uninterruptible Power Supply (UPS)

Connect the Q2ASCPU system to the uninterruptible power supply (UPS), while paying attention to the followings.

Use the on-line UPS or line interactive UPS (voltage distortion of 5% or less.) Alternatively, use the off-line UPS, i.e., FREQUPS-F series with serial number P or later (Mitsubishi).

Example: FW-F10-03.K/0.5K

Do not use the off-line UPS other than above.

4.5 Part names and Settings

4.5.1 Part names and settings

This section describes the name and setting of each part of the module.

Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, Q2ASHCPU-S1

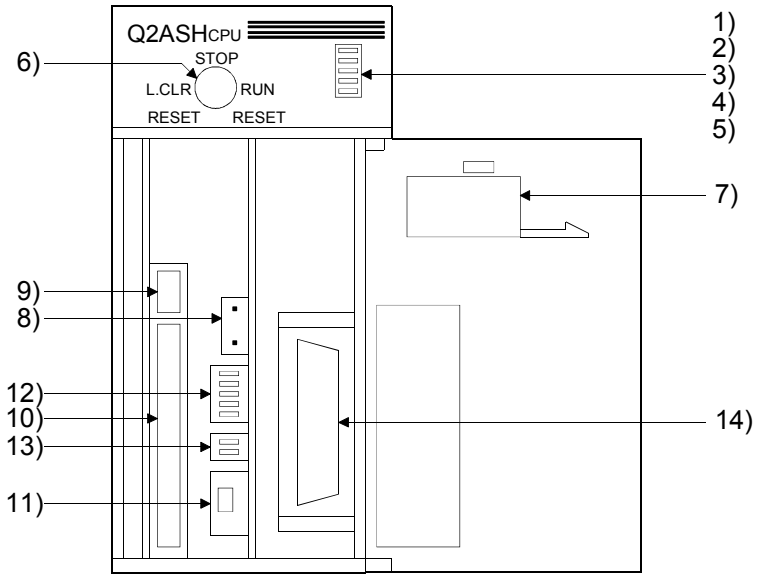
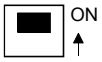
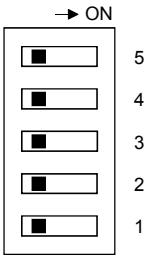
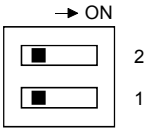


Illustration of the module with the front cover open

No.	Name	Application
1)	RUN LED	This LED indicates the CPU module operating condition. Lit :Operating with the RUN/STOP key switch set to RUN or STEP-RUN. Off :Stopped with the RUN/STOP key switch set to STOP, PAUSE, or STEP-RUN. Or, the CPU module has detected the error that would cause the operation to stop. Flash :The RUN/STOP key switch has been set from STOP to RUN after the program was written in stop mode. The CPU module is not in RUN mode. To engage the CPU module in RUN mode, set the RUN/STOP key switch to RUN, STOP, the RUN. Alternatively, reset the module using the RUN/STOP key switch.
2)	ERROR LED	Lit :A self-diagnostic error (other than a battery error) that will not stop operation has been detected. (The parameter has been set to Continue operation at error detection.) Off :Normal Flash :An error that will stop the operation has been detected.
3)	USER LED	Lit :A error has been detected by the CHK instruction, or annunciator F has been turned ON. Off :Normal Flash :The latch clear operation has been executed.
4)	BAT. ALARM LED	Lit :Battery error has occurred due to a drop in the CPU module main unit/memory card battery voltage. Off :Normal
5)	BOOT LED	Lit :The boot operation has been completed. Off :The boot operation has not been executed.

<table>
<tr><th>No.</th><th>Name</th><th>Application</th></tr>
<tr><td>6)</td><td>RUN/STOP key switch</td><td>RUN/STOP :Executes/stops the operation of the sequence program.
L.CLR :Sets the entire data of the latch area specified by the parameter to OFF or 0. Clears the entry of the sampling trace and the status latch.
RESET :Executes the hardware reset operation and the reset at an operation error occurrence, and initializes the operation.</td></tr>
<tr><td>7)</td><td>Battery (A6BAT)</td><td>Backup battery to be used for the internal RAM and the power failure compensation function.</td></tr>
<tr><td>8)</td><td>Battery connector pin</td><td>Used to connect the battery lead wire. (The lead wire is removed from the connector at shipment in order to prevent battery consumption.)</td></tr>
<tr><td>9)</td><td>Memory card EJECT button</td><td>Used to eject the memory card from the CPU module.</td></tr>
<tr><td>10)</td><td>Memory card loading connector</td><td>This connector is used to load the memory card in the CPU module.</td></tr>
<tr><td>11)</td><td>Memory card Load/eject switch (LED equipped)
</td><td>This switch setting determines whether or not you can load/eject the memory card during energizing. The factory default setting is OFF.
ON :Loading is prohibited. (LED is lit.)
OFF :Loading is allowed. (LED is turned off.)</td></tr>
<tr><td rowspan="4">12)</td><td rowspan="4">System setting switches 1
</td><td>These switches allow you to set the items for the CPU module operation. The factory default setting of all switches is OFF.</td></tr>
<tr><td>SW5 :Boot setting. This switch allows you to select the memory for operation.
ON :Boot operation
OFF :Boot operation is not performed</td></tr>
<tr><td>SW2 to 4 :Parameter area. These switches allow you to select the memory into which to write the parameters.
<table>
<tr><th rowspan="2"></th><th rowspan="2">Internal RAM</th><th colspan="2">Memory card</th><th rowspan="2"></th></tr>
<tr><th>RAM</th><th>ROM</th></tr>
<tr><td>SW4</td><td>OFF</td><td>ON</td><td>OFF</td><td rowspan="3">*SW2 to 4 are valid if SW5 is OFF.</td></tr>
<tr><td>SW3</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>SW2</td><td>OFF</td><td>OFF</td><td>OFF</td></tr>
</table></td></tr>
<tr><td>SW1 :System protect. Writing to the CPU module and issuing the control instructions are prohibited.
ON :System protect is valid.
OFF :System protect is invalid.</td></tr>
<tr><td rowspan="3">13)</td><td rowspan="3">System setting switches 2
</td><td>These switches allow you to set the items for CPU module operation. The factory default setting of all switches is OFF.</td></tr>
<tr><td>SW2 :Unused (Fixed to OFF)</td></tr>
<tr><td>SW1 :Peripheral protocol. This switch allows you to select the type of peripheral devices that are connected to the CPU module peripheral interface.
(Set this switch to ON when you wish to access another stations ACPU from the ACPU peripheral device. The setting becomes effective as soon as you set the switch.)
ON :Peripheral device for the ACPU
OFF :Peripheral device for the Q2ASCPU</td></tr>
<tr><td>14)</td><td>RS-422 connector</td><td>Used to connect a peripheral device.</td></tr>
</table>

4.5.2 Relation between switch operation and the LED indication

(1) Writing a program while the CPU module is stopped:
Follow the procedure below to write a program while the CPU module is stopped:

1) RUN/STOP key switch: STOP
RUN LED: Off .....CPU module is in STOP mode. → Write a program.
2) RUN/STOP key switch: RESET
RUN LED: Off .....CPU module is in STOP mode.
3) RUN/STOP key switch: STOP → RUN
RUN LED: Lit .....CPU module is in RUN mode.

POINT

- After writing a program (except for online program write), perform reset operation, and then place the CPU module in the RUN status.
- When remote STOP is switched to RUN, the CPU module is not put in the "PROG CHECK" status but is placed in the RUN status.

(2) Latch clear operation:
Operate the RUN/STOP key switch as follows to execute the latch clear operation:

1) Turn the RUN/STOP key switch of the CPU module from the "STOP" position to the "L. CLR" position several times (three or four times) to flicker the "USER LED" on the CPU module front.
Normally, the LED flickers when the switch is turned several times (three or four times).
When the "USER LED" flickers, it indicates that latch clear is ready.
2) After the "USER LED" has flickered, turning the RUN/STOP key switch from the "STOP" position to the "L. CLR" position again executes latch clear and lights up the "USER LED".
If the "USER LED" comes on for two seconds and then goes off, it indicates that latch clear is completed normally.
3) To cancel latch clear midway, turn the RUN/STOP key switch to the "RUN" position to place the CPU module in the RUN state, or turn it to the "RESET" position to make a reset.

POINT

- You can make latch clear valid or invalid for each device via the device setting in parameter mode.
- Instead of using the RUN/STOP key switch, you can also execute the latch clear operation remotely from the peripheral device. (Refer to the Q2AS(H)CPU(S1) User's Manual)

(3) Removing the memory card while the programmable controller power is on:
Operate the memory card load/eject switch as described below the memory card while the programmable controller power is still on:

1) Load/eject switch: ON,
Load/eject switch internal LED: Lit.....Ejecting the memory card is prohibited.

2) Load/eject switch: OFF,
Load/eject switch internal LED: Off.....Ejecting the memory card is allowed.
.....→Remove the memory card.

POINT

- The load/eject switch internal LED may not be turned off when you are using the memory card for the CPU module system function (such as sampling trace and status latch) or for the program.
  In this case, quit the corresponding system function or program that is using the memory card. Then, make sure that the load/eject switch internal LED is turned off, and remove the memory card.
- Do not turn on the memory card load/eject switch after you have removed the memory card. Otherwise, on error will occur.
- When there are parameter-set file registers, local devices or failure history, the memory card cannot be the removed.
  If the "memory card in/out" switch is turned OFF, the in/out switch built-in LED does not go off.
  For the file registers, the memory card can be removed when they are set to be unused with the QDRSET(P) instruction.

(4) Loading the memory card while the programmable controller power is on:
Operate the memory card load/eject switch as described below to load the memory card while the programmable controller power is still on:

1) Load the memory card.
2) Load/eject switch: ON,
Load/eject switch internal LED: Lit.....Ejecting the memory card is prohibited.

POINT

- Be sure to turn on the memory card load/eject switch after you have loaded the memory card. Otherwise, you will not be able to use the card.
- Since mount processing is performed again after the memory card is inserted, note that the scan time of one scan when mount processing is performed increases by a maximum of 10ms.

5. SPECIFICATION AND CONNECTION OF I/O MODULES

5.1 Input modules

5.1.1 Input module specifications

Model	Type	No. of Points	Rated Input Voltage	Input Current	Operating Voltage		
					ON voltage	OFF voltage	
A1SX10	AC input	16	100 to 120VAC	6mA	80VAC or higher	30VAC or lower	
A1SX10EU			100 to 120VAC	7mA			
A1SX20			200 to 240VAC	9mA			
A1SX20EU			200 to 240VAC	11mA			
A1SX30	AC/DC input		12/24VAC	4/8.5mA	7VAC/DC or higher	2.7VAC/DC or lower	
			12/24VDC				
A1SX40	DC input (sink type)		12/24VDC	3/7mA	8VDC or higher	4VDC or lower	
A1SX40-S1			24VDC	7mA	DC14V or higher	6.5VDC or lower	
A1SX40-S2							
A1SX41		32	12/24VDC	3/7mA	8VDC or higher	4VDC or lower	
A1SX41-S1			24VDC	7mA	17VDC or higher	3.5VDC or lower	
A1SX41-S2			24VDC	7mA	14VDC or higher	6.5VDC or lower	
A1SX42		64	12/24VDC	2/5mA	8VDC or higher	4VDC or lower	
A1SX42-S1			24VDC	5mA	18.5VDC or higher	3VDC or lower	
A1SX42-S2			24VDC	5mA	17.5VDC or higher	7VDC or lower	
A1SX71	DC input (sink/source type)	32	5/12/24VDC	1.2/3.3/7mA	3.5VDC or higher	1VDC or lower	
A1SX80		16	12/24VDC	3/7mA	8VDC or higher	4VDC or lower	
A1SX80-S1			24VDC	7mA	17VDC or higher	5VDC or lower	
A1SX80-S2			24VDC		13VDC or higher	6VDC or lower	
A1SX81		32	12/24VDC	3/7mA	8VDC or higher	4VDC or lower	
A1SX81-S2			24VDC	7mA	13VDC or higher	6VDC or lower	
A1SX82-S1		64	24VDC	5mA	18.5VDC or higher	3VDC or lower	
A1S42X	DC input (dynamic)	16/32 *2 48/64	12/24VDC	4/9mA	8VDC or higher	4VDC or lower	

	Maximum Simultaneous Input Points (Percentage Simultaneously ON)	Max. Response Time		Field Wiring	Points/ Common	Internal Current Consump-tion (5VDC)	NO. of Occupied Points
		OFF to ON	ON to OFF				
	100%(110VAC) 60%(132VAC)	20ms or lower	35ms or lower	Terminal	16	0.05A	16
	100%(110VAC)	20ms or lower	35ms or lower				
	60%(220VAC)	30ms or lower	55ms or lower				
	60%(220VAC)	30ms or lower	55ms or lower				
	75%(26.4VDC)	25ms or lower	20ms or lower				
		20ms or lower	20ms or lower				
	100%(26.4VDC)	10ms or lower	10ms or lower				
		0.1ms or lower	0.2ms or lower				
		10ms or lower	10ms or lower				
	60%(26.4VDC)	10ms or lower	10ms or lower	40-pin connector	32	0.08A	32
		0.3ms or lower	0.3ms or lower			0.12A	
		10ms or lower	10ms or lower			0.08A	
	50%(24VDC)	10ms or lower	10ms or lower	40-pin connector ×2		0.09A	64
		0.3ms or lower	0.3ms or lower			0.16A	
						0.09A	
	100%	1.5ms or lower	3ms or lower	40-pin connector	32	0.075A*3	32
	100%(26.4VDC)	10ms or lower	10ms or lower	Terminal	16	0.05A	16
		0.4ms or lower	0.5ms or lower				
		10ms or lower	10ms or lower				
	60%(26.4VDC)	10ms or lower	10ms or lower	37-pin D-sub connector	32	0.08A	32
	50%(26.4VDC)	0.3ms or lower	0.3ms or lower	40-pin connector	32	0.16A	64
	100%(26.4VDC)	0.4ms or lower*1	0.4ms or lower*1	24-pin connector	-	0.08A	16/32/48/64

For all modules, the insulation system is photocoupler insulation and the input indications are LED indications.

*1.....The dynamic scan cycle is 13.3ms.

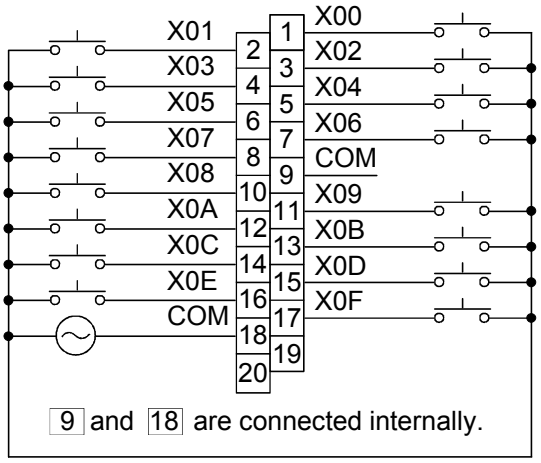
*2.....Set using the DIP switch on the module front.

*3 .....0.08A is shown on the rating plate of the module.

5.1.2 Input module connections

(1)

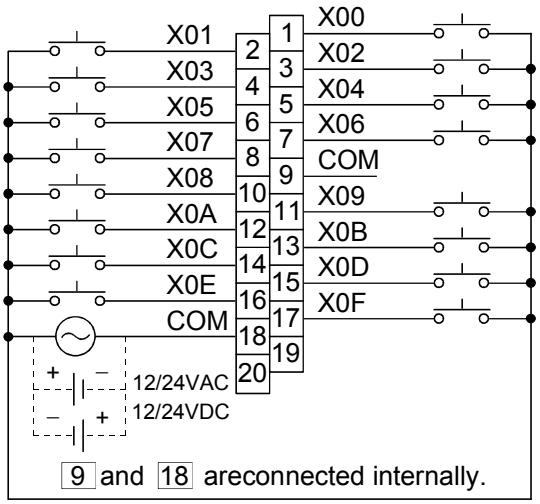
Model	Rated Input Voltage
A1SX10	100 to 120 VAC
A1SX10EU	
A1SX20	200 to 240 VAC
A1SX20EU	



⚠DANGER
- Do not touch terminals while the power is supplied.

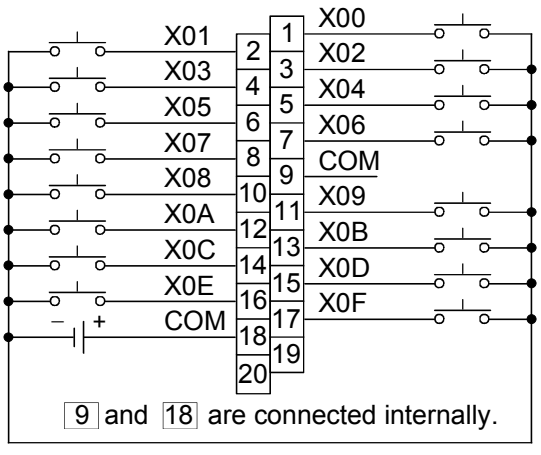
(2)

Model	Rated Input Voltage
A1SX30	12/24 VAC/DC



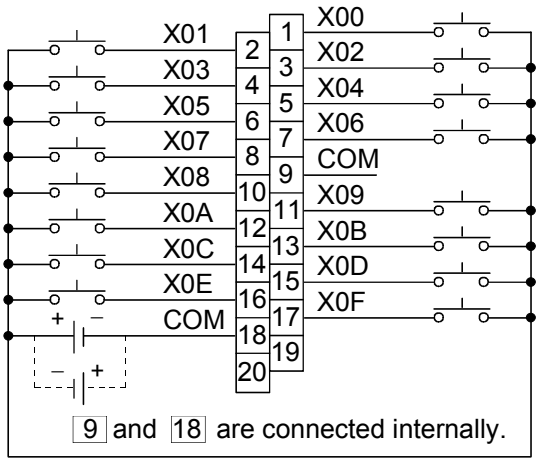
(3)

Model	Rated Input Voltage
A1SX40	12/24 VAC
A1SX40-S1	24 VAC
A1SX40-S2	



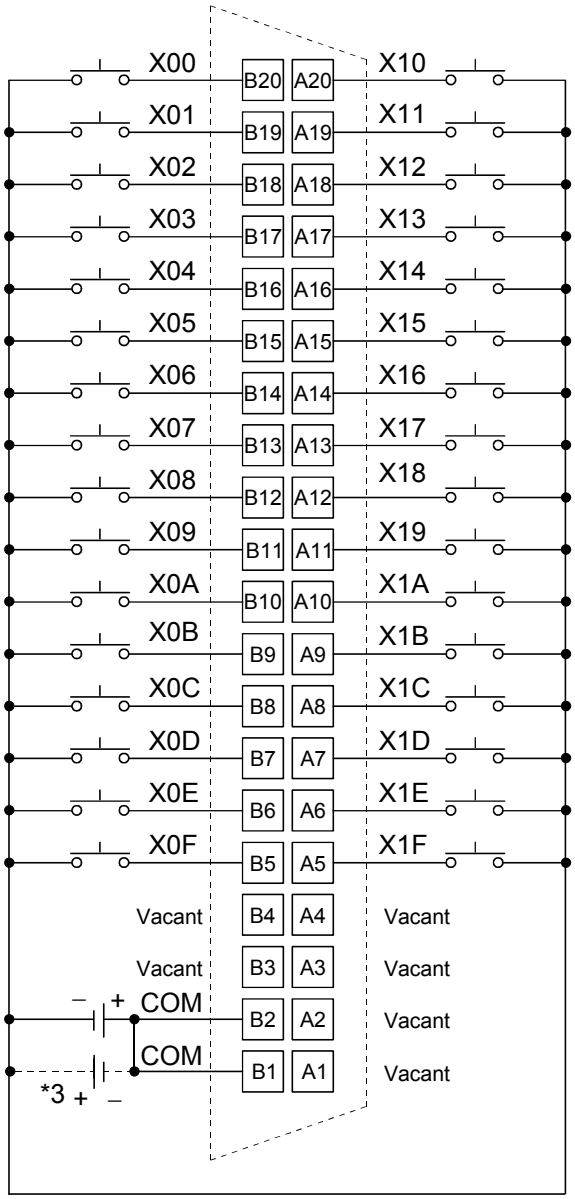
(4)

Model	Rated Input Voltage
A1SX80	12/24 VAC
A1SX80-S1	24 VAC
A1SX80-S2	



(5)

Model	Rated Input Voltage
A1SX41	12/24 VDC
A1SX41-S1(S2)	24 VDC
A1SX42	12/24 VDC
A1SX42-S1(S2)	24 VDC
A1SX82-S1*3	



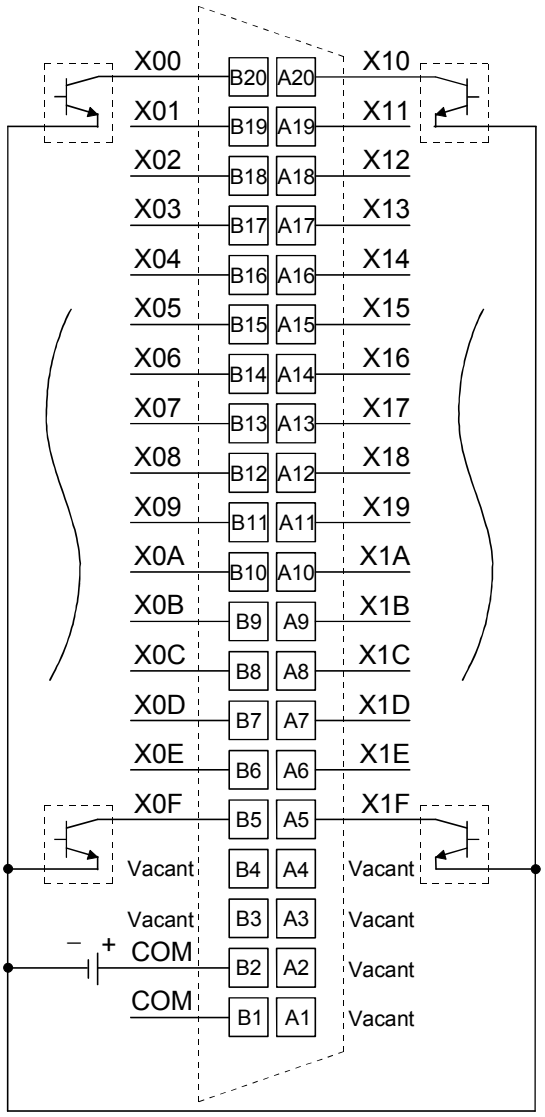
*1 The figure above indicates F (the first half 32 points).
The connections for L (the latter half 32 points) are the same as for F (regard X00 to X1F as X20 to X3F.)
B1 and B2 are connected internally.

*2 The A and B pin number rows shown above are transposed with respect to the diagram of the A and B rows which is printed on the module. Remember that the A row pin numbers correspond to the B row of the module.

*3 A1SX82-S1 can use both positive common and negative common.

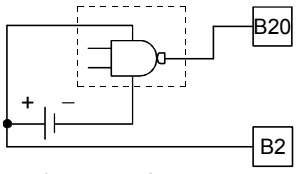
(6)

Model	Rated Input Voltage
A1SX71	5/24 VDC

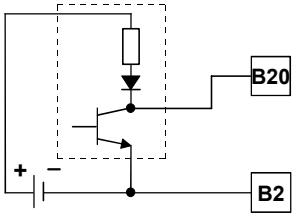


*1 The figure above shows the connections for the open collector (sink) type.
B1 and B2 are connected internally.

- TTL, LS-TTL, CMOS buffer (sink) connection

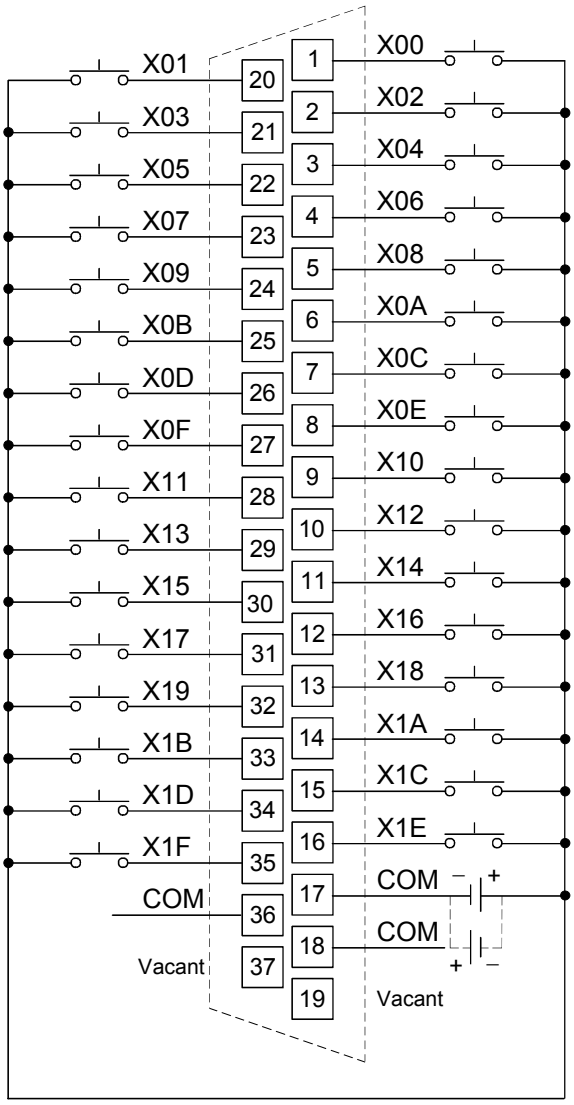


- Sensor (source) connection



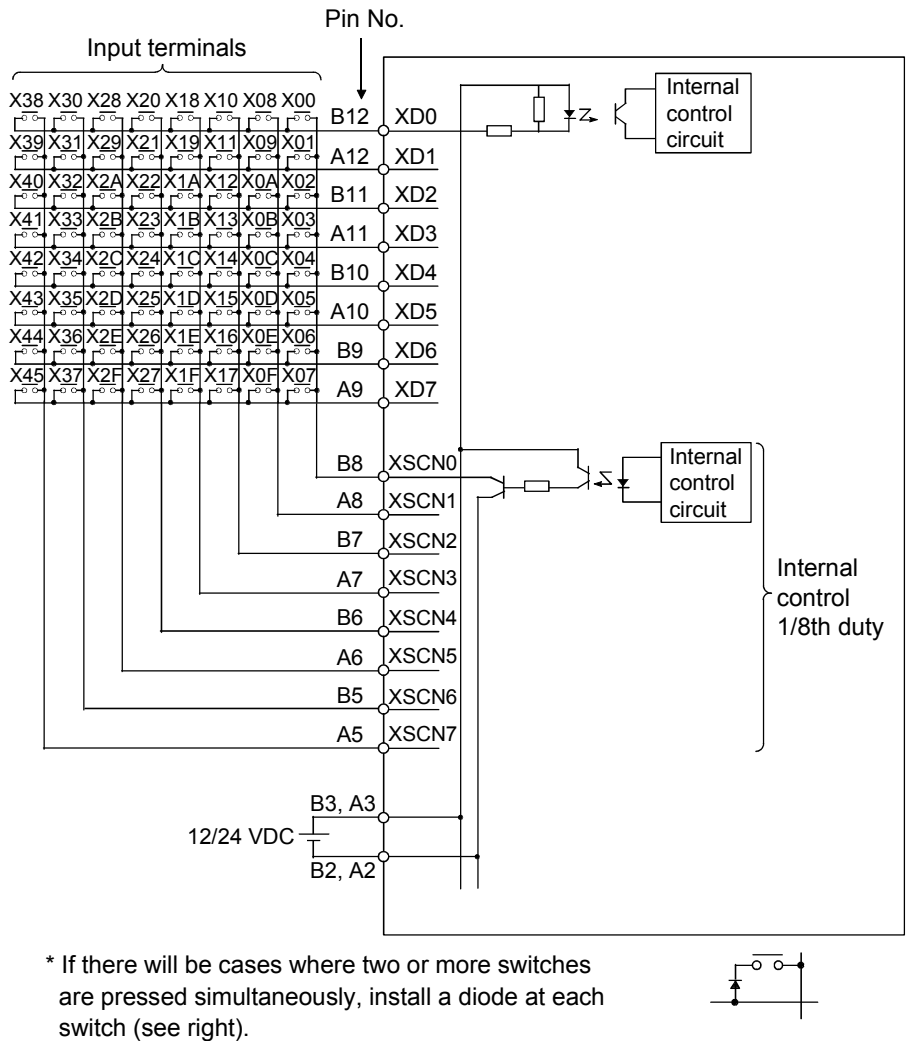
*2 The A and B pin number rows shown above are transposed with respect to the diagram of the A and B rows which is printed on the module. Remember that the A row pin numbers correspond to the B row of the module.

	Model	Rated Input Voltage
(7)	A1SX81	12/24 VDC
	A1SX81-S2	24 VDC



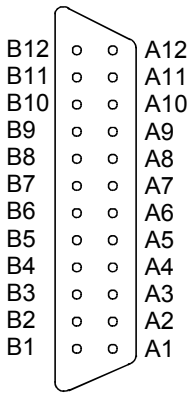
- 17 , 18 and 36 are connected internally.

(8)	Model	Rated Input Voltage
	A1S42X	12/24 VDC



* If there will be cases where two or more switches are pressed simultaneously, install a diode at each switch (see right).

Pin Arrangement



Seen from front face of the module

Pin No.	Signal Name	Pin No.	Signal Name
B12	XD0	A12	XD1
B11	XD2	A11	XD3
B10	XD4	A10	XD5
B9	XD6	A9	XD7
B8	XSCN0	A8	XSCN1
B7	XSCN2	A7	XSCN3
B6	XSCN4	A6	XSCN5
B5	XSCN6	A5	XSCN7
B4	Vacant	A4	Vacant
B3	12/24 VDC	A3	12/24 VDC
B2	0V	A2	0V
B1	FG	A1	FG

5.2 Output modules

5.2.1 Output module specifications

Model	Type	No. of Points	Rated Load Voltage	Max. Load Current			Max. Output Response Time		
				Point	Common	Module	OFF to ON	ON to OFF	
A1SY10	Relay Output	16	100V to 240VAC 24VDC	2A	8A	-	10ms or lower	12ms or lower	
A1SY 10EU		16	AC100V to 120V DC24V	2A	8A	-			
A1SY 14EU		12	100V to 240VAC 24VDC	2A	8A	-			
A1SY18A		8		2A	-	8A			
A1SY 18AEU		8		2A	-	-			
A1SY22	Triac Output	16	100V to 240VAC	0.6A	2.4A	-	1ms or lower	1ms + 0.5 cycles or less	
A1SY28A		8		1A	-	8A(AC136V,46℃) 8A(AC264V,40℃) 4A(AC132V,55℃) 2A(AC264V,55℃)			
A1SY 28EU				0.6A	2.4A (46℃) 1.9A (55℃)	-		1ms + 0.5 cycles or less	
A1SY40	Transistor Output (sink type)	16	12/24VDC	0.1A	0.8A	-	2ms or lower	2ms or lower	
A1SY40P					0.8A	-	1ms or lower	1ms or lower	
A1SY41		32		0.1A	2A	-	2ms or lower	2ms or lower	
A1SY41P					2A	-	1ms or lower	1ms or lower	
A1SY42		64		0.1A	1.6A	-	2ms or lower	2ms or lower	
A1SY42P					2A	-	1ms or lower	1ms or lower	
A1SY50		16		0.5A	2A	-	2ms or lower	2ms or lower	
A1SY60			24VDC	2A	4A	-			
A1SY60E	Transistor Output (source type)		5/12/ 24VDC	2A	4A	-	3ms or lower	10ms or lower	
A1SY68A	Transistor Output (sink/source type)	8	5/1224/ 48VDC	2A	-	-			

For all modules, the insulation system is photocoupler insulation and the output indications are LED indications.
*1 .....The dynamic scan cycle is 13.3ms (FAST mode) or 106.7ms (SLOW mode).
(Set using the DIP switch on the module rear.)
*2 .....Set using the DIP switch on the module front.

	Field Wiring	Points/ Common	Surge Suppression	Fuse Rating	Error display	External Power Supply (TYP DC24V) Current	Internal Current Consumption	No. of Occupied Points
	Terminal	8	None	None	None	0.090A	0.12A	16
		8				0.090A	0.12A	
		4				0.1A	0.12A	
		-				0.075A	0.24A	
						0.075A	0.24A	
		8	CR absorber	5A	LED	0.002A *3	0.27A	
		-	CR absorber varistor	None	None	-	0.13A	
		4	CR absorber				0.27A	
		8	Zener diode	1.6A	LED	0.008A	0.27A	
				None	None	0.011A	0.79A *6	
	40-pin connector	32		3.2A	LED	0.008A	0.5A	32
				None	None	0.012A	0.141A *7	
	40-pin connector ×2			3.2A	LED	0.008A	0.93A	64
				None	None	0.014A	0.17A	
	Terminal	8		3.2A	LED	0.06A	0.12A	16
				5A		0.015A	0.12A	
				7A		0.01A	0.2A	
		-		None	None	-	0.11A	

*3 .....Value at TYP 200VAC.
*4 .....Value at TYP 12VDC.
*5 ....."ERR".LED turns on when fuse is blown or external supply power is off.
*6 .....0.08A is shown on the rating plate of the module.
*7 .....0.15A is shown on the rating plate of the module.

Model	Type	No. of Points	Rated Load Voltage	Max. Load Current			Max. Output Response Time		
				Point	Common	Module	OFF to ON	ON to OFF	
A1SY71	Transistor Output (for TTL/CMOS) sink type	32	5/12VDC	0.016A	0.256A	-	1ms or lower	1ms or lower	
A1SY80	Transistor Output (source type)	16	12/24VDC	0.8A	3.2A	-	2ms or lower	2ms or lower	
A1SY81		32		0.1A	2A	-			
A1SY 81EP				0.1A (25℃) 0.05A (55℃)	2A (25℃) 0.05A (55℃)	-	0.5ms or lower	1.5ms or lower	
A1SY82		64		12VDC 0.1A	12VDC 1.6A	-	2ms or lower	2ms or lower	
				24VDC 0.05A	12VDC 1.6Av				
A1S42Y	Transistor Output (dynamic)	16/32 48/64 *2		0.1A (40℃) 0.05A (55℃)	-	-	2ms or lower *1	2ms or lower *1	

For all modules, the insulation system is photocoupler insulation and the output indications are LED indications.
*1 .....The dynamic scan cycle is 13.3ms (FAST mode) or 106.7ms (SLOW mode).
(Set using the DIP switch on the module rear.)
*2 .....Set using the DIP switch on the module front.

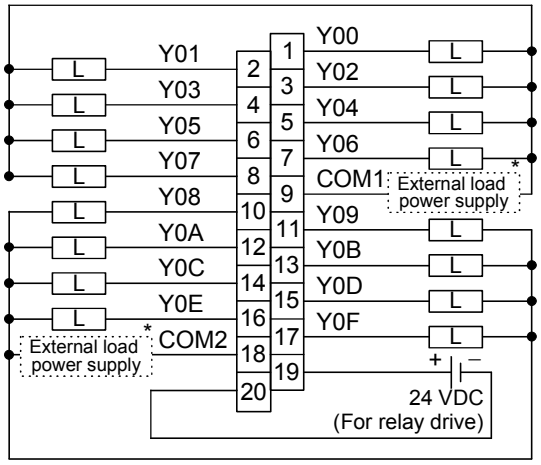
	Field Wiring	Points/ Common	Surge Suppression	Fuse Rating	Error display	External Power Supply (TYP DC24V) Current	Internal Current Consumption	No. of Occupied Points
	40-pin connector	32	None	1.6A	LED	0.15A *4	0.4A	32
	Terminal	8	Zener diode	5A		0.02A	0.12A	16
	37-pin D-sub connector	32		3.2A		0.008A	0.5A	32
			Clamp diode	None	None	0.080A	0.5A	
	40-pin connector ×2	32	Zener diode	3.2A	LED	0.080A	0.93A	64
	24-pin connector	-	None	1.6A	LED	0.008A	0.1A	16/32 48/64

*3 .....Value at TYP 200VAC.
*4 .....Value at TYP 12VDC.
*5 ....."ERR".LED turns on when fuse is blown or external supply power is off.
*6 .....0.08A is shown on the rating plate of the module.
*7 .....0.15A is shown on the rating plate of the module.

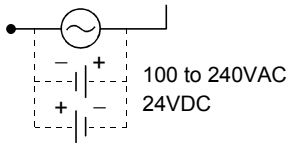
5.2.2 Output module connections

(1)

Model	Rated Load Voltage
A1SY10	240 VAC, 24 VDC



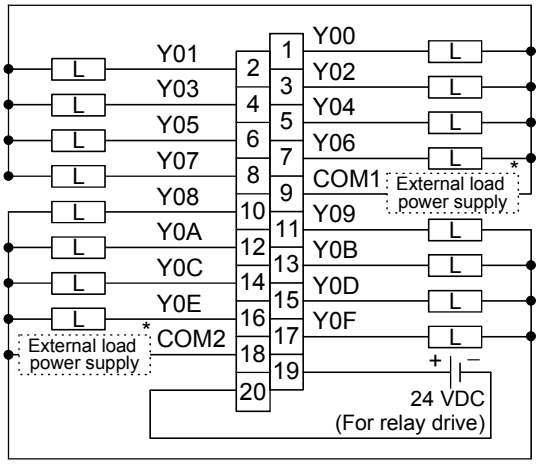
*: The external load power supply section is as shown below.



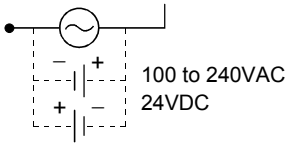
DANGER ● Do not touch terminals while the power is supplied.

(2)

Model	Rated Load Voltage
A1SY10EU	120 VAC, 24 VDC



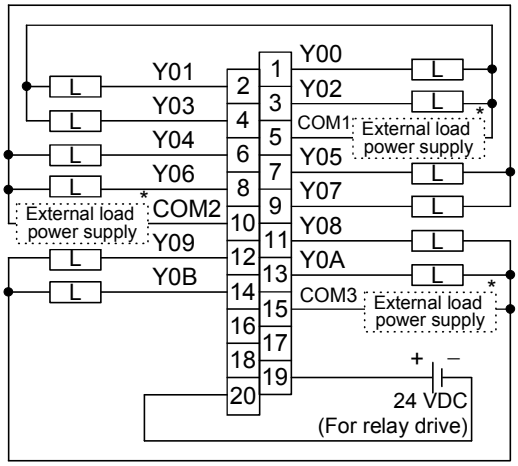
*: The external load power supply section is as shown below.



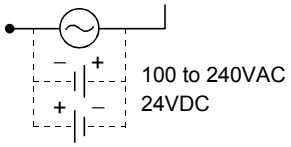
DANGER ● Do not touch terminals while the power is supplied.

(3)

Model	Rated Load Voltage
A1SY14EU	240 VAC, 24 VDC



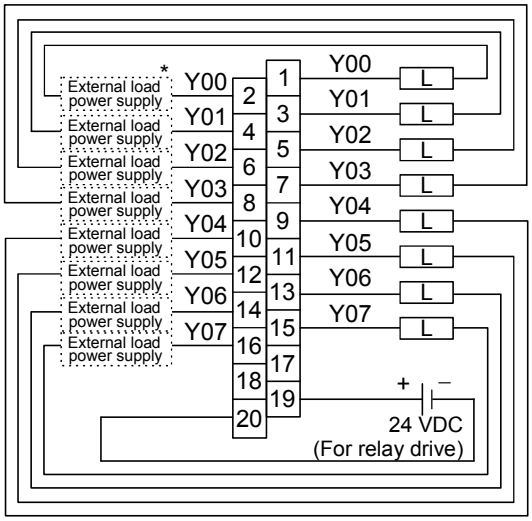
*: The external load power supply section is as shown below.



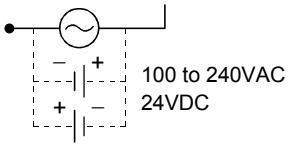
DANGER ● Do not touch terminals while the power is supplied.

(4)

Model	Rated Load Voltage
A1SY18A A1SY18AEU	240 VAC, 24 VDC



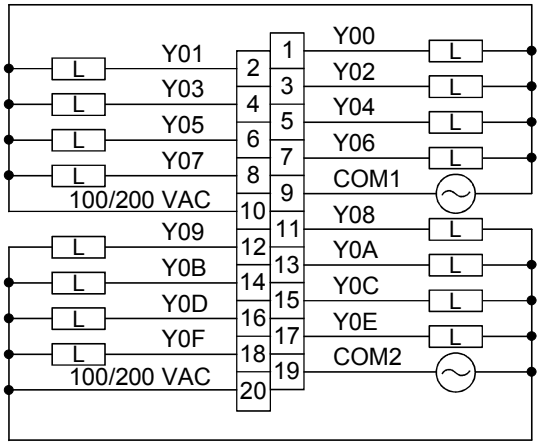
*: The external load power supply section is as shown below.



DANGER ● Do not touch terminals while the power is supplied.

(5)

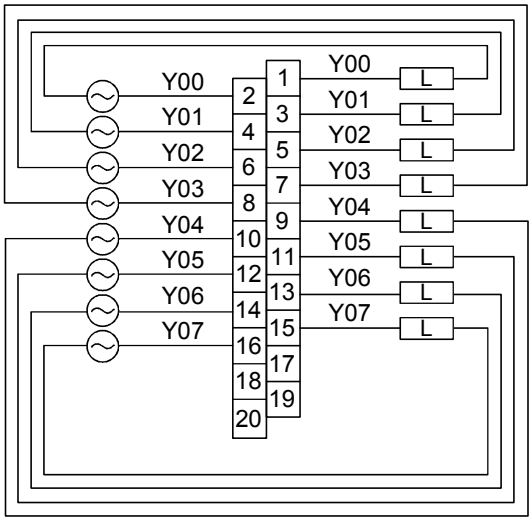
Model	Rated Load Voltage
A1SY22	100 to 200 VAC



⚠DANGER
- Do not touch terminals while the power is supplied.

(6)

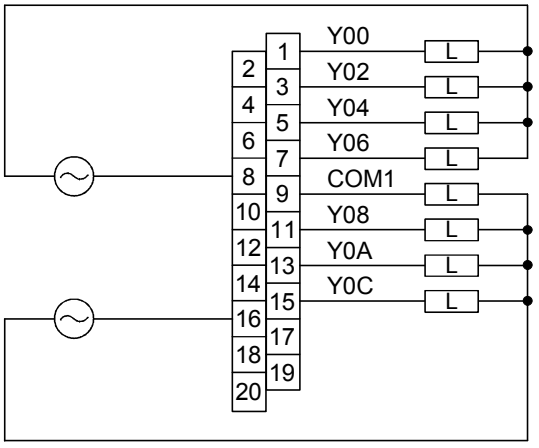
Model	Rated Load Voltage
A1SY28A	100 to 200 VAC



⚠DANGER
- Do not touch terminals while the power is supplied.

(7)

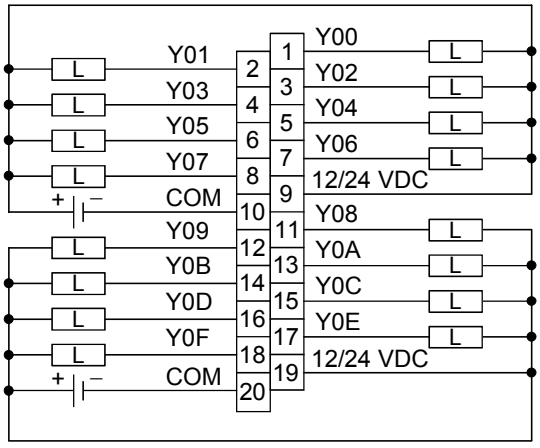
Model	Rated Load Voltage
A1SY28EU	100 to 240 VAC



⚠DANGER
- Do not touch terminals while the power is supplied.

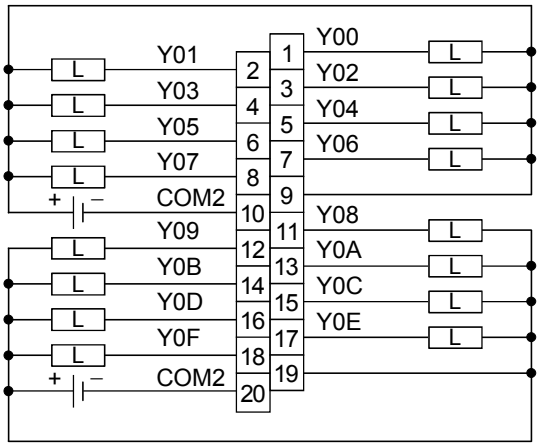
(8)

Model	Rated Load Voltage
A1SY40	12/24 VAC
A1SY40P	



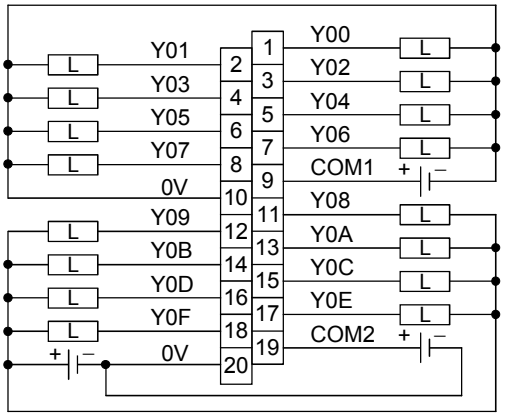
(9)

Model	Rated Load Voltage
A1SY50	12/24 VDC
A1SY60	24 VDC



(10)

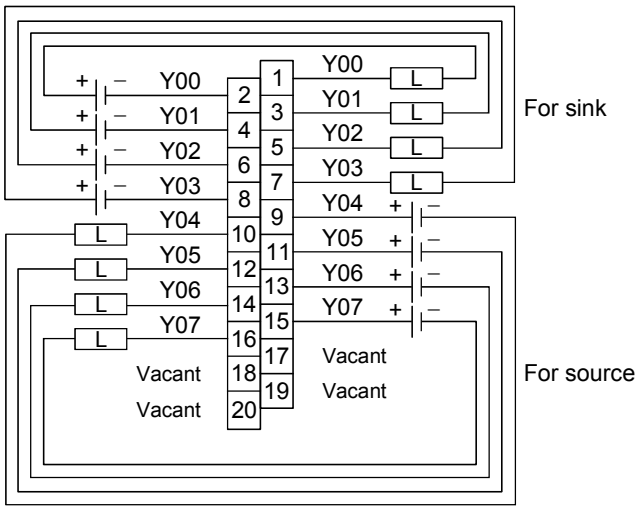
Model	Rated Load Voltage
A1SY60E	5/12/24 VDC



* When using a working load voltage of 5VDC, a separate 12/24VDC source is required for the external power supply.

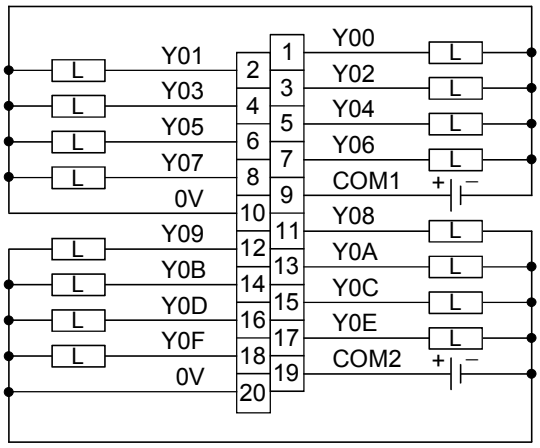
(11)

Model	Rated Load Voltage
A1SY68A	5/12/24/48 VDC



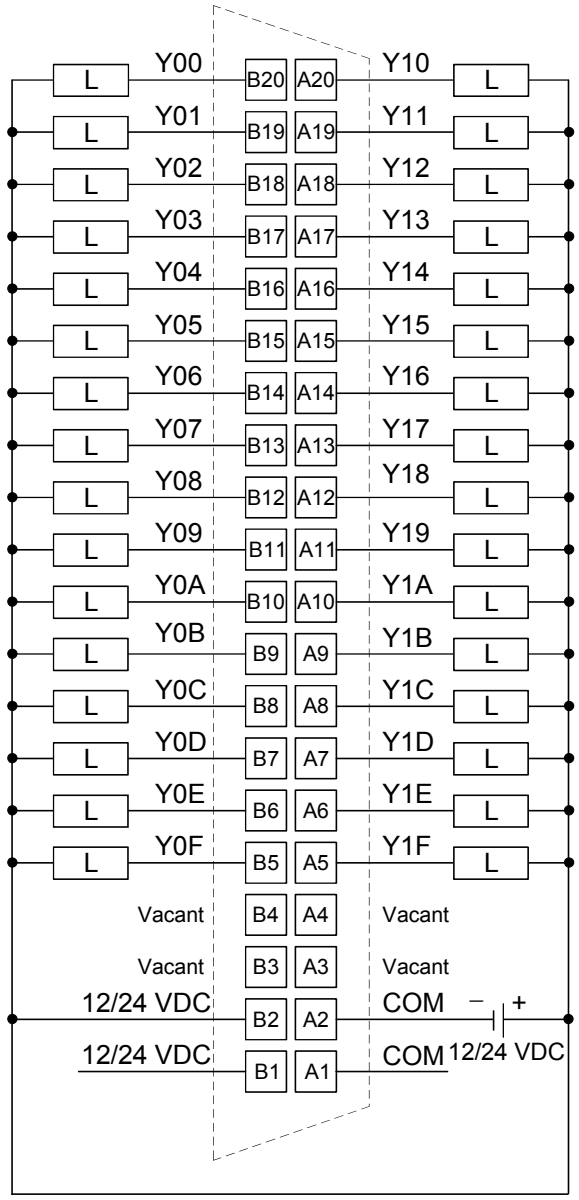
(12)

Model	Rated Load Voltage
A1SY80	12/24 VAC



(13)

Model	Rated Load Voltage
A1SY41	12/24 VDC
A1SY41P	

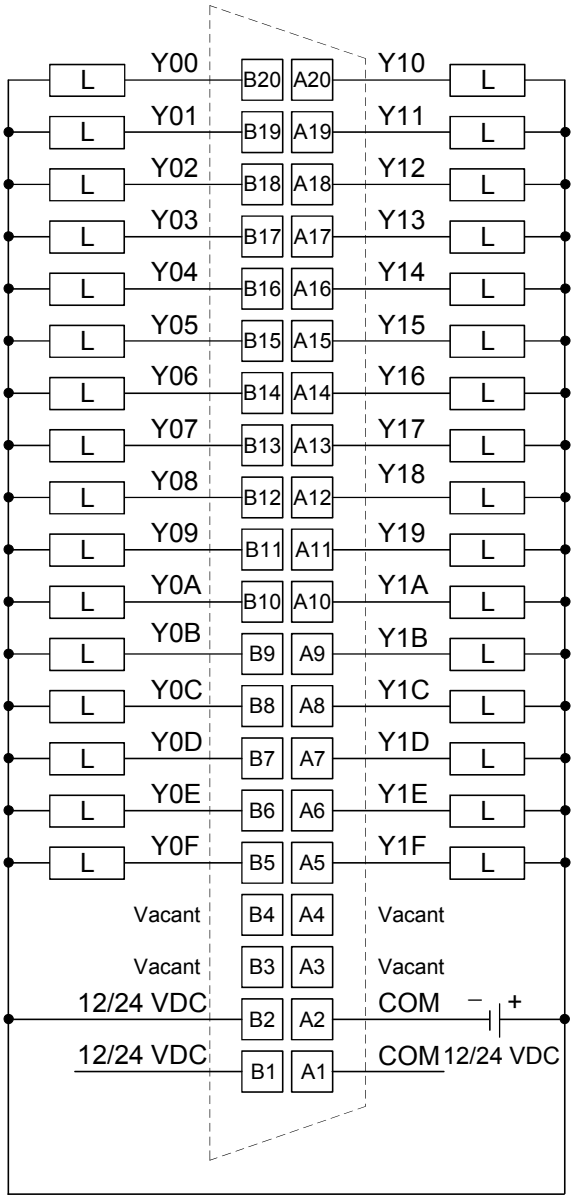


*1 B1 and B2 , and A1 and A2 , are connected internally.

*2 The A and B pin number rows shown above are transposed with respect to the diagram of the A and B rows which is printed on the module. Remember that the A row pin numbers correspond to the B row of the module.

(14)

Model	Rated Load Voltage
A1SY42	12/24 VDC
A1SY42P	

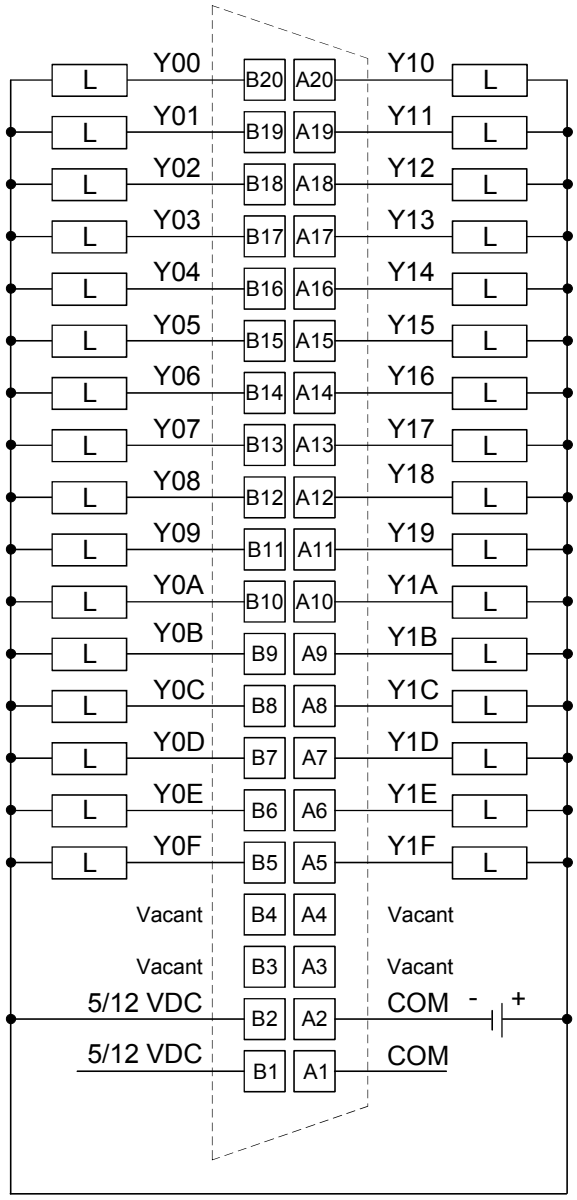


*1 The figure above indicates F (the first half 32 points).
The connections for L (the latter half 32 points) are the same as for F (regard Y00 to Y1F as Y20 to Y3F.)
B1 and B2 , and A1 and A2 , are connected internally.

*2 The A and B pin number rows shown above are transposed with respect to the diagram of the A and B rows which is printed on the module. Remember that the A row pin numbers correspond to the B row of the module.

(15)

Model	Rated Load Voltage
A1SY71	5/12 VDC

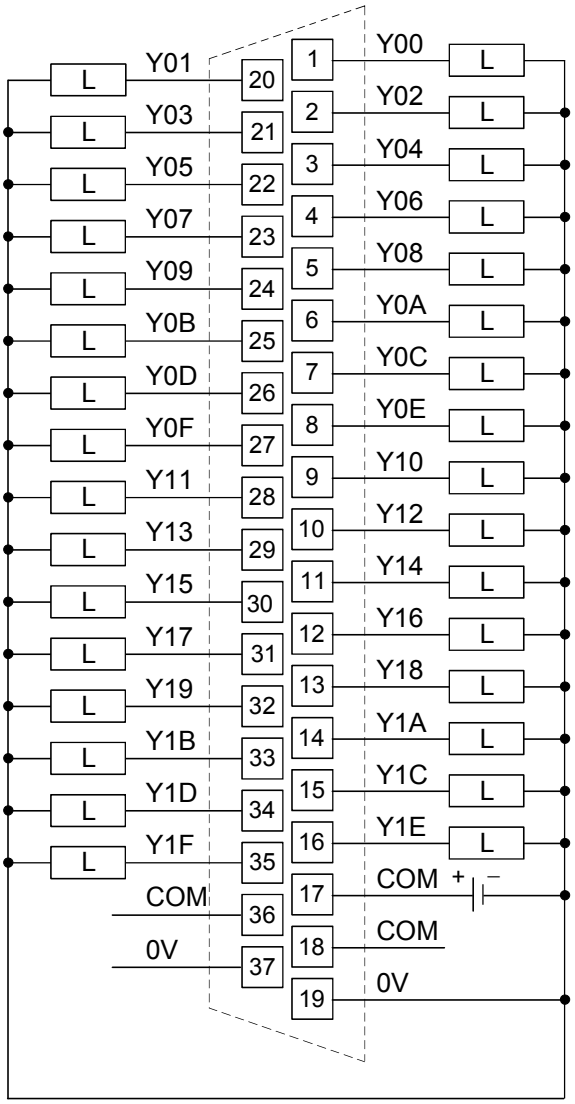


*1 B1 and B2 , and A1 and A2 , are connected internally.

*2 The A and B pin number rows shown above are transposed with respect to the diagram of the A and B rows which is printed on the module. Remember that the A row pin numbers correspond to the B row of the module.

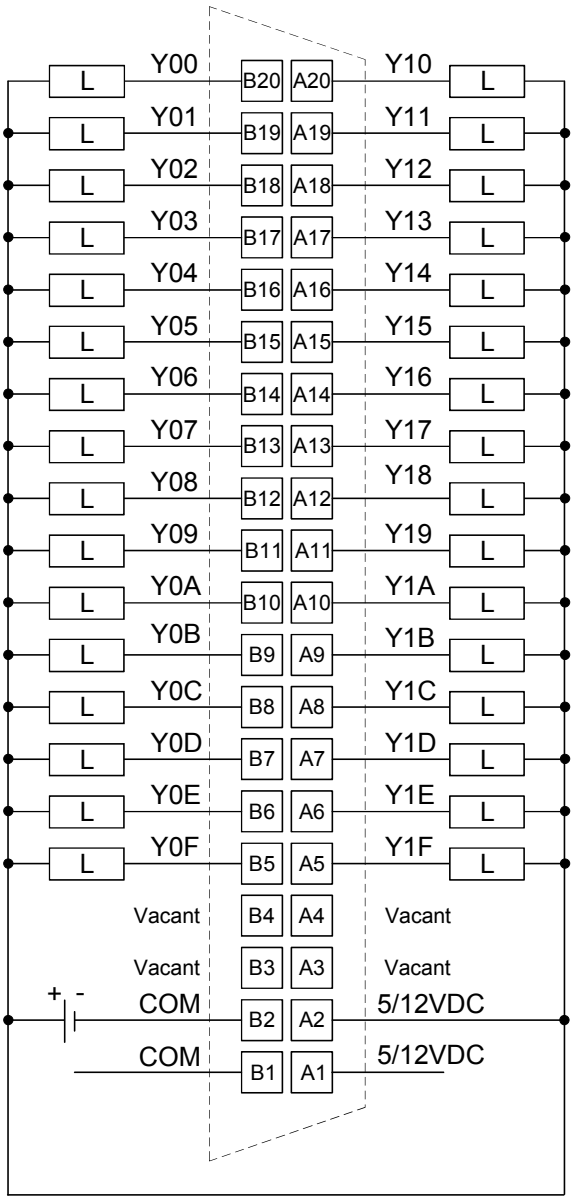
(16)

Model	Rated Load Voltage
A1SY81	12/24 VDC
A1SY81EP	



- 17 and 18 and 36 , and 19 and 37 are connected internally.

(17)	Model	Rated Load Voltage
	A1SY82	12/24 VDC

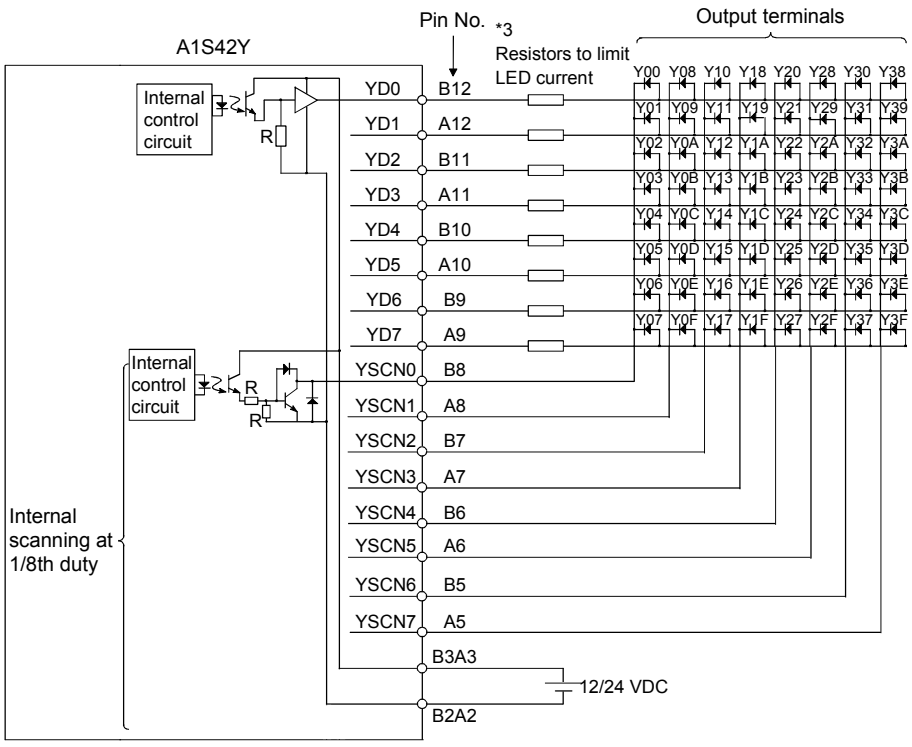


*1 The figure above indicates [F] (the first half 32 points).
The connections for [L] (the latter half 32 points) are the same as for [F] (regard Y00 to Y1F as Y20 to Y3F.)
[B1] and [B2] , and [A1] and [A2] , are connected internally.

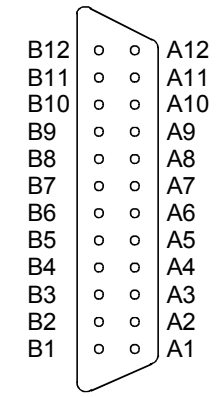
*2 The A and B pin number rows shown above are transposed with respect to the diagram of the A and B rows which is printed on the module. Remember that the A row pin numbers correspond to the B row of the module.

(18)

Model	Rated Load Voltage
A1S42Y	12/24 VDC



Pin Arrangement



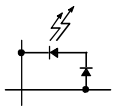
Seen from front face of the module

Pin No.	Signal Name (F_H)	Pin No.	Signal Name (F_H)
B12	YD0	A12	YD1
B11	YD2	A11	YD3
B10	YD4	A10	YD5
B9	YD6	A9	YD7
B8	YSCN0	A8	YSCN1
B7	YSCN2	A7	YSCN3
B6	YSCN4	A6	YSCN5
B5	YSCN6	A5	YSCN7
B4	Vacant	A4	Vacant
B3	12/24 VDC	A3	12/24 VDC
B2	0V	A2	0V
B1	Vacant	A1	Vacant

*1 The fuse in the output module is provided to prevent the external wiring from burning in the event of a short circuit in the module's output. Consequently, it may not be able to protect output devices.
If an output device is damaged in a failure mode other than a short circuit, the fuse might not be blown.

*2 The "ERR." LED will alxo come ON when the external power supply is cut.

*3 Mount the resistors to limit LED current externally to the A1S42Y.



*4 The power supply voltage (12/24VDC) is applied in the LED's reverse direction.
If the peak inverse voltage is insufficient, connect protective diodes in series with each of the LEDs.

MEMO

5.3 Input/output combined modules

5.3.1 Input/output combined module specifications

Model	Type	No. of Points	Rated Input Voltage	Input Current	Operating Voltage	
					ON Voltage	OFF Voltage
A1SH42	DC Input (sink type)	32	12/24VDC	2/5mA	8VDC or higher	4VDC or lower
A1SH42-S1			24VDC	5mA	15VDC or higher	3VDC or lower
A1SX48Y18		8	24VDC	7mA	14VDC or higher	6.5VDC or lower
A1SX48Y58						

Model	Type	No. of Points	Rated Load Voltage	Max. Load Current		Max. Output Response Time	
				1 Point	Common	OFF to ON	ON to OFF
A1SH42	Transistor Output (sink type)	32	12/24VDC	0.1A	1.6A	2ms or lower	2ms or lower
A1SH42-S1							
A1SX48Y18	Relay Output	8	24VDC 240VAC	2A	8A	10ms or lower	12ms or lower
A1SX48Y58	Transistor Output		12/24VDC	0.5A	2A	2ms or lower	2ms or lower

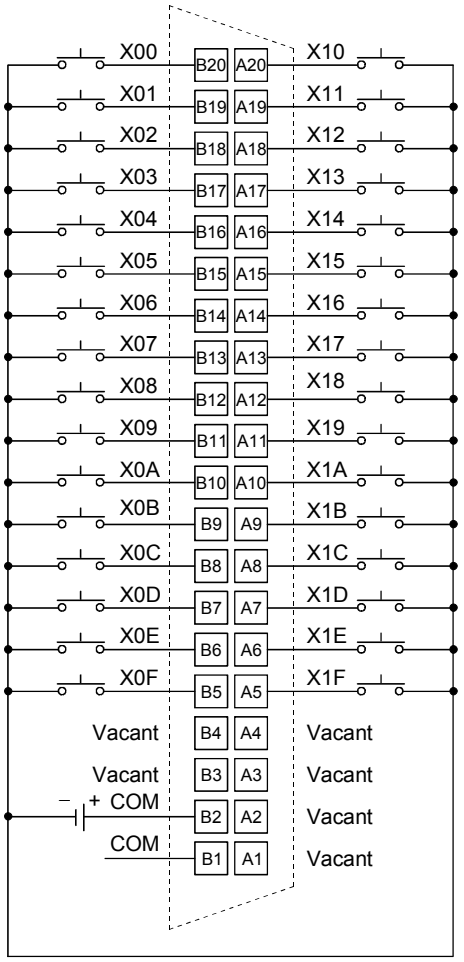
For all modules, the insulation system is photocoupler insulation and the operation status is provided by LED indications.

	Max. Simultaneous Input Points (Percentage Simultaneously ON)	Max. Response Time		No. of Occupied Points
		OFF to ON	ON to OFF	
	60%(24VDC)	10ms or lower	10ms or lower	32
		0.3ms or lower	0.3ms or lower	20
	100%(26.4VDC)	10ms or lower	10ms or lower	8

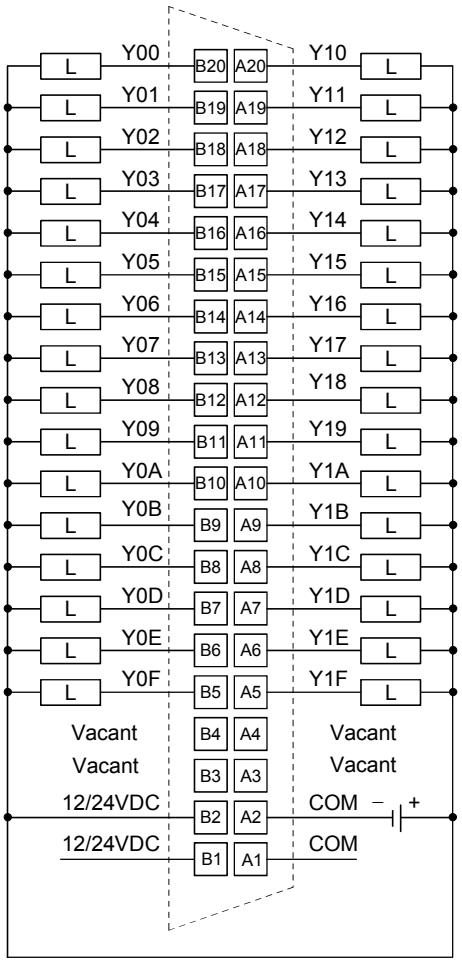
	Points/ Common	Field Wiring	Surge Suppression	Fuse Rating	External Power Supply (TYP 24VDC)	External Current Consumption (5VDC)	No. of Occupied Points
					Current		
	32	40-pin Connector	Zener diode	3.2A	0.008A	0.5A	32
	8	Terminal	None	None	0.045A	0.085A	16
			Zener diode	3.2A	0.06A	0.06A	

5.3.2 Input/output composite module connections

(1)	Model	Rated Input Voltage	Rated Load Voltage
	A1SH42 A1SH42-S1	12/24 VDC	12/24 VDC



X (Input side)



Y (Output side)

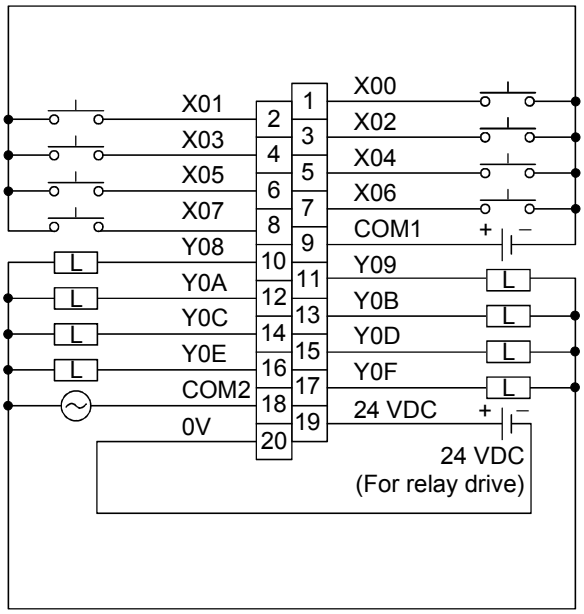
*1 B1 and B2 are connected internally.

*3 B1 and B2 , and A1 and A2 , are connected internally.

*2 The A and B pin number rows shown above are transposed with respect to the diagram of the A and B rows which is printed on the module. Remember that the A row pin numbers correspond to the B row of the module.

(2)

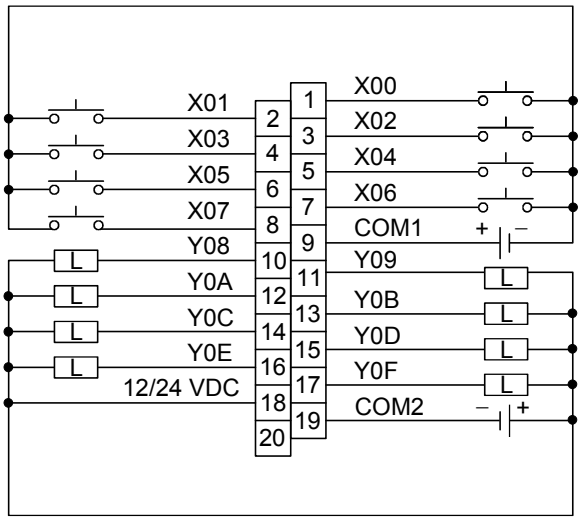
Model	Rated Input Voltage	Rated Load Voltage
A1SX48Y18	24 VDC	24 VDC/ 240 VAC



DANGER ● Do not touch terminal while the power is supplied.

(3)

Model	Rated Input Voltage	Rated Load Voltage
A1SX48Y58	24 VDC	12/24 VDC



6. ERROR CODE

If an error occurs when the programmable controller is powered ON, switched to RUN status or running, the Q2ASCPU module executes the self diagnostics function to display the error (LED display, message display) and store the error information into the special relay SM and special register SD.
Also, if an error occurs when a communication request is issued from a peripheral device, special function module or network system, the Q2ASCPU module returns the error code (4000H to 4FFFH) to the request source.
The following explains the Q2ASCPU errors and the corresponding corrective actions.

REMARK

The error code of the error that occurred when a general data processing request is made from the peripheral device, special function module or network system is not stored into SD0 of the Q2ASCPU.
The error code is returned to the source of the general data processing request.

6.1 Error Code Type

Errors are detected by the self diagnostics function of CPU module or during communication with CPU module.
The following table classifies the errors according to the detection pattern, detection location and error code.

Error detection pattern	Error detection location	Error code	Reference
Detection by the self diagnostics function of CPU module	CPU module	1000 to 10000*1	Section 6.3
Detection at communication with CPU module	CPU module	4000H to 4FFFH	Q2A(S1)/Q3A/Q4ACPU User's Manual
	Serial communication module, etc.	7000H to 7FFFH	Serial Communication User's Manual, etc.
	CC-Link module	B000H to BFFFH	CC-Link System Master/Local Module User's Manual
	Ethernet module	C000H to CFFFH	Ethernet Interface Module User's Manual
	MELSECNET/H network module	F000H to FFFFH	For QnA/Q4AR MELSECNET/10 Network System Reference Manual

*1: CPU module error codes are classified into minor, moderate, major errors as shown below.

- Minor error: Errors that may allow the CPU module to continue the operation, e.g., battery error.
  (Error code: 1300 to 10000)
- Moderate error: Errors that may cause the CPU module to stop the operation, e.g., WDT error.
  (Error code: 1300 to 10000)
- Major error: Errors that may cause the CPU module to stop the operation, e.g., RAM error.
  (Error code: 1000 to 1299)

Determine the error level, i.e. whether the operation can be continued or stopped, by referring to "Operating Statuses of CPU" described in Section 6.3 "Error Code List".

6.2 Reading Error Code

When an error occurs, the corresponding error code and error message can be read out using a peripheral device.
For details on peripheral device operation, refer to GX Developer Operating Manual or SW□IVD-GPPQ/SW□NX-GPPQ Operating Manual (Online).

6.3 Error Code List

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

<Relevant CPU>

○ : Indicates all the QnACPUs and QCPU.
QCPU : Indicates all the Q series CPU modules.
Q00J/Q00/Q01 : Indicates the Basic model QCPU.
Qn(H) : Indicates the High Performance model QCPU.
QnPH : Indicates the Process CPU.
QnPRH : Indicates the Redundant CPU.
QnA : Indicates the QnA series and Q2ASCPU series.
Rem : Indicates the MELSECNET/H remote I/O modules.
Each CPU module model name: Indicates the relevant specific CPU module.
(Example: Q4AR, Q2AS)

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
1000	MAIN CPU DOWN	–	–	Off	Flicker	Stop	Always	
1010	END NOT EXECUTE	–	–	Off	Flicker	Stop	When an END instruction executed	

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)
*2 The BAT.ALM LED turns on at BATTERY ERROR.

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	1000	Runaway or failure of CPU module or failure of main CPU • Malfunctioning due to noise or other reason • Hardware fault	• 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.)	QnA
	1010	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.	• 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.)	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
1101	RAM ERROR	–	–	Off	Flicker	Stop	At power ON/ At reset/ When an END instruction executed	
1102							At power ON/ At reset/ When an END instruction executed	
1103							At power ON/ At reset	
1104	RAM ERROR	–	–	Off	Flicker	Stop	At power ON/ At reset	
1105								

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

*2 The BAT.ALM LED turns on at BATTERY ERROR.

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	1101	The sequence program storing built-in RAM/program memory in the CPU module is faulty.	• 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.)	QnA
	1102	The work area RAM in the CPU module is faulty.	• 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.)	QnA
	1103	The device memory in the CPU module is faulty.	• 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.)	QnA
	1104	The address RAM in the CPU module is faulty.	• 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.)	QnA
	1105	The system RAM in the CPU module is faulty.		Q4AR

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
1200	OPE. CIRCUIT ERR.	–	–	Off	Flicker	Stop	At power ON/ At reset	
1201								
1202								
1203	OPE. CIRCUIT ERR.	–	–	Off	Flicker	Stop	When an END instruction executed	
1204								
1205								
1206	OPE. CIRCUIT ERR.	–	–	Off	Flicker	Stop	When instruction executed	

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

*2 The BAT.ALM LED turns on at BATTERY ERROR.

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	1200	The operation circuit for index modification in the CPU module does not operate normally.	This suggests a CPU module hardware fault. (Contact your local Mitsubishi representative.)	QnA
	1201	The hardware (logic) in the CPU module does not operate normally.		QnA
	1202	The operation circuit for sequence processing in the CPU module does not operate normally.		QnA
	1203	The operation circuit for index modification in the CPU module does not operate normally.		Q4AR
	1204	The hardware (logic) in the CPU module does not operate normally.		Q4AR
	1205	The operation circuit for sequence processing in the CPU module does not operate normally.		QnA
	1206	The DSP operation circuit in the CPU module does not operate normally.		Q4AR

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
1300	FUSE BREAK OFF	Module No. (Slot No.) [For Remote I/O network] Network No./ Station No.	–	Off/ On	Flicker/ On	Stop/ Continue*1	Always	
1310	I/O INT. ERROR	–	–	Off	Flicker	Stop	During interrupt	

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

*2 The BAT.ALM LED turns on at BATTERY ERROR.

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	1300	There is an output module with a blown fuse.	• Check ERR. LED of the output modules and replace the fuse of the module whose LED is lit. • Read the common information of the error using the peripheral device and replace the fuse at the output module corresponding to the numerical value (module No.) reading. Alternatively, monitor special registers SD1300 to SD1331 with the peripheral device and change the fuse of 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.	QnA Q4AR
		• There is an output module with a blown fuse. • External power supply for output load is turned off or disconnected.	• Check ERR. LED of the output modules and replace the module whose LED is lit. • Read the common information of the error using the peripheral device and replace the fuse at the output module corresponding to the numerical value (module No.) reading. Alternatively, monitor special registers SD1300 to SD1331 with the peripheral device and change the fuse of the output module whose bit has a value of "1". • Check whether the external power supply for output load is ON or OFF. • 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.	Q2AS
	1310	An interruption has occurred although there is no interrupt module.	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.)	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
1401	SP. UNIT DOWN	Module No. (Slot No.)	–	Off	Flicker	Stop*2	At power ON/ At reset	
1402	SP. UNIT DOWN	Module No. (Slot No.)	Program error location	Off	Flicker	Stop	During execution of FROM/TO instruction set	
1411	CONTROL-BUS. ERR.	Module No. (Slot No.)	–	Off	Flicker	Stop	At power ON/ At reset	
1412	CONTROL-BUS. ERR.	Module No. (Slot No.)	Program error location	Off	Flicker	Stop	During execution of FROM/TO instruction set	
1421	SYS. UNIT DOWN	–	–	Off	Flicker	Stop	Always	
1500	AC/DC DOWN	–	–	On	Off	Continue	Always	

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

*2 The BAT.ALM LED turns on at BATTERY ERROR.

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	1401	When PLC parameter I/O allocation was being made, there was no return signal from the special function module during initial processing stage.(When error is generated, the head I/O number of the special function module that corresponds to the common information is stored.)	The CPU module, base unit and/or the special function module that was accessed is experiencing a hardware fault. (Contact your local Mitsubishi representative.)	QnA
	1402	The special function module was accessed during the execution of a FROM/TO instruction set, but there was no response. (When an error is generated, the program error location corresponding to the individual information is stored.)	The CPU module, base unit and/or the special function module that was accessed is experiencing a hardware fault.(Contact your local Mitsubishi representative.)	QnA
	1411	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.)	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.)	QnA
	1412	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.)		QnA
	1421	Hardware fault at the system management module AS92R.	This suggests a system management module AS92R hardware fault. (Contact your local Mitsubishi representative.)	Q4AR
	1500	• A momentary power supply interruption has occurred. • The power supply went off.	Check the power supply.	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
1510	DUAL DC DOWN 5V	–	–	On	On	Continue	Always	
1520	DC DOWN 5V	–	–	Off	Flicker	Stop	Always	
1530	DC DOWN 24V	–	–	On	On	Continue	Always	
1600	BATTERY ERROR*2	Drive Name	–	On	Off	Continue	Always	
1601								
1602					On			

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

*2 The BAT.ALM LED turns on at BATTERY ERROR.

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	1510	The power supply voltage (100 to 240VAC) of either of the two power supply modules on the power supply duplexing extension base unit dropped to or below 85% of the rated voltage. (This can be detected from the control system of the redundant system.)	Check the supply voltage of the power supply module. If the voltage is abnormal then replace the power supply module.	Q4AR
	1520	The voltage(100 to 240VAC) of the power supply module on the extension base unit dropped to or below 85% of the rated voltage. (This can be detected from the control system of the stand-alone system or redundant system.)	Check the supply voltage of the power supply module. If the voltage is abnormal then replace the power supply module.	Q4AR
	1530	The 24 VDC power supplied to the system management module AS92R has dropped below 90% of the rated voltage. (This can be detected from the control system or standby system of the redundant system.)	Check the 24VDC power supplied to the system management module AS92R.	Q4AR
	1600	• The battery voltage in the CPU module has dropped below stipulated level. • The lead connector of the CPU module battery is not connected.	• Change the battery. • If the battery is for program memory, standard RAM or for the back-up power function, install a lead connector.	QnA
	1601	Voltage of the battery on memory card 1 has dropped below stipulated level.	Change the battery.	QnA
	1602	Voltage of the battery on memory card 2 has dropped below stipulated level.	Change the battery.	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
2000	UNIT VERIFY ERR.	Module No. (Slot No.) [For Remote I/O network] Network No./ Station No.	–	Off/ On	Flicker/ On	Stop/ Continue*1	When an END instruction executed	
2100	SP. UNIT LAY ERR.	Module No. (Slot No.)	–	Off	Flicker	Stop	At power ON/ At reset	
2101	SP. UNIT LAY ERR.	Module No. (Slot No.)	–	Off	Flicker	Stop	At power ON/ At reset	
2102								
2103	SP. UNIT LAY ERR.	Module No. (Slot No.)	–	Off	Flicker	Stop	At power ON/ At reset	

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

*2 Either error stop or continue can be selected for each module by the parameters.

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	2000	I/O module information power ON is changed. • I/O module (or special function module) not installed properly or installed on the base unit.	• Read the common information of the error using the peripheral device, and check and/or change the module that corresponds to the numerical value (module number) there. • Alternatively, monitor the special registers SD1400 to SD1431 at a peripheral device, and change the fuse at 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.	QnA
	2100	In PLC parameter I/O allocation settings, a special function module was allocated to a location reserved for an I/O module. Or, the opposite has happened.	Reset the PLC parameter I/O allocation setting to conform with the actual status of the special function modules.	QnA
	2101	13 or more special function modules (not counting the A(1S)I61) capable of sending an interrupt to the CPU module have been installed.	Keep the number of special function modules that can initiate an interrupt (with the exception of the A(1S)I61 module) to 12 or fewer.	QnA
	2102	Seven or more serial communication modules (excludes A(1S)J71QC24) have been installed.	Keep the number of serial communication modules (excludes A(1S)J71QU24) installed to six or fewer.	QnA
	2103	Two or more A(1S)I61 interrupt modules have been mounted.	Install only 1 A(1S)I61 module.	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
2104 2105	SP. UNIT LAY ERR.	Module No. (Slot No.)	–	Off	Flicker	Stop	At power ON/ At reset	
2106	SP. UNIT LAY ERR.	Module No. (Slot No.)	–	Off	Flicker	Stop	At power ON/ At reset	

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

*2 Either error stop or continue can be selected for each module by the parameters.

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	2104	At the MELSECNET/MINI auto refresh network parameter settings, the module allocation that was set is different from the actual module models at the station numbers in the link system.	Reset the network parameter MELSECNET/MINI auto refresh unit module allocation setting so that it conforms to the station number of the module that is actually linked.	QnA
	2105	There are too many special function modules that can use dedicated instructions allocated (number of modules installed). (The total of the figures indicated below is above 1344.) (AD59 modules installed × 5) (AD57(S1)/AD58 modules installed × 8) (AJ71C24(S3/S6/S8) modules installed × 10) (AJ71UC24 modules installed × 10) (AJ71C21(S1) modules installed × 29) (AJ71PT32-S3/AJ71T32-S3 modules installed ×125) * (AJ71QC24(R2,R4) modules installed × 29) (AJ71ID1(2)-R4 modules installed × 8) +(AD75 modules installed × 12) total ＞1344 *: When the expansion mode is used.	Reduce the number of special function modules installed.	
	2106	• Five or more AJ71QLP21 & AJ71QBR11 modules are installed. • Three or more AJ71AP21/R21 & AJ71AT21B modules are installed. • The total number of installed AJ71QLP21, AJ71QBR11, AJ71AP21/R21, and AJ71AT21B modules exceeds five. • The same network numbers or identical station numbers exist in the MELSECNET/10 network system. • Two or more master or load stations exist simultaneously at the MELSECNET(II) or MELSECNET/B data link system.	• Reduce the AJ71QLP21 and AJ71QBR11 modules to four or less. • Reduce the AJ71AP21/R21 and AJ71AT21B modules to two or less. • Reduce the AJ71QLP21, AJ71QBR11, AJ71AP21/R21 and AJ71AT21B modules to a total of four or less. • Check the network Nos. and station Nos. • Check the station Nos.	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
2107	SP. UNIT LAY ERR.	Module No. (Slot No.)	–	Off	Flicker	Stop	At power ON/ At reset	
2108								
2109						Stop/ Continue*2		
2110	SP. UNIT ERROR	Module No. (Slot No.)	Program error location	Off/ On	Flicker/ On	Stop/ Continue*1	When instruction executed	
2111								
2112	SP. UNIT ERROR	Module No. (Slot No.)	Program error location	Off/ On	Flicker/ On	Stop/ Continue*1	When instruction executed/ STOP → RUN	

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

*2 Either error stop or continue can be selected for each module by the parameters.

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	2107	The start X/Y set in the PLC parameter's I/O assignment settings is overlapped with the one for another module.	Make the PLC parameter's I/O assignment setting again so it is consistent with the actual status of the special function modules.	QnA
	2108	A(1S)J71LP21 or A(1S)J71BR11 for use with the AnUCPU network module has been installed.	Replace the network module to A(1S)J71QLP21 or A(1S)J71QBR11.	QnA
	2109	The control system and standby system module configurations are different when a redundant system is in the backup mode.	Check the module configuration of the standby system.	Q4AR
	2110	• The location designated by the FROM/TO instruction set is not the special function module. • The module that does not include buffer memory has been specified by the FROM/TO instruction. • The special function module, Network module being accessed is faulty. • Station not loaded was specified using the instruction whose target was the CPU share memory.	• Read the individual information of the error using the GX Developer, check the FROM/TO instruction that corresponds to that numerical value (program error location), and correct when necessary. • The special function module that was accessed is experiencing a hardware fault. Therefore, change the faulty module. Alternatively, contact your local Mitsubishi representative.	QnA
	2111	• The location designated by a link direct device (J□ \□) is not a network module. • The I/O module (special function module) was nearly removed, completely removed, or mounted during running.		QnA
	2112	• The module other than special function module is specified by the special function module dedicated instruction. Or, it is not the corresponding special function module. • The module model specified by the special function module dedicated instruction and that specified by the parameter I/O assignment is different.	• Read the individual information of the error using a peripheral device, and check the special function module dedicated instruction (network instruction) that corresponds to the value (program error part) to make modification. • Set the module model by PLC parameter I/O assignment according to the special function module dedicated instruction setting. Example) Although AJ71QC24N is used actually, AJ71QC24 is set.	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
2113	SP. UNIT ERROR	$FFFF_H$ (fixed)	Program error location	Off/ On	Flicker/ On	Stop/ Continue*2	When instruction executed/ STOP → RUN	
2210	BOOT ERROR	Drive name	–	Off	Flicker	Stop	At power ON/ At reset	
2300	ICM. OPE. ERROR	Drive name	–	Off/ On	Flicker/ On	Stop/ Continue*1	When memory card is inserted or removed	
2301								
2302								
2400	FILE SET ERROR	File name/ Drive name	Parameter number	Off	Flicker	Stop	At power ON/ At reset/ At PLC writing	

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

*2 Either error stop or continue can be selected for each module by the parameters.

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	2113	Data of special function module to be simulated is not set in the simulation data.	Read the individual information of the error using a peripheral device, and check the special function module / special function module dedicated instruction (network instruction) that corresponds to the value (program error part) to make modification.	QnA
	2210	There is no boot file in the drive designated by the parameter enabled drive switch even though the Boot DIP switch is ON.	Check and correct the valid parameter drive settings made by the DIP switches. Set the boot file to the drive specified by the parameter drive DIP switches.	QnA
	2300	• 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.	• Remove memory card after placing the memory card in/out switch OFF. • Turn on the card insert switch after inserting a memory card.	QnA
	2301	• The memory card has not been formatted. • Memory card format status is incorrect.	• Format memory card. • Reformat memory card.	QnA
	2302	A memory card that cannot be used with the CPU module has been installed.	• Format memory card. • Reformat memory card. • Check memory card.	QnA
	2400	The file designated at the PLC file settings in the parameters cannot be found.	• Read the individual information of the error using peripheral device, 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.	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
2401	FILE SET ERROR	File name/ Drive name	Parameter number	Off	Flicker	Stop	At power ON/ At reset/ At PLC writing	
2402								

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

*2 Either error stop or continue can be selected for each module by the parameters.

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	2401	The file specified by parameters cannot be made.	• Read the individual information of the error using the peripheral device, 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.	QnA
	2402	Though the file register has been set in the pairing setting/tracking setting, the file register does not exist.	Confirm the file register and parameter.	Q4AR

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
2410	FILE OPE. ERROR	File name/ Drive name	Program error location	Off/ On	Flicker/ On	Stop/ Continue*1	When instruction executed	
2411								
2412								
2413								

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

*2 Either error stop or continue can be selected for each module by the parameters.

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	2410	• 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.	• Read the individual information of the error using the peripheral device, 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.	QnA
	2411	• The file is the 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.	Read the individual information of the error using the peripheral device, check to be sure that the program corresponds to the numerical values there (program location), and correct.	QnA
	2412	The SFC program file is one that cannot be designated by the sequence program.	Read the individual information of the error using the peripheral device, check to be sure that the program corresponds to the numerical values there (program location), and correct.	QnA
	2413	No data has been written to the file designated by the sequence program.	Read the individual information of the error using the peripheral device, 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.	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
2500	CAN'T EXE. PRG.	File name/ Drive name	–	Off	Flicker	Stop	At power ON/ At reset	
2501								
2502								
2503								
2504								

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

*2 Either error stop or continue can be selected for each module by the parameters.

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	2500	• 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.	• Read the common information of the error using the peripheral device, 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. • If PLC parameter device setting is changed, batch-write the parameter and program file into the PLC.	QnA
	2501	There are multiple program files although "none" has been set at the PLC parameter program settings.	Edit the PLC parameter program setting to "yes". Alternatively, delete unneeded programs.	QnA
	2502	The program file is incorrect. Alternatively, the file contents are not those of a sequence program.	Check whether the program version is＊＊＊.QPG, and check the file contents to be sure they are for a sequence program.	QnA
	2503	There are no program files at all.	• Check program configuration. • Check parameters and program configuration.	QnA
	2504	Two or more SFC normal programs or control programs have been designated.		QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
3000	PARAMETER ERROR	File name/ Drive name	Parameter number	Off	Flicker	Stop	At power ON/ At reset/ STOP→RUN/ At PLC writing	
3001								
3002	PARAMETER ERROR	File name/ Drive name	Parameter number	Off	Flicker	Stop	At power ON/ At reset/ STOP→RUN/ At PLC writing	
3003	PARAMETER ERROR	File name/ Drive name	Parameter number	Off	Flicker	Stop	At power-On/ At reset/ STOP→RUN/ At PLC writing	
3004	PARAMETER ERROR	File name/ Drive name	Parameter number	Off	Flicker	Stop	At power-On/ At reset/ STOP→RUN/ At PLC writing	

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	3000	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.	• Read the individual information of the error using the peripheral device, 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.)	QnA
		The parameter settings in the error individual information (special register SD16) are illegal.		QnA
	3001	The parameter settings are corrupted.		QnA
	3002	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.	• Read the individual information of the error using the peripheral device, 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.)	QnA
	3003	The number of devices set at the PLC parameter device settings exceeds the possible CPU module range.	• Read the individual information of the error using the peripheral device, 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 errorm of the CPU module's built-in RAM or program memory or the memory card. (Contact your local Mitsubishi representative.)	QnA
	3004	The parameter file is incorrect. Alternatively, the contents of the file are not parameters.	Check whether the parameter file version is＊＊＊.QPA, and check the file contents to be sure they are parameters.	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
3100	LINK PARA. ERROR	File name/ Drive name	Parameter number	Off	Flicker	Stop	At power ON/ At reset/ STOP→RUN	
3101	LINK PARA. ERROR	File name/ Drive name	Parameter number	Off	Flicker	Stop	At power ON/ At reset/ STOP→RUN	
3102	LINK PARA. ERROR	File name/ Drive name	Parameter number	Off	Flicker	Stop	At power ON/ At reset/ STOP→RUN	

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	3100	Although the QnACPU is a control station or master station, the network parameters have not been written.	• Correct and write the network parameters. • If the error occurs after correction, it suggests a hardware fault. (Contact your local Mitsubishi representative.)	QnA
	3101	• 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/10 is out of the specified area.	• Check the network parameters and mounting status, and if they differ, match the network parameters and mounting status. If any network parameter has been corrected, write it to the CPU module. • Confirm the setting of the number of extension stages of the extension base units. • Check the connection status of the extension base units and extension cables. When the GOT is bus-connected to the main base unit and extension base units, also check their connection status. • If the error occurs after the above checks, the cause is a hardware fault. (Contact your local Mitsubishi representative, explaining a detailed description of the problem.)	QnA
	3102	• The network module detected a network parameter error.	• Correct and write the network parameters. • If the error occurs after correction, it suggests a hardware fault. (Contact your local Mitsubishi representative.)	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
3103	LINK PARA. ERROR	File name/ Drive name	Parameter number	Off	Flicker	Stop	At power ON/ At reset/ STOP→RUN	
3104	LINK PARA. ERROR	File name/ Drive name	Parameter number	Off	Flicker	Stop	At power ON/ At reset/ STOP→RUN	
3105								
3107	LINK PARA. ERROR	File name	Parameter number	Off	Flicker	Stop	At power ON/ At reset/ STOP→RUN	

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	3103	• Although the number of modules has been set to one or 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.	• Correct and write the network parameters. • If the error occurs after correction, it suggests a hardware fault. (Contact your local Mitsubishi representative.)	QnA
		• AJ71QE71 does not exist in the position of I/O number set by the parameter. • I/O number designation is overlapping. • Numbers of the network parameter and loaded AJ71QE71 are different. • Ethernet (parameter + dedicated instruction) is set to more than five.		QnA
	3104	• The Ethernet 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.	• Correct and write the network parameters. • If the error occurs after correction, it suggests a hardware fault. (Contact your local Mitsubishi representative.)	QnA
	3105	The contents of the Ethernet parameter are incorrect.	Write after correcting parameters.	QnA
	3107	• The CC-Link parameter setting is incorrect. • The set mode is not allowed for the version of the mounted CC-Link module.	Check the parameter setting.	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
3200	SFC PARA. ERROR	File name	Parameter number	Off	Flicker	Stop	STOP→RUN	
3201								
3202								
3203								

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	3200	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.	Read the common information of the error using the peripheral device, check error step corresponding to its numerical value (program error location), and correct the problem.	QnA
	3201	The block parameter setting is illegal.		QnA
	3202	The number of step relays specified in the device setting of the PLC parameter dialog box is less than that used in the program.		QnA
	3203	The execution type of the SFC program specified in the program setting of the PLC parameter dialog box is other than scan execution.		QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
4000	INSTRCT. CODE ERR	Program error location	–	Off	Flicker	Stop	At power ON/ At reset/ STOP→RUN When instruction executed	
4001								
4002								
4003								
4004								
4010	MISSING END INS.	Program error location	–	Off	Flicker	Stop	At power ON/ At reset/ STOP→RUN	
4020	CAN'T SET(P)	Program error location	–	Off	Flicker	Stop		
4021								
4030	CAN'T SET(I)	Program error location	–	Off	Flicker	Stop		

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	4000	• The program contains an instruction code that cannot be decoded. • An unusable instruction is included in the program.	Read the common information of the error using a peripheral device, check error step corresponding to its numerical value (program error location), and correct the problem.	QnA
	4001	The program contains a dedicated instruction for SFC although it is not an SFC program.		QnA
	4002	• 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.		QnA
	4003	The number of devices for the dedicated instruction specified by the program is incorrect.		
	4004	The device which cannot be used by the dedicated instruction specified by the program is specified.		
	4010	There is no END (FEND) instruction in the program.		QnA
	4020	The total number of internal file pointers used by the program exceeds the number of internal file pointers set in the parameters.		QnA
	4021	• The common pointer Nos. assigned to files overlap. • The local pointer Nos. assigned to files overlap.		QnA
	4030	The allocation pointer Nos. assigned by files overlap.		

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
4100	OPERATION ERROR	Program error location	–	Off/ On	Flicker/ On	Stop/ Continue*1	When instruction executed	
4101								
4102	OPERATION ERROR	Program error location	–	Off/ On	Flicker/ On	Stop/ Continue*1	When instruction executed	
4103								
4104								
4107								
4108	OPERATION ERROR	Program error location	–	Off/ On	Flicker/ On	Stop/ Continue*1	When instruction executed	

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	4100	The instruction cannot process the contained data.	Read the common information of the error using the peripheral device, check error step corresponding to its numerical value (program error location), and correct the problem.	QnA
	4101	• 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.	Read the common information of the error using the peripheral device, check error step corresponding to its numerical value (program error location), and correct the problem.	QnA
	4102	• 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.	Read the common information of the error using the peripheral device, check error step corresponding to its numerical value (program error location), and correct the problem.	QnA
	4103	The configuration of the PID dedicated instruction is incorrect.		QnA
	4104	The number of settings is beyond the range.	Read the common information of the error using peripheral device, and check and correct the program corresponding to that value (program error location).	Q4AR
	4107	Numbers of execution to the CC-Link instruction are beyond 32.	Set the numbers of execution to the CC-Link instruction to 32 or less.	QnA
	4108	The CC-Link parameter is not set when the CC-Link instruction is executed.	Execute the CC-Link instruction after setting the CC-Link parameter.	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
4200	FOR NEXT ERROR	Program error location	–	Off	Flicker	Stop	When instruction executed	
4201	FOR NEXT ERROR	Program error location	–	Off	Flicker	Stop	When instruction executed	
4202								
4203								
4210	CAN'T EXECUTE(P)	Program error location	–	Off	Flicker	Stop	When instruction executed	
4211								
4212								
4213								
4220	CAN'T EXECUTE(I)	Program error location	–	Off	Flicker	Stop	When instruction executed	
4221								
4223								
4230	INST. FORMAT ERR.	Program error location	–	Off	Flicker	Stop	When instruction executed	
4231								
4235								

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	4200	No NEXT instruction was executed following the execution of a FOR instruction. Alternatively, there are fewer NEXT instructions than FOR instructions.	Read the common information of the error using the peripheral device, check error step corresponding to its numerical value (program error location), and correct the problem.	QnA
	4201	A NEXT instruction was executed although no FOR instruction has been executed. Alternatively, there are more NEXT instructions than FOR instructions.		QnA
	4202	More than 16 nesting levels are programmed.	Keep nesting levels at 16 or under.	QnA
	4203	A BREAK instruction was executed although no FOR instruction has been executed prior to that.	Read the common information of the error using the peripheral device, check error step corresponding to its numerical value (program error location), and correct the problem.	QnA
	4210	The CALL instruction is executed, but there is no subroutine at the specified pointer.		QnA
	4211	There was no RET instruction in the executed subroutine program.		QnA
	4212	The RET instruction exists before the FEND instruction of the main routine program.		QnA
	4213	More than 16 nesting levels are programmed.	Keep nesting levels at 16 or under.	QnA
	4220	Though an interrupt input occurred, the corresponding interrupt pointer does not exist.	Read the common information of the error using the peripheral device, check error step corresponding to its numerical value (program error location), and correct the problem.	QnA
	4221	An IRET instruction does not exist in the executed interrupt program.		QnA
	4223	The IRET instruction exists before the FEND instruction of the main routine program.		QnA
	4230	The number of CHK and CHKEND instructions is not equal.	Read the common information of the error using the peripheral device, check error step corresponding to its numerical value (program error location), and correct the problem.	QnA
	4231	The number of IX and IXEND instructions is not equal.		QnA
	4235	The configuration of the check conditions for the CHK instruction is incorrect. Alternatively, a CHK instruction has been used in a low speed execution type program.		QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
4300	EXTEND INST. ERR.	Program error location	–	Off/ On	Flicker/ On	Stop/ Continue*1	When instruction executed	
4301								
4400	SFCP. CODE ERROR	Program error location	–	Off	Flicker	Stop	STOP→RUN	
4410	CAN'T SET(BL)	Program error location	–	Off	Flicker	Stop	STOP→RUN	
4411								
4420	CAN'T SET(S)	Program error location	–	Off	Flicker	Stop	STOP→RUN	
4421	CAN'T SET(S)	Program error location	–	Off	Flicker	Stop	STOP→RUN	
4422								
4500	SFCP. FORMAT ERR.	Program error location	–	Off	Flicker	Stop	STOP→RUN	
4501								
4502								
4503								
4504								

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	4300	The designation of a MELSECNET/ MINI-S3 master module control instruction was wrong.	Read the common information of the error using the peripheral device, check error step corresponding to its numerical value (program error location), and correct the problem.	QnA
	4301	The designation of an AD57/AD58 control instruction was wrong.		QnA
	4400	No SFCP or SFCPEND instruction in SFC program.	Write the program to the CPU module again using GX Developer.	QnA
	4410	The block number designated by the SFC program exceeds the range.		QnA
	4411	Block number designations overlap in SFC program.		QnA
	4420	A step number designated in an SFC program exceeds the range.		QnA
	4421	Total number of steps in all SFC programs exceed the maximum.		QnA
	4422	Step number designations overlap in SFC program.		QnA
	4500	The numbers of BLOCK and BEND instructions in an SFC program are not equal.	Write the program to the CPU module again using the peripheral device.	QnA
	4501	The configuration of the STEP* to TRAN* to TSET to SEND instructions in the SFC program is incorrect.		QnA
	4502	The structure of the SFC program is illegal. • STEPI* instruction does not exist in the block of the SFC program.		QnA
	4503	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.	• Write the program to the CPU module again using GX Developer. • Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location).	QnA
	4504	The structure of the SFC program is illegal. • The step specified in the TAND instruction does not exist.	Write the program to the CPU module again using GX Developer.	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
4600 4601 4602	SFCP. OPE. ERROR	Program error location	–	Off/ On	Flicker/ On	Stop/ Continue*1	When instruction executed	
4610 4611	SFCP. EXE. ERROR	Program error location	–	On	On	Continue	STOP→RUN	
4620 4621	BLOCK EXE. ERROR	Program error location	–	Off	Flicker	Stop	When instruction executed	

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	4600	The SFC program contains data that cannot be processed.	Read common information of the error using the peripheral device, check error step corresponding to its numerical value (program error location), and correct the problem.	QnA
	4601	Exceeds device range that can be designated by the SFC program.		QnA
	4602	The START instruction in an SFC program is preceded by an END instruction.		QnA
	4610	The active step information at presumptive start of an SFC program is incorrect.	Read common information of the error using the peripheral device, check error step corresponding to its numerical value (program error location), and correct the problem. The program is automatically subjected to an initial start.	QnA
	4611	Key-switch was reset during RUN when presumptive start was designated for SFC program.		QnA
	4620	Startup was executed at a block in the SFC program that was already started up.	Read common information of the error using the peripheral device, check error step corresponding to its numerical value (program error location), and correct the problem.	QnA
	4621	Startup was attempted at a block that does not exist in the SFC program.	• Read the common information of the error using GX Developer, and check and correct the error step corresponding to that value (program error location). • Turn ON if the special relay SM321 is OFF.	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
4630	STEP EXE. ERROR	Program error location	–	Off	Flicker	Stop	When instruction executed	
4631								
4632								
4633								

*1 CPU operation can be set in the parameters at error occurrence. (LED indication varies.)

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	4630	Startup was executed at a block in the SFC program that was already started up.	Read common information of the error using the peripheral device, check error step corresponding to its numerical value (program error location), and correct the problem.	QnA
	4631	• 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 exit in the SFC program. Or, the transition condition for forced transition that does not exit in the SFC program was canceled.	• Read the common information of the error using the peripheral device, and check and correct the error step corresponding to that value (program error location). • Turn ON if the special relay SM321 is OFF.	QnA
	4632	There were too many simultaneous active steps in blocks that can be designated by the SFC program.	Read common information of the error using the peripheral device, check error step corresponding to its numerical value (program error location), and correct the problem.	QnA
	4633	There were too many simultaneous active steps in all blocks that can be designated.		QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
5000	WDT ERROR	Time (value set)	Time (value actually measured)	Off	Flicker	Stop	Always	
5001	WDT ERROR	Time (value set)	Time (value actually measured)	Off	Flicker	Stop	Always	
5010 5011	PRG. TIME OVER	Time (value set)	Time (value actually measured)	On	On	Continue	Always	

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	5000	• 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.	• Read the individual information of the error from the peripheral device, 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.	QnA
	5001	• The scan time of the program exceeded the WDT value specified in the PLC RAS setting of the PLC parameter.	• Read the individual information of the error using the peripheral device, 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.	QnA
	5010	The program scan time exceeded the constant scan setting time specified in the PLC RAS setting of the PLC parameter.	• 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.	QnA
		The low speed program execution time specified in the PLC RAS setting of the PLC parameter exceeded the excess time of the constant scan.		QnA
	5011	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.	Read the individual information of the error using the peripheral device, 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.	QnA

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
6000	PRG. VERIFY ERR.	File name	–	Off	Flicker	Stop	Always	
6010	MODE. VERIFY ERR.	–	–	On	On	Continue	Always	
6100	TRUCKINERR.	–	–	On	On	Continue	At power ON/ At reset/ STOP→RUN	
6101	TRUCKIN ERR.	–	–	On	On	Continue	When an END instruction executed	
6200	CONTROL EXE.	Reason(s) for system switching	–	On	Off	Continue	Always	
6210	CONTROL WAIT	Reason(s) for system switching	–	On	Off	Continue	Always	

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	6000	The control system and standby system in the redundant system do not have the same programs and parameters. (This can be detected from the standby system of the redundant system.)	Synchronise the programs and parameters of the control system and standby system.	Q4AR
	6010	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.)	Synchronise the operation statuses of the control system and standby system.	Q4AR
	6100	A CPU module tracking memory error was detected during initial. (This can be detected from the control system or standby system of the redundant system.)	Hardware fault of the CPU module. (Please contact your local nearest Mitsubishi or sales representative, explaining a detailed description of the problem. Change the CPU modules in order of the standby system CPU module and control system CPU module.)	Q4AR
	6101	The CPU module detected an error during the handshake for tracking. (This can be detected from the control system or standby system of the redundant system.)	Check the condition of the other stations.	Q4AR
	6200	The standby system in a redundant system is switched to the control system. (This can be detected from the standby system of the redundant system.)	Check the control system condition.	Q4AR
	6210	The control system in a redundant system is switched to the standby system. (This can be detected from the standby system of the redundant system.)	Check the control system condition.	Q4AR

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
6220	CAN'T EXE. CHANGE	Reason(s) for system switching	–	On	On	Continue	At switching request	
6221	CAN'T EXE. CHANGE	Reason(s) for system switching	–	On	On	Continue	At switching request	
6230	DUAL SYS. ERROR	–	–	On	On	Continue	Always	

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	6220	• Since the standby system is in an error or similar status in the redundant system, the control system cannot be switched to the standby system. • When an attempt was made to execute system switching, the control system could not be switched to the standby system due to a network error of the control system. (This can be detected from the control system of the redundant system.)	Check the standby system condition.	Q4AR
	6221	Switching is disabled because of a bus switching module error. (This can be detected from the control system of the redundant system.)	This is a bus switching module hardware fault. (Contact your local Mitsubishi representative.)	Q4AR
	6230	The link module mounted on the standby system CPU module is the remote master station.	Check the system configuration status.	

Error Code (SD0)	Error Message	Common Information (SD5 to 15)	Individual Information (SD16 to 26)	LED Status		CPU Operation Status	Diagnostic Timing	
				RUN	ERROR			
9000	F****	Program error location	Annunciator number	On	On/ Off *2	Continue	When instruction executed	
				USER LED On				
9010	<CHK>ERR ***-***	Program error location	Failure No.	On	Off	Continue	When instruction executed	
				USER LED On				

	Error Code (SD0)	Error Contents and Cause	Corrective Action	Corresponding CPU
	9000	Annunciator (F) was set ON	Read the individual information of the error using the peripheral device, and check the program corresponding to the numerical value (annunciator number).	QnA
	9010	Error detected by the CHK instruction.	Read the individual information of the error using the peripheral device, and check the program corresponding to the numerical value (error number) there.	QnA

6.4 Canceling of Errors

Q series CPU module can perform the cancel operation for errors only when the errors allow the CPU module to continue its operation.
To cancel the errors, follow the steps shown below.

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

After the CPU module is reset by the canceling of the error, the special relays, special registers, and LEDs associated with the error are returned to the status under which the error occurred.
If the same error occurs again after the cancellation of the error, it will be registered again in the error history.

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

Refer to the following manual for details of error canceling.
→ QCPU User's Manual (Function Explanation, Program Fundamentals

POINT

(1) When the error is canceled with the error code to be canceled stored in the SD50, the lower one digit of the code is neglected.
(Example)
If error codes 2100 and 2101 occur, and error code 2100 to cancel error code 2101.
If error codes 2100 and 2111 occur, error code 2111 is not canceled even if error code 2100 is canceled.

(2) Errors developed due to trouble in other than the CPU module are not canceled even if the special relay (SM50) and special register (SD50) are used to cancel the error.
(Example)
Since "SP. UNIT DOWN" is the error that occurred in the base unit (including the extension cable), intelligent function module, etc. the error cause cannot be removed even if the error is canceled by the special relay (SM50) and special register (SD50).
Refer to the error code list and remove the error cause.

7. TRANSPORTATION PRECAUTIONS

When transporting lithium batteries, make sure to treat them based on the transportation regulations.

7.1 Relevant Models

The batteries for the QnACPU are classified as shown in the table below.

Product Name	Model	Description	Handled As
QnA series battery	A6BAT	Lithium battery	Non-dangerous goods
QnA series battery memory card	Q1MEM-128S, Q1MEM-128SE, Q1MEM-1MS, Q1MEM-1MSE, Q1MEM-1MSF, Q1MEM-256S, Q1MEM-256SE, Q1MEM-256SF, Q1MEM-2MS, Q1MEM-2MSF, Q1MEM-512S, Q1MEM-512SE, Q1MEM-512F, Q1MEM-64S, Q1MEM-64SE	Packed with lithium coin battery (BR2325)	

7.2 Transportation Guidelines

Products are packed properly in compliance with the transportation regulations prior to shipment. When repacking any of the unpacked products to transport it to another location, make sure to observe the IATA Dangerous Goods Regulations, IMDG Code and other local transportation regulations.
For details, please consult your transportation company.

MEMO

Warranty

Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; machine damage or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

⚠For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi.
- This product has been manufactured under strict quality control. However, when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

Country/Region	Sales office/Tel
U.S.A	Mitsubishi Electric Automation Inc. 500 Corporate Woods Parkway Vernon Hills, IL 60061, U.S.A. Tel : +1-847-478-2100
Brazil	MELCO-TEC Rep. Com.e Assessoria Tecnica Ltda. Rua Correia Dias, 184, Edificio Paraiso Trade Center-8 andar Paraiso, Sao Paulo, SP Brazil Tel : +55-11-5908-8331
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