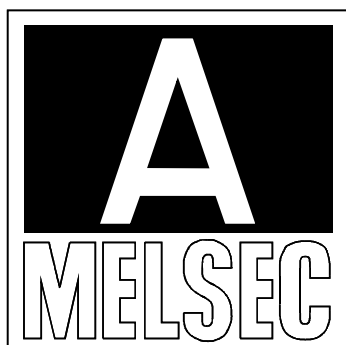# MITSUBISHI

Type A1SJHCPU-S8

Mitsubishi Programmable Controller

User's Manual

(Hardware)

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

**Prior to use, please read both this manual and detailed manual
thoroughly and familiarize yourself with the product.**

MODEL	A1SJHCPU-S8-U(H/W)-E
MODEL CODE	13JL73
IB(NA)-66884-D(0810)MEE	

● SAFETY PRECAUTIONS ●
(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in this manual.

Also pay careful attention to safety and handle the module properly.

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

⟨!⟩ **DANGER**	**Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out properly.**
⚠ **CAUTION**	**Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out properly.**

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

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

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

[DESIGN PRECAUTIONS]

⟨!⟩ DANGER
● **Install a safety circuit external to the PLC that keeps the entire system safe even when there are problems with the external power supply or the PLC module. Otherwise, trouble could result from erroneous output or erroneous operation.** (1) **Outside the PLC, construct mechanical damage preventing interlock circuits such as emergency stop, protective circuits, positioning upper and lower limits switches and interlocking forward/reverse operations.**

[DESIGN PRECAUTIONS]

◇ **DANGER**

---

(2) When the PLC detects the following problems, it will stop calculation and turn off all output in the case of (a). In the case of (b), it will stop calculation and hold or turn off all output according to the parameter setting.
Note that the AnS series module will turn off the output in either of cases (a) and (b).

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

  (b) The PLC CPUs self-diagnosis functions, such as the watch dog timer error, detect problems.
     In addition, all output will be turned on when there are problems that the PLC CPU cannot detect, such as in the I/O controller. Build a fail safe circuit exterior to the PLC that will make sure the equipment operates safely at such times. See section 9.1 of this manual for example fail safe circuits.

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

● When overcurrent which exceeds the rating or caused by short-circuited load flows in the output module for a long time, it may cause smoke or fire. To prevent this, configure an external safety circuit, such as fuse.

● Build a circuit that turns on the external power supply when the PLC main module power is turned on. If the external power supply is turned on first, it could result in erroneous output or erroneous operation.

● When a data link results in a communication error, the faulty station changes in operating status depending on the used data link type.
  (1) For the data link data, the data prior to the communication error will be held.
  (2) The MELSECNET (II,/B,/10) remote I/O station will turn all output off.
  (3) The MELSECNET/MINI-S3 remote I/O station will hold the output or turn all output off depending on the E.C. remote setting.
  Refer to the data link manuals regarding the method for setting the communication problem station and the operation status when there are communication problem.

[DESIGN PRECAUTIONS]

◇ **DANGER**

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

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

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

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

● When configuring a system, do not leave any slots vacant on the base. Should there be any vacant slots, always use a blank cover (A1SG60) or dummy module (A1SG62).

When the extension base A1S52B, A1S55B or A1S58B is used, attach the dustproof cover supplied with the product to the module installed in slot 0.

If the cover is not attached, the module's internal parts may be dispersed when a short-circuit test is performed or overcurrent/overvoltage is accidentally applied to the external I/O area.

⚠ **CAUTION**

● Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other. They should be installed 100 mm (3.94 inch) or more from each other. Not doing so could result in noise that would cause erroneous operation.

● When controlling items like lamp load, heater or solenoid valve using an output module, large current (approximately ten times greater than that present in normal circumstances) may flow when the output is turned OFF to ON.

Take measures such as replacing the module with one having sufficient rated current.

[INSTALLATION PRECAUTIONS]

⚠ CAUTION

● Use the PLC in an environment that meets the general specifications contained in this manual. Using this PLC in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.

● Hold down the module loading lever at the module bottom, and securely insert the module fixing latch into the fixing hole in the base unit.
Incorrect loading of the module can cause a malfunction, failure or drop.
When using the PLC in the environment of much vibration, tighten the module with a screw.
Tighten the screw in the specified torque range. Undertightening can cause a drop, short circuit or malfunction. Overtightening can cause a drop, short circuit or malfunction due to damage to the screw or module.

● When installing extension cables, be sure that the connectors of base unit are installed correctly. After installation, check them for looseness. Poor connections could cause an input or output failure.

● Correctly connect the memory cassette installation connector to the memory cassette. After installation, be sure that the connection is not loose. A poor connection could cause an operation failure.

● Completely turn off the external power supply before loading or unloading the module. Not doing so could result in electric shock or damage to the product.

● Do not directly touch the module's conductive parts or electronic components. Touching the conductive parts could cause an operation failure or give damage to the module.

[WIRING PRECAUTIONS]

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

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

[STARTUP AND MAINTENANCE PRECAUTIONS]

◇ DANGER

● **Do not touch the terminals while power is on.**
  Doing so could cause shock or erroneous operation.

● **Correctly connect the battery.**
  Also, do not charge, disassemble, heat, place in fire, short circuit, or solder the battery. Mishandling of battery can cause overheating or cracks which could result in injury and fires.

● **Switch all phases of the external power supply off when cleaning the module or retightening the terminal or module mounting screws. Not doing so could result in electric shock.**
  Undertightening of terminal screws can cause a short circuit or malfunction. Overtightening of screws can cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.

⚠ CAUTION

● **The online operations conducted for the CPU module being operated, connecting the peripheral device (especially, when changing data or operation status), shall be conducted after the manual has been carefully read and a sufficient check of safety has been conducted. Operation mistakes could cause damage or problems with of the module.**

● **Do not disassemble or modify the modules.**
  Doing so could cause trouble, erroneous operation, injury, or fire.

● **Use any radio communication device such as a cellular phone or a PHS phone more than 25cm (9.85 inch) away from the PLC.**
  Not doing so can cause a malfunction.

● **Switch all phases of the external power supply off before mounting or removing the module. If you do not switch off the external power supply, it will cause failure or malfunction of the module.**

● **Do not drop or give an impact to the battery installed in the module.**
  Otherwise the battery will be broken, possibly causing internal leakage of electrolyte. Do not use but dispose of the battery if it has fallen or an impact is given to it.

[STARTUP AND MAINTENANCE PRECAUTIONS]

⚠ CAUTION
● Always make sure to touch the grounded metal to discharge the electricity charged in the electricity charged in the body, etc., before touching the module. Failure to do say cause a failure or malfunctions of the module.

[DISPOSAL PRECAUTIONS]

⚠ CAUTION
● When disposing of this product, treat it as industrial waste. When disposing of batteries, separate them from other wastes ccording to the local regulations. (For details of the battery directive in EU member states, refer to the QCPU User's Manual (Type A1SJH(S8)/A1SH/A2SHCPU (S1) User's Manual).)

[TRANSPORTATION PRECAUTIONS]

⚠ CAUTION
● When transporting lithium batteries, make sure to treat them based on the transport regulations. (Refer to Appendix 2 for details of the controlled models.)

REVISIONS

This manual describes EMC standards and Low-Voltage instructions the handling precautions, and error codes of: A1SJHCPU-S8 (abbreviated to CPU in this manual)

| Manuals |

The manuals related to A1SJHCPU-S8 are listed below.
Refer to the following manuals when necessary.

Detailed manuals

Manual Name	Manual No. (Model Code)

type A1SJH/A1SH/A2SHCPU(S1) User's manual
   Provides information on the performance, specifications,
   handling, etc. of the A1SJHCPU/A1SHCPU/A2SHCPU(S1)
   and on the memory cassette specifications and handling.
                        (Optional)
	IB-66779
	(13JL22)

Related manuals

Manual Name	Manual No. (Model Code)

ACPU Programming Manual (Fundamentals)
    Describes programming methods necessary for creating programs, device names, parameters, program types, memory area configuration, and so on.
                                                     (Optional)
	IB-66249
	(13J740)

ACPU Programming Manual (Common Instructions)
    Describes how to use the sequence instruction, basic instructions, applied instructions and microcomputer programs.
                                                     (Optional)
	IB-66250
	(13J741)

AnSHCPU/AnACPU/AnUCPU Programming Manual (Dedicated Instructions)
    Describes instructions that have been expanded for A1SJHCPU/A1SHCPU/A2SHCPU(S1).
                                                     (Optional)
	IB-66251
	(13J742)

AnS Module type I/O User's Manual
    Describes the specification of the compact building block type I/O module.
                                                     (Optional)
	IB-66541
	(13JE81)

1. SPECIFICATIONS

1.1 SPECIFICATIONS

Table 1.1 General specification

Item	Specifications				
Ambient operating temperature	0 to 50 °C				
Ambient storage temperature	−20 to 75 °C				
Ambient operating humidity	10 to 90 % RH, No-condensing				
Ambient storage humidity	10 to 90 % RH, No-condensing				
Vibration resistance	Conforming to JIS B 6501, IEC 1131-2		Frequency	Acceleration	Amplitude	No. of sweeps
		Under intermittent vibration	10 to 57Hz	——	0.075mm (0.003in.)	10 times each in X, Y, Z directions
			57 to 150Hz	9.8m/s^2 {1 G}	——	
		Under continuous vibration	10 to 57Hz	——	00.35mm (0.001in.)	——
			57 to 150Hz	4.9m/s^2 {1 G}	——	
Shock resistance	Conforming to JIS B 3501, IEC 1131-2 (147 m/s2 {15G}, 3 times in each of 3 directions X Y Z)				
Operating ambience	No corrosive gases				
Operating elevation	2000m (6562ft.) max.				
Installation location	Control panel				
Over voltage category *1	II max.				
Pollution level *2	2 max.				

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

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

2. PERFORMANCE SPECIFICATIONS

2.1 Performance Specifications

The memory capacities of A1SJHCPU-S8 module, performances of devices, etc., are presented below.

Table 2.1 Performance specifications

Item \ Type	A1SJHCPU-S8
Control system	Repeated operation (using stored program)
I/O control method	Refresh mode/Direct mode selectable
Programming language	Language dedicated to sequence control. Relay symbol type and logic symbolic language, MELSAP-II (SFC)
Number of instructions (types)	Sequence instructions : 26
	Basic instructions : 131
	Application instructions : 106
	CC-Link dedicated instructions : 8
Processing speed (sequence instruction) (m sec/step)	Direct : 1.0 to 2.3
	Refresh : 1.0
I/O points	2048 *1
Actual I/O number of point	256
Watchdog timer (WDT) (msec)	10 to 2000
Memory capacity *2 (built-in RAM)	64 k bytes
Program capacity — Main sequence	Max. 8 k steps
Program capacity — Sub sequence	Unavailable
Self-diagnostic functions	Watchdog error monitor, Memory error detection, CPU error detection, I/O error detection, Battery error detection, etc.
Operation mode at the time of error	STOP/CONTINUE
STOP → RUN output mode	Output data at time of STOP restored/data output after operation execution
Clock function	Year, month, day, hour, minute, second (Automatically recognizes leap years.) Accuracy −3.1 to +5.3 s (TYP. +1.7 s)/d at 0 °C −1.6 to +5.3 s (TYP. +2.4 s)/d at 25°C −9.6 to +3.6 s (TYP. -2.1 s)/d at 55 °C
Allowable momentary power interruption time	20 msec (1 ms or less for the A1S63P only. 100 V AC or more for the A1SJHCPU-S8.)
Current consumption (5 V DC)	0.3 A
Number of I/O slot	8
Weight [kg (lb.)]	1.06 (2.33)
External dimensions mm(inch)	130 (5.12) × 435 (17.1) × 82 (3.23)
Standard	UL/cUL

*1 The I/O device after the actual input points can be used as MELSECNET(/B), MELSECNET/MINI, or CC-Link.

*2 The maximum total memory that can be used for parameters, T/C set values, program capacity, file registers, number of comments, sampling trace, and status latch is 32 k/64 k bytes. The memory capacity is fixed. No expansion memory is available.

2

3. EMC DIRECTIVE AND LOW-VOLTAGE INSTRUCTION

3.1 Requirements for Compliance to EMC Directive (89/336/EEC)

The EMC Directive (89/336/EEC) become mandatory within Europe from January 1st 1996. The EMC directive in essence defines the amount of electromagnetic output a product is allowed to produce and how susceptible that product is to electromagnetic interference. Any manufacturer or importer of electrical/electronic apparatus must before releasing or selling products within Europe after that date have a CE mark attached to their goods. Testing to comply with the directive is done by use of agreed European standards which define limits for radiated and mains conducted electromagnetic emissions from equipment, levels of immunity to radiated emissions, ability for equipment to cope with transient voltage surges and electro-static discharges.

When installed in the specified manner this unit will be compliant with the relevant standards EN50081-2 and prEN50082-2 as applicable in the EMC directive. Failure to comply with these instructions could lead to impaired EMC performance of the equipment and as such Mitsubishi Electric Corporation can accept no liability for such actions.

3.1.1 EMC standards

When the PC 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
EN50081-2: 1995	EN55011 Radiated noise	Measure the emission released by the product.	30M-230MHz QP : 30dBm V/m (30m measurement) *1 230M-1000MHz QP : 37dBm V/m (30 m measurement)
	EN55011 Conduction noise	Measure the emission released by the product to the power line.	150K-500kHzQP: 79dB, Mean : 66dB *1 500K-30MHz QP : 73dB, Mean: 60dB
prEN50082-2: 1991	IEC801-2 Static electricity immunity *2	Immunity test by applying static electricity to the module enclosure.	4kV contact discharge 8kV air discharge
	IEC801-3 Radiated electromagnetic field *2	Immunity test by applying aradiated electric field to the product.	10V/m, 27-500MHz
	IEC801-4 First transient burst noise	Immunity test by applying burst noise to the power line and signal cable.	2kV

Specifications	Test Item	Test Description	Standard Values
EN50082-2: 1995	EN61000-4-2 Static electricity immunity *2	Immunity test by applying static electricity to the module enclosure.	4kV contact discharge 8kV air discharge
	EN61000-4-4 First transient burst noise	Immunity test by applying burst noise to the power line and signal cable., 2kV	2kV
	ENV50140 Radiated electromagnetic field AM modulation *2	Immunity test by applying aradiated electric field to the product.	10V/m, 80-1000M Hz, 80% AM modulation @ 1kHz
	ENV50204 Radiated electromagnetic field Pulse modulation *2	Immunity test by applying aradiated electric field to the product.	10V/m, 900MHz, 200Hz pulse modulation, 50% duty
	ENV50141 Conduction noise	Immunity test by inducting an electromagnetic field in the power line signal cable.	10Vrms, 0.15-80 Hz, 80% modulation @1kHz

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

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

3.1.2 Installation instructions for EMC

3.1.2.1 Control cabinet

When constructing a control cabinet where the PC system will be installed, the following instructions must be followed.

(1) Use a conductive control cabinet.

(2) 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.

(3) 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.

(4) Earth the control cabinet with a thick wire so that a low impedance connection to ground can be ensured even at high frequencies. (22mm^2 wire or thicker is recommended.)

(5) Holes made in the control cabinet must be 10cm (3.94in.) diameter or less. If the holes are 10cm (3.94in.) or larger, radio frequency noise may be emitted.

(6) Connect the door of cabinet to the main body with flat braided wires at as many points as possible so that a low impedance can be ensured even at high frequencies.

3.1.2.2 Connection of power and ground wires

Ground and power supply wires for the PC system must be connected as described below.

(1) 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 30cm (11.18in.) or shorter.) The LG and FG terminals function is to pass the noise generated in the PC system to the ground, so an impedance that is as low as possible must be ensured. As the wires are used to relieve the noise, the wire itself carries a large noise content and thus short wiring means that the wire is prevented from acting as an antenna.

Note) A long conductor will become a more efficient antenna at high frequency.

(2) 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) Except for A1S61PN and A1S62PN, short between FG and LG terminals by a short jumper wire.

3.1.2.3 Cables

The cables led from the control cabinet contain a high frequency noise element and outside the control panel these cables act as antennae and radiate noise. The cables connected to input/output modules or special modules which leave the control panel should always be shielded cables.

Mounting of a ferrite core on the cables is not required (excluding some models) but if a ferrite core is mounted, the noise radiated through the cable can be suppressed further.

Use of a shielded cable is also effective for increasing the noise immunity level. The PC system's input/output and special function module provide a noise immunity level of equivalent to that stated in IEC801-4 : 2kV when a shielded cable is used. If a shielded cable is not used or if the shield earthing treatment is not suitable even when used (See Section 3.1.2.4), the noise immunity level is less than 2kV.

Note) prEN50082-2 specifies the noise resistance level based on the signal wire application.
Signals involved in process control :   2kV
Signals not involved in process control : 1kV

The meaning of "involved in process control" is not defined in prEN50082-2. However, when the purposes of the EMC Directive are considered, the signals that could cause personal injury or risks in the facility if a malfunction occurs should be defined as "signals involved in process control". Thus, it is assumed that a high noise immunity level is required.

3.1.2.4 Shield earthing

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

Shield section

Screw

Clamp fitting

Paint mask

Shielded cable
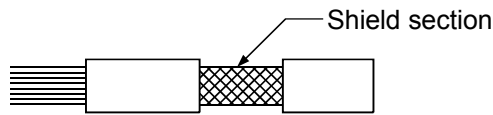
(a) Peel the cable insulation off and expose the shield section.
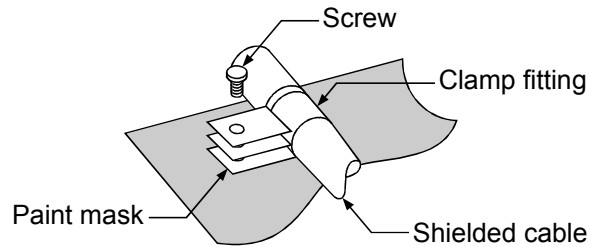
(b) Sandwich the exposed shield section with the and earth to the control cabinet over a wide area.

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.

Shielded cable

Wire

Crimp terminal
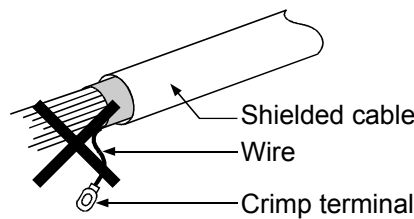
3.1.2.5 MELSECNET/II module

The following requirements apply to A1SJ71AR21, A1SJ71BR11, AnNCPUR21, AnACPUR21.

(1) Always use a triaxial cable for the module. The radiated noise in the band of 30MHz or higher can be suppressed by using a triax cable. Earth the outer shield by the method described in Section 3.1.2.4.

Earth this section
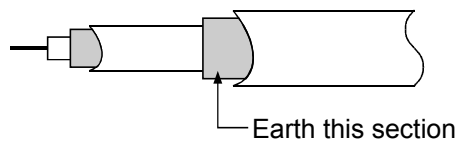
(2) Always mount a ferrite core onto the triaxial cable. Mount the ferrite core near the control cabinet outlet of each cable. Use of the TDK ZCAT3035 ferrite core is recommended.

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3.1.2.6 Ethernet module

(1) Always earth the AUI cable connected to the A1SJ71E71-B5. The AUI is a shielded cable so remove the outer insulation and connect to earth the exposed shield section using as wide a surface area as possible in the manner shown below.

AUI cable

Shield
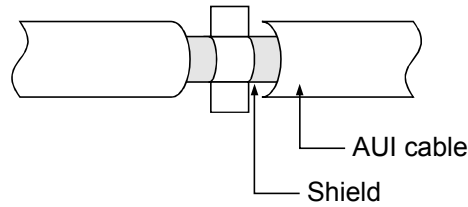
(2) Always use a triaxial cable for the coaxial cable connected to the A1SJ71E71-B2. The earthing precautions are the same as Section 3.1.2.5.

(3) For A1SJ71E71-B2/B5, always mount a ferrite core in addition to items (1) and (2) above. Use of the TDK ZCAT3035 ferrite core is recommended.

3.1.2.7 Positioning Modules

(1) When wiring with a 2m (6.6ft.) 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 distance.
Install the drive unit in the same panel.

External wiring connector

Cable clamp

External wiring cable (within 2 m (6.56 ft.))

Power supply module

CPU module

A1SD75 module

Drive unit
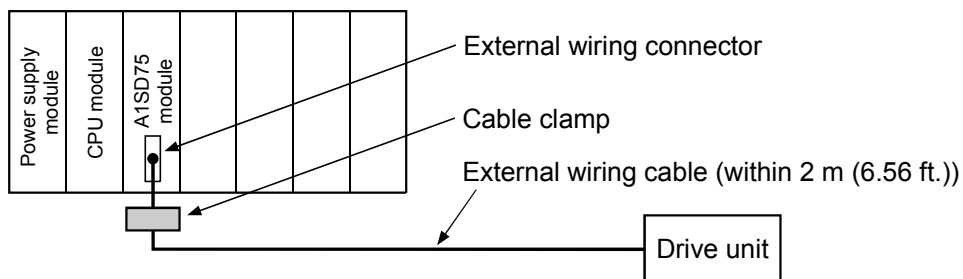
(2) When wiring with cable that exceeds 2m (6.6ft.), but is 10m (32.8ft.) or less
Ground the shield section of the external wiring cable with the cable clamp.
(Ground the shield at the closest location to the AISD75 external wiring connector.)
Install a ferrite core.
Wire the external wiring cable to the drive unit and external device with the shortest distance.
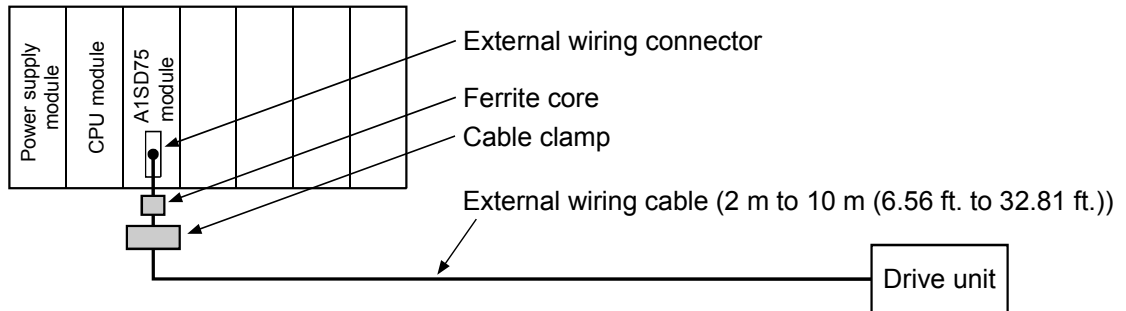
(3) Ferrite core and cable clamp types and required quantities

(a) Cable clamp
Type： AD75CK (Mitsubishi Electric)

(b) Ferrite core
Type： ZCAT3035-1330 (TDK ferrite core)

(c) Required quantity

Cable length	Prepared part	Required Qty		
		1 axis	2 axes	3 axes
Within 2m (6.6 t.)	AD75CK	1	1	1
2m (6.6ft.) to 10m (32.8ft.)	AD75CK	1	1	1
	ZCAT3035-1330	1	2	3

3.1.2.8 I/O and other communication cables

Always earth the shield section of the I/O signal cables and other communication cables (RS-232-C, RS-422, etc.) in the same manner as described in Section 3.1.2.4 if the cables go outside of the control cabinet.

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3.1.2.9 Power supply module

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

Model	Precautions
A1S61P A1S62P A1S63P [*1]	Always mount one of the filters listed in Section 3.1.2.10 to the incoming power supply lines.
A1S61PEU A1S62PEU	None
A1S61PN A1S62PN	Make sure to short and ground the LG and FG terminals. [*2]
A1SJCPU-S3 A1SJHCPU A1SJHCPU-S8	Always ground the LG and FG terminals after short-circuiting them.

*1 If a sufficient filter circuitry is built into a 24VDC 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.

3.1.2.10 Ferrite core

A ferrite core is effective for reducing noise in the band of 30MHz to 100MHz. Mounting of a ferrite core is not necessary except for some particular models described in Section 3.1.2.5 and 3.1.2.6. However if further attenution of noise is necessary, mounting of a ferrite core on cables which radiate noise is recommended. When a ferrite core is mounted, mount the ferrite core just before the point where the cable goes outside of the cabinet. The ferrite will not be effective if the mounting position is not adequate.
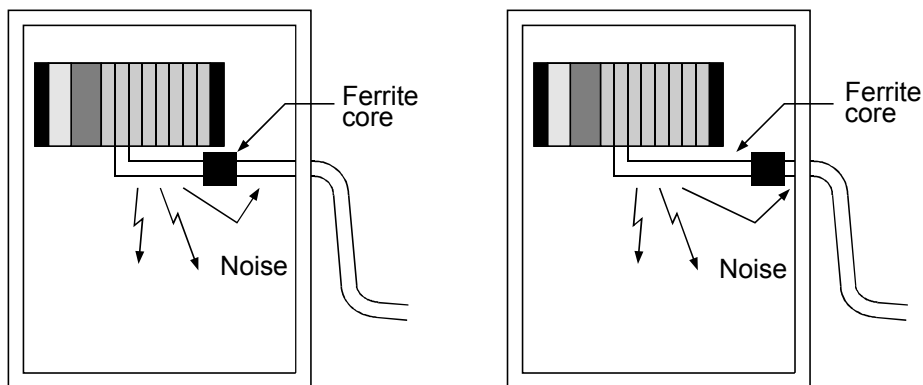
(a) When there is a distance from the cable exit hole, the noise will jump over the ferrite, thus the effect will be halved.

(b) When mounted by the cable exit hole, the noise will not jump over the ferrite.

3.1.2.11 Noise filter (power supply line filter)

The noise filter (power supply line filter) is a device effective to reduce conducted noise. Except for some particular models described in Section 3.1.2.8, installation of a noise filter onto the power supply lines is not necessary. However conducted noise can be reduced if it is installed. (The noise filter is generally effective for reducing conducted noise in the band of 10MHz or less.) Usage of the following filters is recommended.

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

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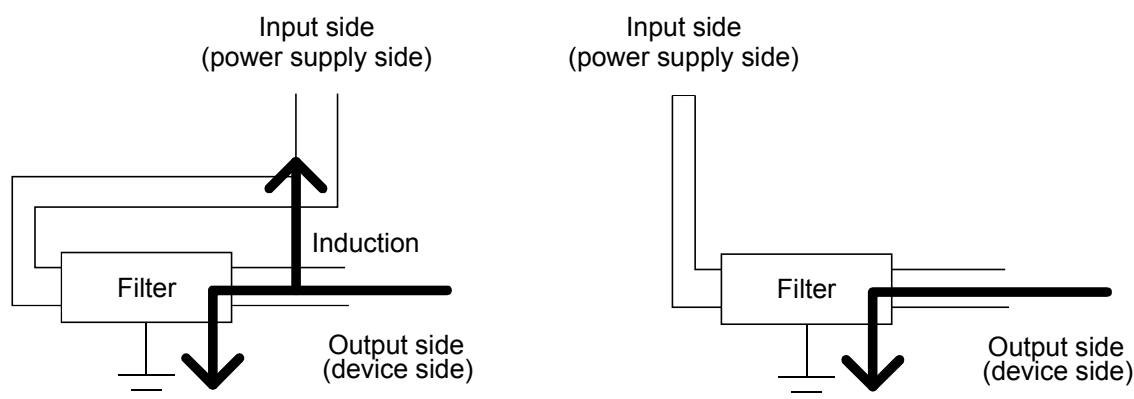
(a) The noise will be included when the input and output wires are bundled.

(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. 10cm (3.94 in.)).

3.2 Requirements for conpliance with the Low Voltage Directive (73/23/EEC) and (93/68/EEC)

The Low Voltage Directive is mandatory within Europe, effective 1st January 1997.

The Low Voltage Directive requires each device which operates with power supply ranging from 50VAC to 1000V and 75VDC to 1500V to satisfy necessary safety items.

In the Sections from 3.2.1 to 3.2.8, cautions on installation and wiring of the MELSEC-AnS series PC to conform to the Low Voltage Directive requires are described.

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

3.2.1 Standard applied for MELSEC-AnS

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

For the modules which operate with the rated voltage of 50VAC/75VDC or above, we have developed new models that conform to the above standard.

For the modules which operate with the rated voltage under 50VAC/75VDC, the conventional models can be used, because they are out of the the Low Voltage Directive application range.

3.2.2 Precautions when using the MELSEC-AnS series PC

Module selection

(1) Power module
    For a power module with rated input voltage of 100/200VAC, 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 42.4V or more at the peak) area.
    For a power module with 24VDC rated input, a conventional model can be used.

(2) I/O module

For I/O module with rated input voltage of 100/200VAC, 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 24VDC 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 5VDC circuit inside.

(4) Special module

Conventional models can be used for the special modules including analog module, network module, and positioning module, because the rated voltage is 24VDC or less.

(5) Display device

Use an A870GOT CE compatible model.

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 PC.

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

| Category IV | Category III | Category II | Category I |
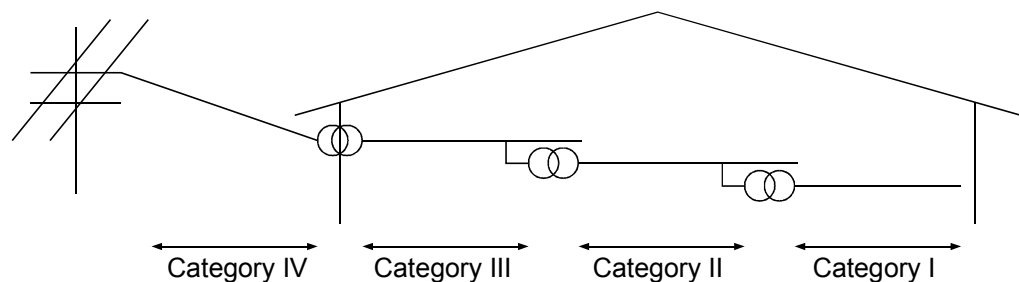
Figure 1. : Installation Category

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 cabinet

Because the PC is open type equipment (a device designed to be stored within another module), be sure to use it only when installed in a control cabinet.

(1) Electrical shock prevention
In order to such as the operators from electric shocks, the control box must have the following functions :

 (a) The control cabinet must be equipped with a lock so that only skilled or qualified personnel.

 (b) The control cabinet must be fitted with advice which automatically stops the power supply when the cabinet is opened.

(2) Dustproof and waterproof features

The control cabinet also provides protection from dust, water and ether substances. Insufficient ingression protection may lower the insulation withstand voltage, resulting in insulation destruction. The insulation in our PC is designed to cope with the pollution level 2, so use in an environment with pollustion level 2 or better.

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

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

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

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

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

3.2.5 Module installation

(1) Installing modules contiguously
In A series PCs, 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 100/200VAC rating, the printed board which contains the hazardous voltage circuit becomes bare. When it is unavoidable to leave an open slot, be sure to install the blank module (A1SG60).
When using the A1S5 B expansion base with no power supply, attach the cover packaged with the expansion base to the side of the leftmost module.

3.2.6 Grounding

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

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

Functional grounding ⏚ : Improves the noise resistance.

3.2.7 External wiring

(1) 24VDC external power supply
For special modules that require a 24VDC I/O module or external power supply, select a model which complies with the Low Voltage Directive's requirements for isolation between the primary and secondary circuits.

(2) External devices
When a device with a hazardous voltage circuit is externally connected to the PC, select a model which complies with the Low Voltage Directive's requirements for isolation between the primary and secondary circuits.

(3) Insulation requirements
Dielectric withstand voltages are shown in Table 2.

Table2 : Intensive Insulation Withstand Voltage
(Installation Category II, source : IEC664)

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

4. LOADING AND INSTALLATION

4.1 Module Handling

(1) Module enclosure, terminal block connectors and pin connectors are made of resin; do not drop them or subject them to strong impact.

(2) Do not remove modules' printed circuit boards from the enclosure in order to avoid changes in operation.

(3) During wiring, take care to ensure that wiring off-cuts, etc. do not get inside the case. If anything does get inside the case, remove it.

(4) Tighten the module mounting and fixing screws as specified below.

Screw	Tightening Torque N · cm (kgf · cm) [lb · inch]
Module mounting screws (M4)	78.4 to 117.6 (8 to 12) [45 to 67]
I/O module terminal screw (M3.5)	58.8 to 88.2 (6 to 9) [34 to 50]
Power supply module terminal screws (M3.5)	58.8 to 88.2 (6 to 9) [34 to 50]

4.2 Base Mounting

(1) Mounting dimension
    Mounting dimensions of each base unit are as follows:
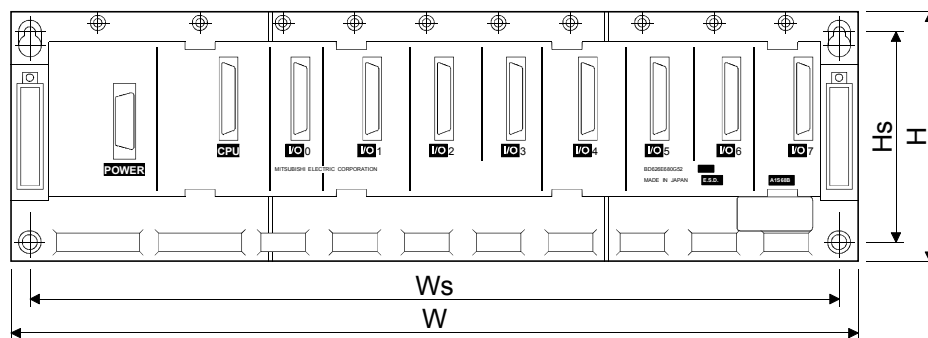
Dimensions: mm (inch)

	A1S52B (S1)	A1S55B (S1)	A1S58B (S1)	A1S65B (S1)	A1S68B (S1)
W	155 (6.10)	260 (10.24)	365 (14.37)	315 (12.40)	420 (16.54)
Ws	135 (5.31)	240 (9.45)	345 (13.58)	295 (11.61)	400 (15.75)
H	130 (5.12)				
Hs	110 (4.33)				

(2) Base unit mounting position

Provide a clearance between the top and bottom of modules and wall of structure or components as given below. This is required for ventilation and allows easy replacement of modules.

Main base, Extension base   30mm (1.18inch) or over
(CPUA1S5[ ]B (S1),A1S6[ ]B (S1))

Extension base
(A5[ ]B, A6[ ]B)   80mm (3.15inch) or over
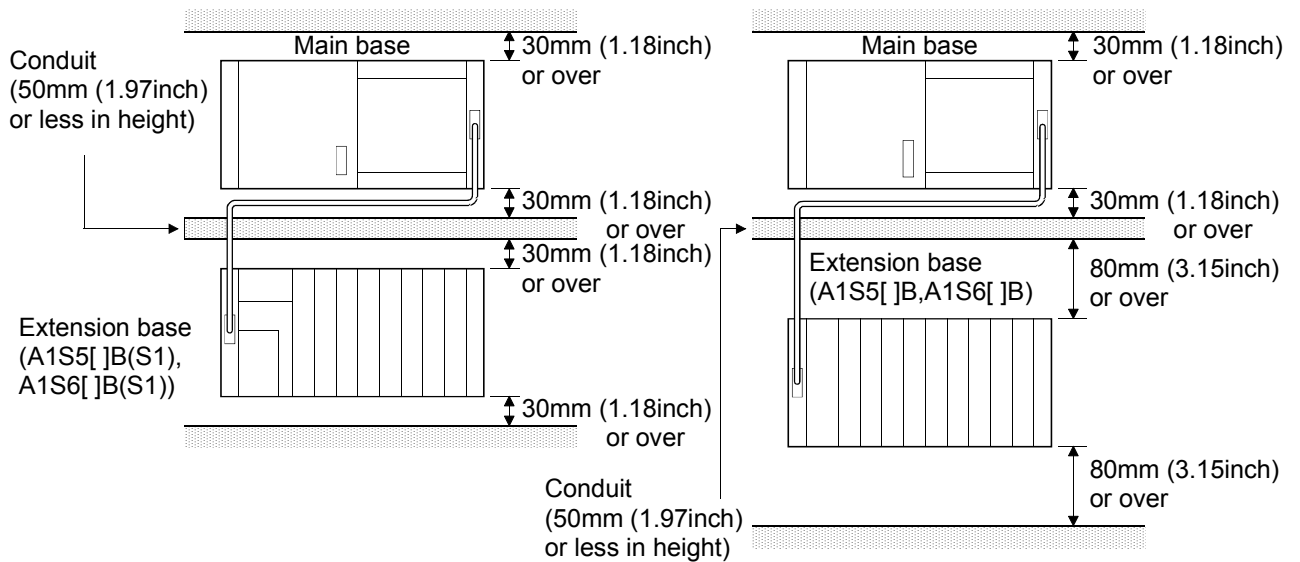
(3) Unit mounting orientation

   (a) Since the PC generates heat, it should be mounted on a well ventilated location in the orientation shown below.
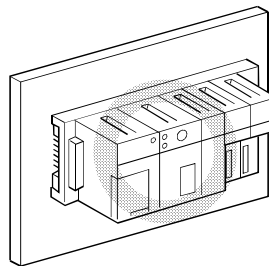
   (b) Do not mount it in either of the orientations shown below.

17
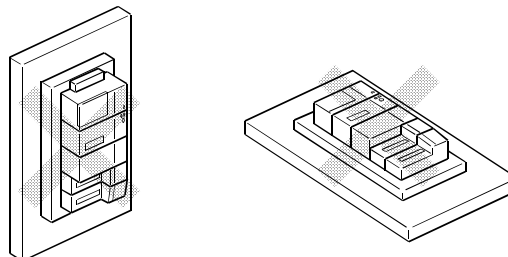
(4) Mount base unit on a flat surface. If the mounting surface is not even, this may strain the printed circuit boards and cause malfunctions.

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

(6) In order to avoid the effects of radiated noise and heat, provide the clearances indicated below between the PC and devices that generate noise or heat (contactors and relays).
Required clearance in front of: at least 100mm (3.94inches)
Required clearance on the right and left of : at least 50mm (1.97inches)

100mm (3.94inch) or over

Contactor, relay, etc.

50mm (1.97inch) or over

50mm (1.97inch) or over
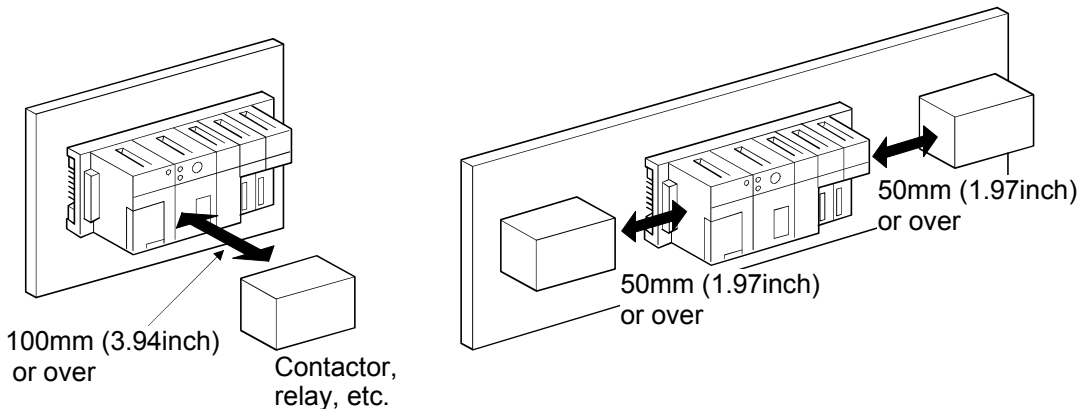
(7) If you want to mount base units on a DIN rail, please note the following points.
    (a) Suitable DIN rail types (JIS-C2B12) are listed as follows:
        TH35-7.5Fe
        TH35-7.5Al
        TH35-15Fe
        *JIS: Japanese Industrial Standard

    (b) Spacing intervals for DIN rail mounting screws
        When using a TH35-7.5Fe or TH35-7.5Al DIN rail, rail mounting screws should be placed at a pitch of 200mm (7.87inch) or less in order to ensure that the rail has sufficient strength.

DIN rail

DIN rail mounting screw

35 mm (1.38 inches)

P   P   P
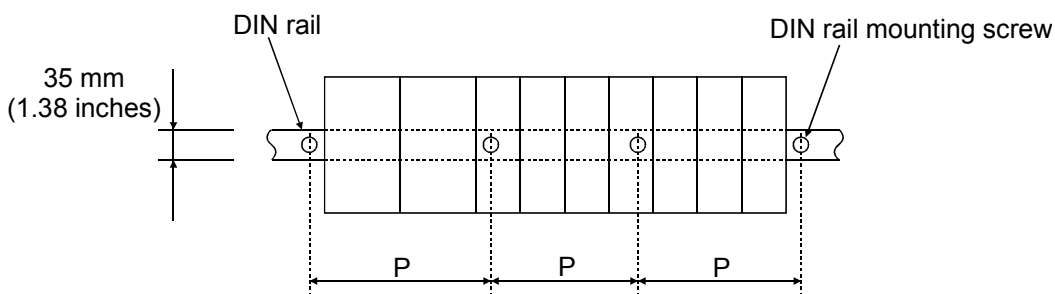
P=200 mm (7.87 inches) or less

(8) It is recommendable to fix the base module to the control panel directly using screws, as this method ensures higher resistance to vibration than when using a DIN rail.

4.3 Fail-Safe Constructions

4.3.1 General Safety Requirements

> ⚠️ **DANGER**
>
> ● **Safety circuitry must be so designed and constructed externally that an entire system stays in safe in case of a external power supply failure and/or PC failure. In particular, the following safety circuitry are required to constructed outside of the PC.**
>
> **(1) Emergency stop circuit, protection circuit, interlocking circuit for contrary operations such as forward and reverse movement, and hardware stroke limit circuit for positioning controls must be constructed externally.**
>
> **(2) In case of hardware failure which PC CPU cannot detect occurs, all or some output signals could be turned on without program instructions. An external safety circuitry must be so constructed that safety of equipment or machine can be protected from such case. Please refer to Sub-clause 4.3.2 for details.**
>
> **(3) In some cases, relays or transistors used in output modules stay always ON or OFF as failure symptoms. If such failure could cause serious damage on persons or properties, those safety critical output signals must be externally monitored.**
>
> ● **If the power to the PC is turned ON after turning ON the external power supply used for the process control with the DC output module, the DC output module may make an erroneous output for an instant. Take the following procedures for power up of the equipment, in order to prevent such erroneous input and output to/from the PC.**

(1) Turn ON the power to the PC.

(2) Turn ON the external power supply used for the process control.

(3) Turn ON the START switch.

(4) Turn ON the power to the output devices by using a program.

(5) Confirm that all external power supplies are turned ON, and then, an I/O control program should be executed.

4.3.2 Fail-Safe Circuitry Against to Failure of the PC

Though Mitsubishi PCs are manufactured under strict quality control, they may cause failure or abnormal operations due to unspecific reasons. To prevent the abnormal operation of the whole system, machine breakdown, and accidents, fail-safe circuitry against to failure of the PC must be constructed outside the PC. The following page gives an example of system designing that conforms to the explanation mentioned above and an example of fail-safe measures when the PC causes a failure.

(1) System design circuit example
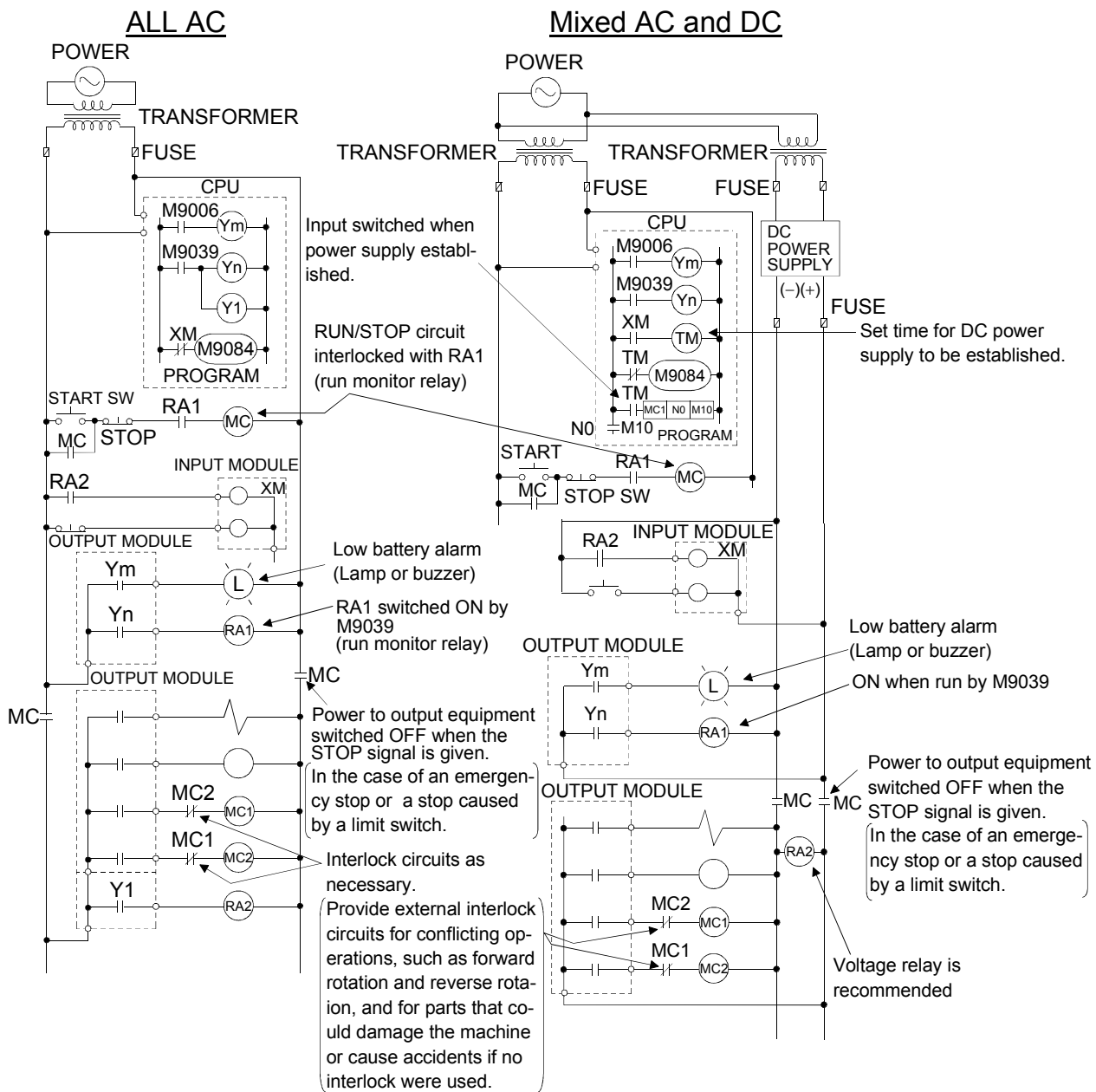
The power-ON procedure is an follows:

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

(2) Failure of a CPU or memory can be detected by the self diagnosis function. However, Failure of I/O control area may not be detected by the CPU. In such cases, all I/O points turn ON or OFF depending on a condition of problem, and normal operating conditions and operating safety cannot sometimes be maintained. Examples of fail-safe circuitry are described as follows:

   (a) Using on-delay and off-delay timers
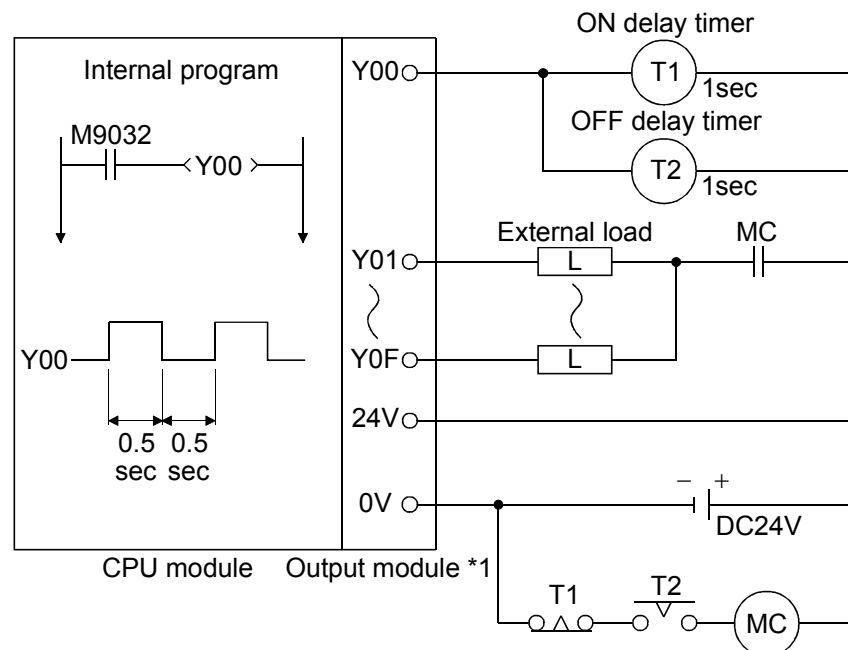
*1: Y00 repeats turning ON and then OFF at 0.5second intervals.
    Use a no-contact output module (transistor in the example shown above).

4.4 Wiring

4.4.1 Performance specifications for the A1SJHCPU-S8 built-in power supply

Table 4.1 Performance specifications for

the A1SJHCPU-S8 built -in power supply

Type Item	A1SJHCPU-S8
Input power supply	100-120VAC $^{+10\%}_{-15\%}$ (85 to 132VAC) 500-240VAC $^{+10\%}_{-15\%}$ (170 to 264VAC)
Input frequency	50/60Hz ±3Hz
Input voltage distortion factor	Within 5% (See Section 4.5.)
Input maximum apparent power	100VA
Rush current	20A 8msec or less
Rated output	5 VDC 3A
Overcurrent protection *1	3.3A or over
Overvoltage protection	Not provided
Efficiency	65 % or over
Power supply indication	POWER LED indicator
Terminal screw size	M3.5 × 8
Applicable solderless terminal	0.3 to 2 mm^2
Applicable solderless terminal	RAV 1.25-3.5, RAV 2-3.5
Allowable momentary power failure	20msec or less (100VAC or over)

POINT

*1 : Overcurrent protection

When a current larger than the specification value flows through the 5 V DC circuit, the overcurrent protection device cuts off the circuit and stops the system.

The POWER LED turns off or lights dimly due to the voltage drop. If this device operated, remove causes of failures such current capacity shortage and short-circuit and restart the system.

4.4.2 Wiring instructions

This section gives the wiring instruction for the system.

◇ DANGER
● **Before beginning any installation or wiring work, make sure all phase of the power supply have been obstructed from the outside. Failure to completely shut off the power supply phase may cause electric shock and/or damage to the module.** ● **When turning on the power or operating the module after installation or wiring work, be sure the module's terminal covers are correctly attached. Failure to attach the terminal covers may result in electric shock.**

⚠ CAUTION
● **Be sure to ground the FG terminals and LG terminals and LG terminals to the protective ground conductor.** **Not doing so could result in electric shock or erroneous operation.** ● **When wiring the PC, check the rated voltage and terminal layout of the wiring, and make sure the wiring is done correctly. Connecting a power supply the differs from the rated voltage or wiring it incorrectly may coups fire or breakdowns.** ● **Tighten the terminal screws with the specified torque. If the terminal screw are loose, it may result in short circuits, fire or malfunction.** **If the terminal screws are tightened too much, it may damage the screws and the module result in short circuits, malfunction or cause the module to fall out.** ● **Be careful not to let foreign matter such as filings or wire chips gear inside the module. These can cause fire, breakdowns and malfunction.** ● **Perform correct pressure-welding, crimp-contact or soldering for connectors for the outside using the specified tools. See the User's Manual of the corresponding I/O module for tools required to perform pressure-welding and crimp-contact.** **Incorrect connection may cause short circuits, fire, or malfunction.** ● **Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other. They should be installed 100mm (3.94in.) or more from each other. Failure to do so may result in nose that would cause malfunction.**

Precautions when wiring power supply cable are described.

(1) Wiring power supply

(a) Separate the PC's power supply line from the lines for I/O devices and power devices as shown below.
When there is much noise, connect an insulation transformer.
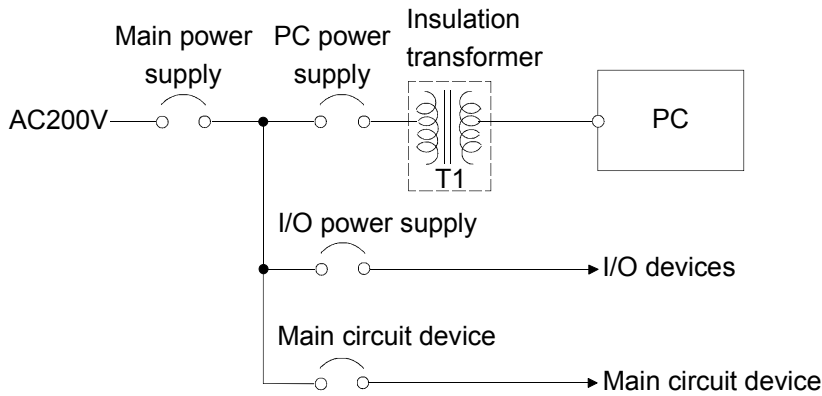
(b) 100VAC, 200VAC and 24VDC wires should be twisted as dense as possible. Connect the modules with the shortest distance.
Also, to reduce the voltage drop to the minimum, use the thickest wires possible (maximum 2mm^2).

(c) As a countermeasure to power surge due to lightening, connect a surge absorber for lightening as shown below.
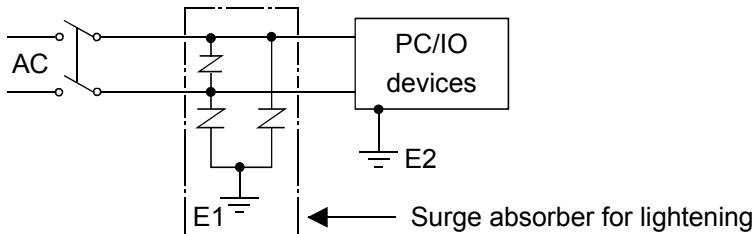
(d) Do not supply 24VDC power supply from more than one power supply modules in parallel to one I/O module. If they are connected so, the power supply modules will become not and could be caused fire and/or malfunction.
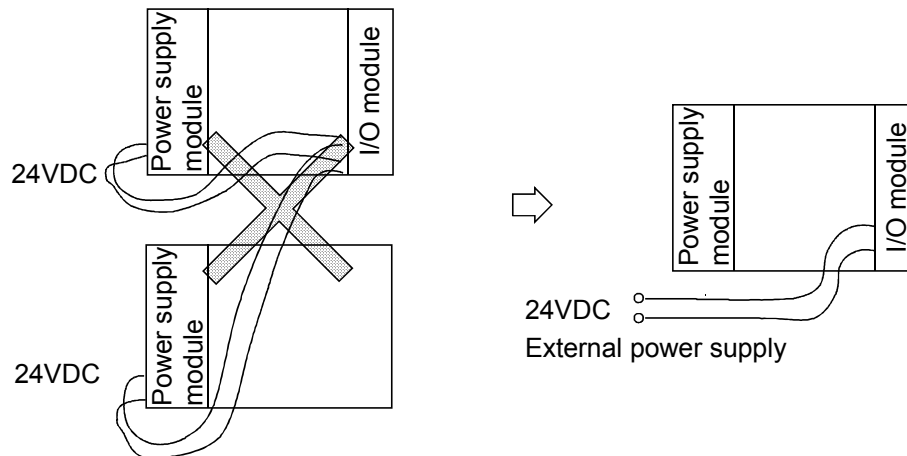
┌─────────────┐
│ **POINTS** │
└─────────────┘

(1) Separate the ground of the surge absorber for lightening (E_1) from that of the PC (E_2).

(2) Select a surge absorber for lightening whose power supply voltage dose no exceed the maximum allowable circuit voltage even at the time of maximum power supply voltage elevation.

4.4.3 Wiring to module terminals

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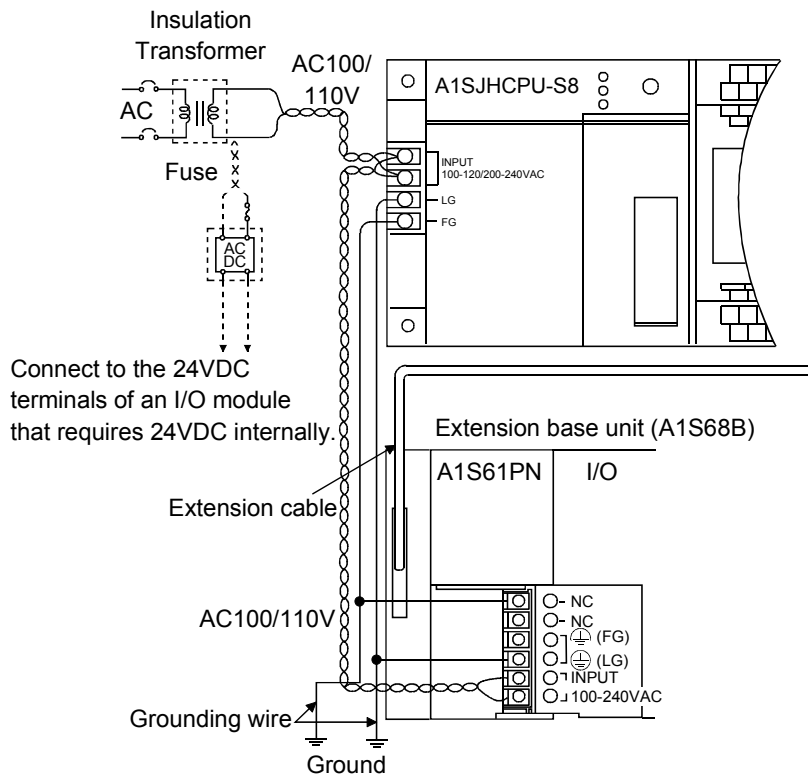
POINTS

(1) Use thick wires (MAX. 2mm^2) as much as possible for the 100/200VAC and 24VDC power supply, and twist the wires beginning with the connecting terminal. When a solderless terminal is used, use a solderless terminal with an insulation sleeve to prevent short-circuit when the terminal screw becomes loose.

(2) When the LG and FG terminals are connected, they must be grounded. If they are not grounded, the operation processing will be easily influences by noise. Use caution not to touch the LG terminal since it has an electric potential of half the input voltage.

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

4.5 Precaution when Connecting the Uninterruptive Power Supply (UPS)

Be sure of the following items when connecting the AnSHCPU system to the uninterruptive power supply (abbreviated as UPS hereafter):

Use the online UPS with a voltage distortion of 5% or less or line-interactive UPS. For standby UPS, select the Mitsubishi FREQUPS-F series UPS (serial No. P or later) such as FW-F10-03K/0.5K.

Do not use the stand UPS other than above.

4.6 Part Identification of the CPU

4.6.1 Part Identification of A1SJHCPU-S8
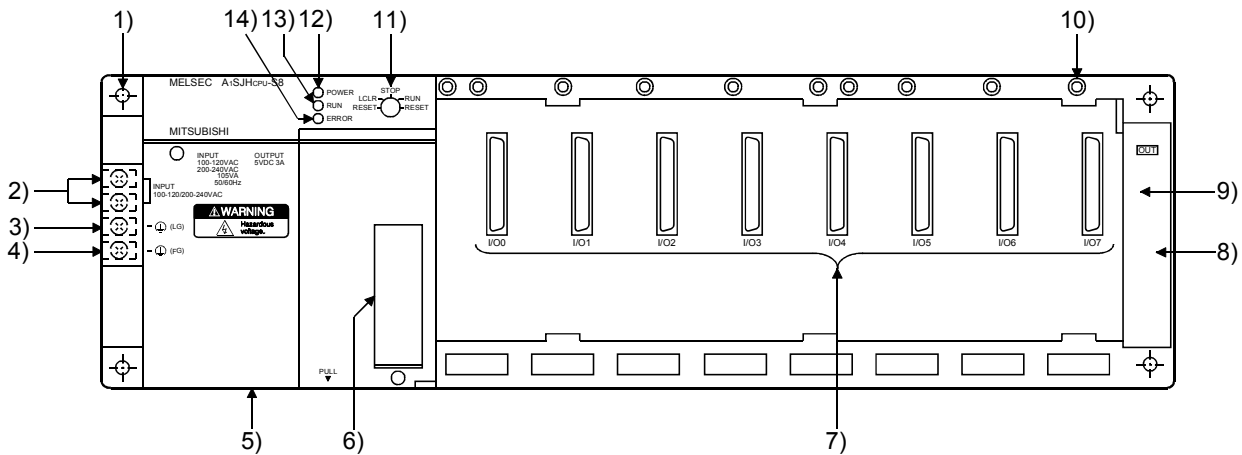
1) Base mounting hole
2) Power supply input terminal
3) LG terminal
4) FG terminal
5) Hook for DIN rail
6) Cover for RS-422 connector
7) Module connector
8) Connector for extension cable
9) Base cover
10) Module fixing screw
11) RUN/STOP switch

RUN/STOP key switch:
Used to start or stop sequence program execution.
RESET switch:
Used to reset the hardware.
Used to reset the hardware and initialize operation when an operation error occurs.
L.CLR:
Used to clear the data set in the latch range set in the parameters.

12) "POWER" LED
(Indicator LED for the 5 VDC power supply.)

13) "RUN" LEDON:

ON:

Indicates that the RUN/STOP key switch is set to the RUN position and the sequence program is being executed.

OFF:

The "RUN" LED is OFF in the following cases:

● When the 100/200 VAC power supply is not being supplied to the A1SJHCPU-S8.

● When the RUN/STOP key switch is set to the STOP position.

● When a remote STOP/ PAUSE is currently effective.

Flashing:

The "RUN" LED flashes in the following cases:

● When an error that stops sequence program operation has been detected in self-diagnosis.

● When a latch clear operation is being executed.

14) ERROR LED

ON:

Indicates that an error has been detected in self-diagnosis. (Note that this LED remains OFF if the setting for the detected error in the ERROR LED indication priority settings is "OFF" .)

OFF:

Indicates that no error has occurred, or a fault has been detected by the ┃ CHK ┃ instruction.

Flashing:

Indicates that the annunciator (F) has been switched ON by the sequence program.

─── Method for clearing the latch status ───

1) Set the RUN/STOP switch from the STOP position to the L.CLR position several times, causing the RUN LED to flash.

2) Set the RUN/STOP switch from the STOP position to the L.CLR position one more time.

3) The latch clear operation is completed when the RUN LED goes OFF.
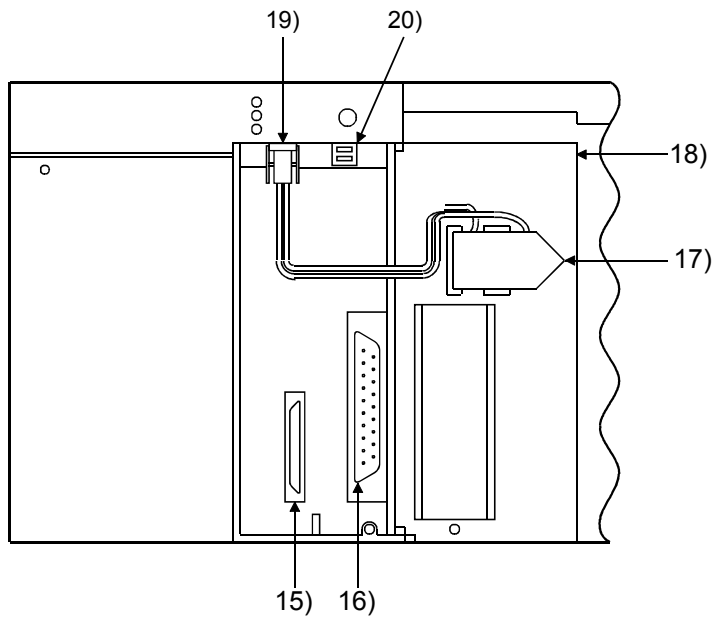
15) Connector for installing the memory cassette

16) RS-422 connector

17) Battery

18) Cover

19) Battery connector

20) Dip switch

Memory write protect switch
(OFF: Memory write protect not allowed, ON: Memory write protected)
I/O control switch (OFF: Refresh mode, ON: Direct mode)

MEMO
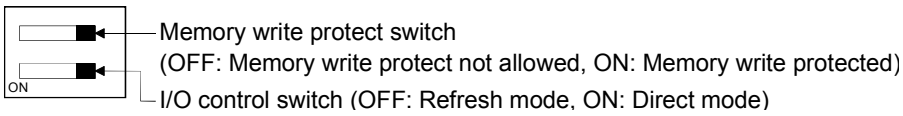
5. SPECIFICATION AND CONNECTION OF I/O MODULES

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	4.2/8.6mA	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	6.5VDCor 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	7mA	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	

32

	Maximum Simultaneous Input Points (Percentage Simultaneously ON)	Max. Response Time		Field Wiring	Points/ Common	Internal Current Con-sump 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		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	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 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.

5.1.2 Input module connections

<table>
<tr><td rowspan="2">(1)</td><td>Model</td><td>Rated Input Voltage</td></tr>
<tr><td>A1SX10
A1SX10EU</td><td>100 to 120 VAC</td></tr>
<tr><td></td><td>A1SX20
A1SX20EU</td><td>200 to 240 VAC</td></tr>
</table>

9 and 18 are connected internally.

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

<table>
<tr><td rowspan="2">(2)</td><td>Model</td><td>Rated Input Voltage</td></tr>
<tr><td>A1SX30</td><td>12/24 VAX/DC</td></tr>
</table>

9 and 18 are connected internally.

<table>
<tr><td rowspan="2">(3)</td><td>Model</td><td>Rated Input Voltage</td></tr>
<tr><td>A1SX40</td><td>12/24 VAC</td></tr>
<tr><td></td><td>A1SX40-S1
A1SX40-S2</td><td>24 VAC</td></tr>
</table>

9 and 18 are connected internally.

<table>
<tr><td rowspan="2">(4)</td><td>Model</td><td>Rated Input Voltage</td></tr>
<tr><td>A1SX80</td><td>12/24 VAC</td></tr>
<tr><td></td><td>A1SX80-S1
A1SX80-S2</td><td>24 VAC</td></tr>
</table>

9 and 18 are connected internally.

	Model	Rated Input Voltage
(5)	A1SX41	12/24 VDC
	A1SX41-S2	24 VDC
	A1SX42	12/24 VDC
	A1SX42-S2	24 VDC
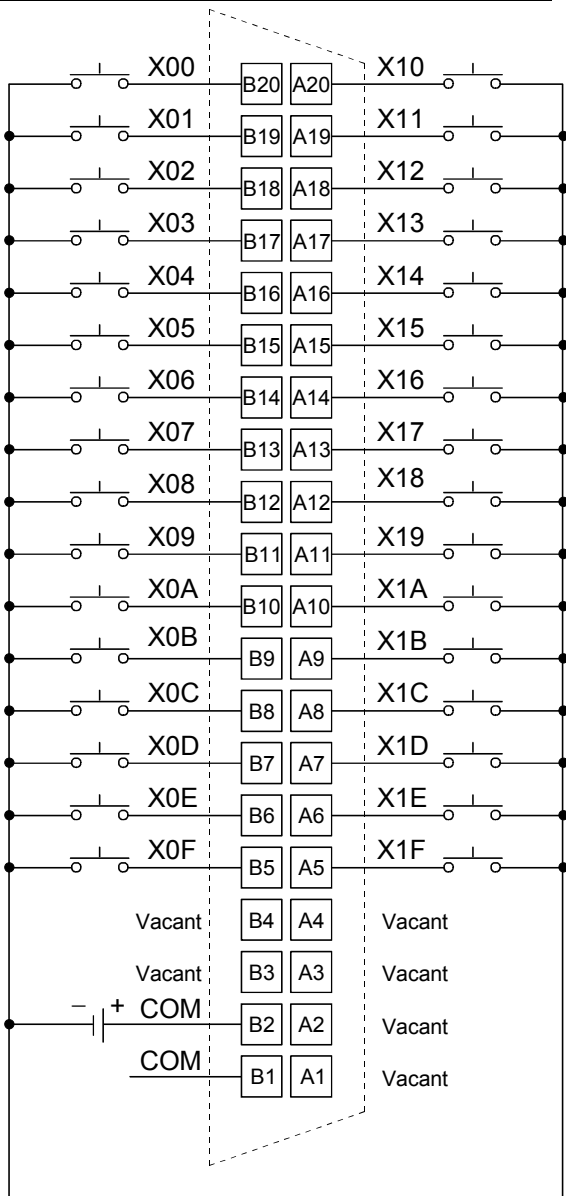
*1 The figure above indicates ⬚F (the first half 32 points).

The connections for ⬚L (the latter half 32 points) are the same as for ⬚F (regard 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.

(6)

	Model	Rated Input Voltage
	A1SX71	5/24 VDC
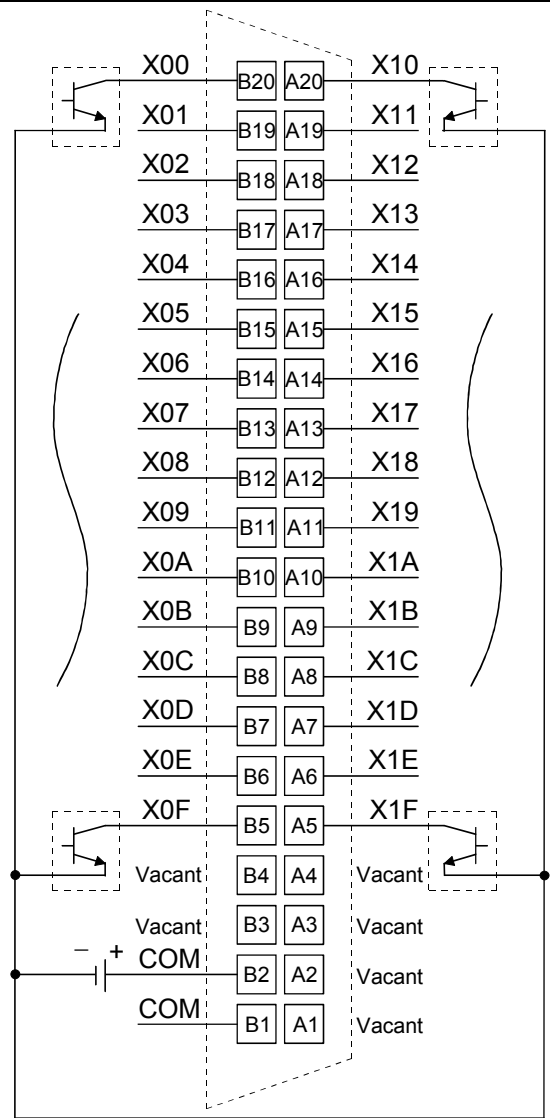
*1 The figure above shows the connections for the open collector (sink) type.

⬚B1 and ⬚B2 are connected internally.

● TTL, LS-TTL, CMOS buffer (sink) connection
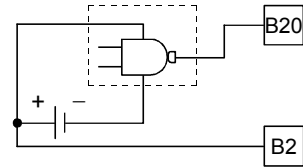
● Sensor (source) connection
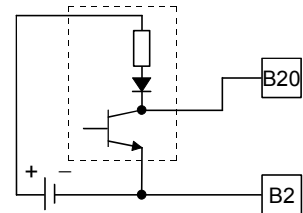
*2 The A and B pin number rows shown above are transposed with respect to the diagram of the A and B rows which is printed on the module. Remember that the A row pin numbers correspond to the B row of the module.

(7)	Model	Rated Input Voltage
	A1SX81	12/24 VDC
	A1SX81-S2	24 VDC
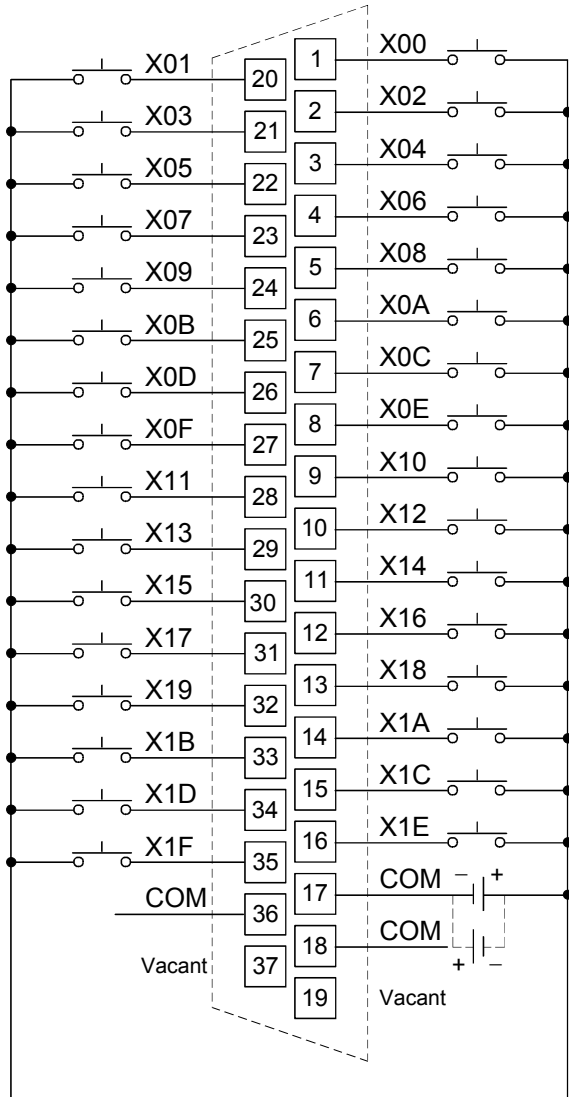
● [17] , [18] and [36] are connected internally.

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

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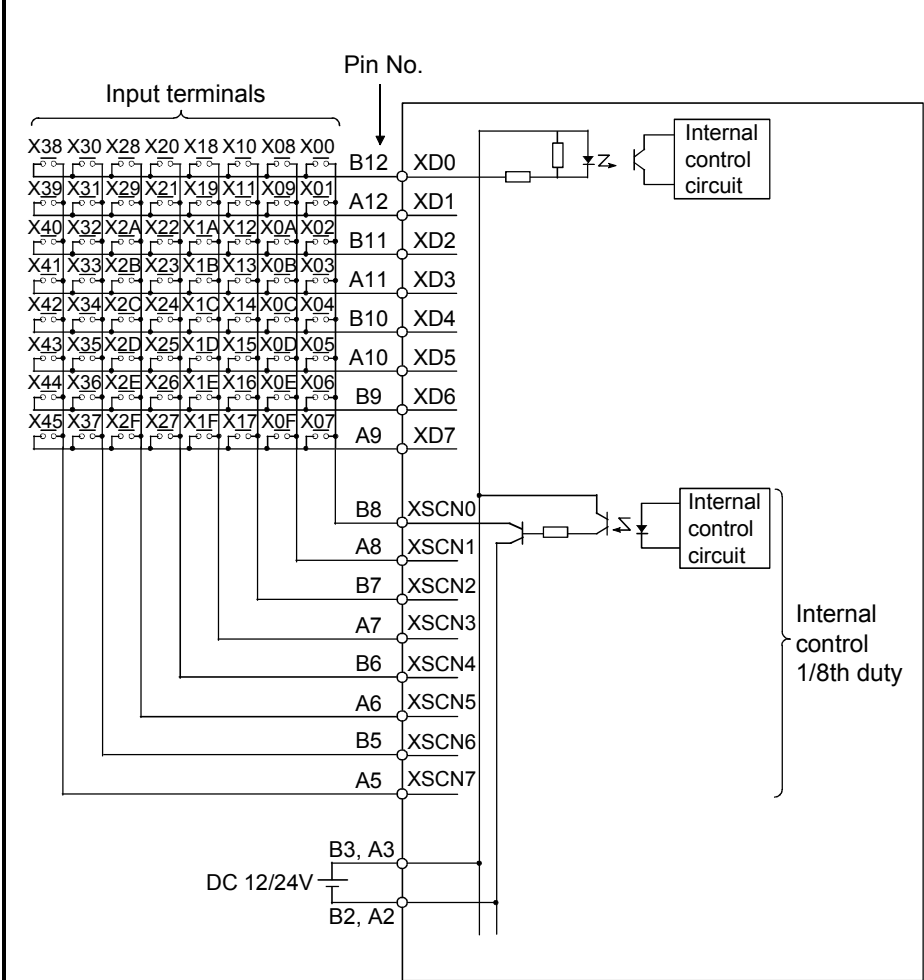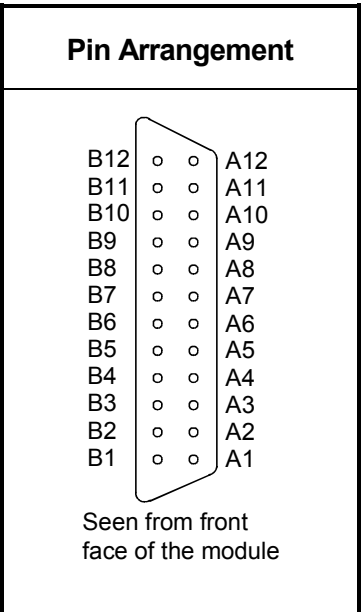
Pin No.	Signal Name	Pin No.	Signal Name
B12	XD0	A12	XD1
B11	XD2	A11	XD3
B10	XD4	A10	XD5
B9	XD6	A9	XD7
B8	XSCN0	A8	XSCN1
B7	XSCN2	A7	XSCN3
B6	XSCN4	A6	XSCN5
B5	XSCN6	A5	XSCN7
B4	Vacant	A4	Vacant
B3	12/24 VDC	A3	12/24 VDC
B2	0V	A2	0V
B1	FG	A1	FG

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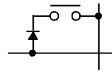
5.2 Output modules

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		2A	8A	-			
A1SY 14EU		12		2A	8A	-			
A1SY18A		8		2A	-	8A			
A1SY 18AEU		8		2A	-	-			
A1SY22	Triac Output	16	100V to 240VAC	0.6A	2.4A	-	1ms or lower		
A1SY28A		8		1A	-	4A (132VAC) 2A (264VAC)		0.5Hz+ 1ms or lower	
A1SY 28EU				0.6A	1.9A	-		0.5CYCLE+1ms or lower	
A1SY40	Transistor Output (sink type)	16	12/24V DC	0.1A	0.8A	-	2ms or lower	2ms or lower	
A1SY41		32		0.1A	2A	-			
A1SY42		64			1.6A	-			
A1SY42P				0.1A	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)	16	5/12 /24VDC	2A	4A	-	3ms or lower	10ms or lower	
A1SY68A	Transistor Output (sink/source type)	8	5/12 24/48VDC	2A	-	-			
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	12/24V DC	0.8A	3.2A	-	2ms or lower	2ms or lower	
A1SY81		32				-			
A1SY 81EP		32		0.1A	2A	-	0.5ms or lower	1.5ms or lower	
A1SY82		64		DC24V 0.05A	DC24V 1.6A	-	2ms or lower	2ms or lower	
A1S42Y	Transistor Output (dynamic)	16/32 48/64 *2		0.1A	-	-	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.
*3 .... Value at TYP 200VAC.
*4 .... Value at TYP 12VDC.

	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	5A	LED	0.002A *3	0.27A	
		-	CR	None	None	-	0.13A	
		4	CR				0.27A	
		8	Zener diode	1.6A			0.27A	
	40-pin connector	32		3.2A	LED	0.008A	0.5A	32
	40-pin connector ×2						0.93A	64
				None	None	0.014A	0.17A	
	Terminal	8	Zener diode	3.2A	LED	0.06A	0.12A	16
				5A		0.015A	0.12A	
				7A		0.01A	0.2A	
		-		None	None	-	0.11A	
	40-pin connector	32	None	1.6A	LED	0.15A *4	0.4A	32
	Terminal	8	Zener diode	5A	LED	0.02A	0.12A	16
	37-pin connector	32	Zener diode	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

5.2.2 Output module connections

(1)

Model	Rated Load Voltage
A1SY10	240 VAC, 24 VDC

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

(2)

Model	Rated Load Voltage
A1SY10EU	120 VAC, 24 VDC

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

(3)

Model	Rated Load Voltage
A1SY14EU	240 VAC, 24 VDC

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

(4)

Model	Rated Load Voltage
A1SY18A	240 VAC, 24 VDC
A1SY18AEU	

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

(5)	Model	Rated Load Voltage	
	A1SY22	100/200 VAC	
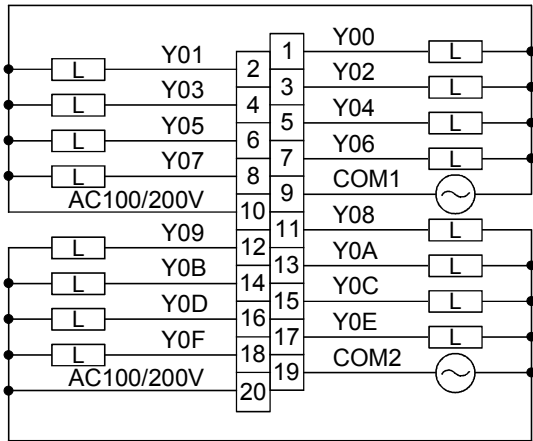
	● Do not touch
◇DANGER	terminals while the power is supplied.

(6)	Model	Rated Load Voltage	
	A1SY28A	100/200 VAC	
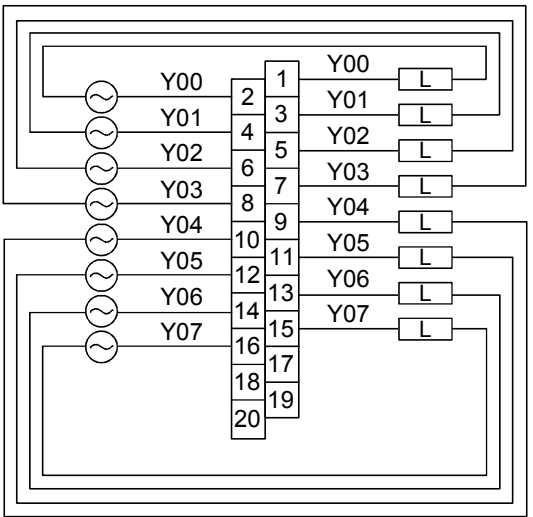
	● Do not touch
◇DANGER	terminals while the power is supplied.

(7)	Model	Rated Load Voltage	
	A1SY28EU	100-240 VAC	
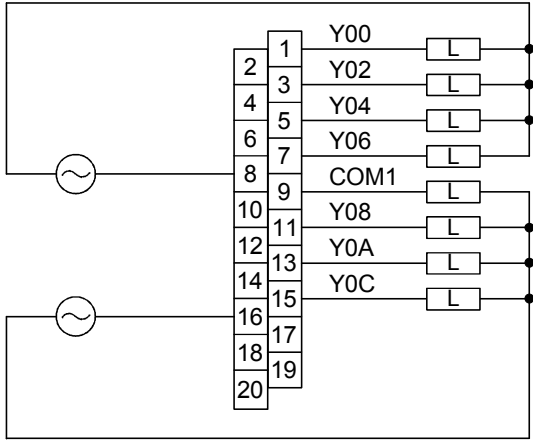
	● Do not touch
◇DANGER	terminals while the power is supplied.

(8)	Model	Rated Load Voltage	
	A1SY40A	12/24 VAC	

41
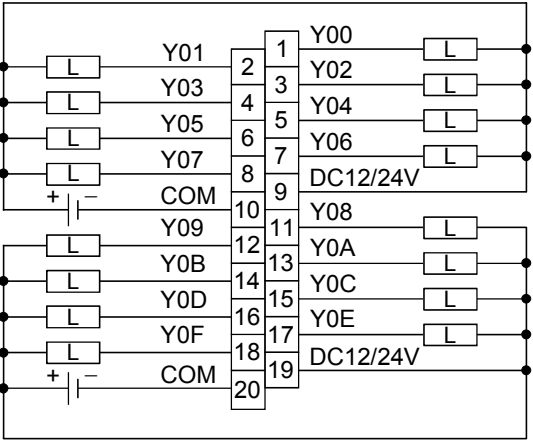
(9)

Model	Rated Load Voltage
A1SY50	12/24 VDC
A1SY60	24 VDC
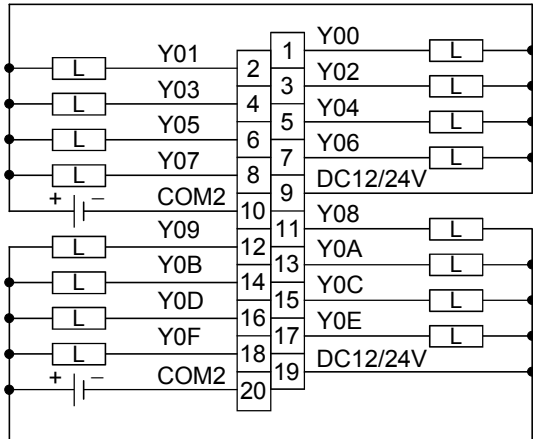
(10)

Model	Rated Load Voltage
A1SY60E	5/12/24 VDC
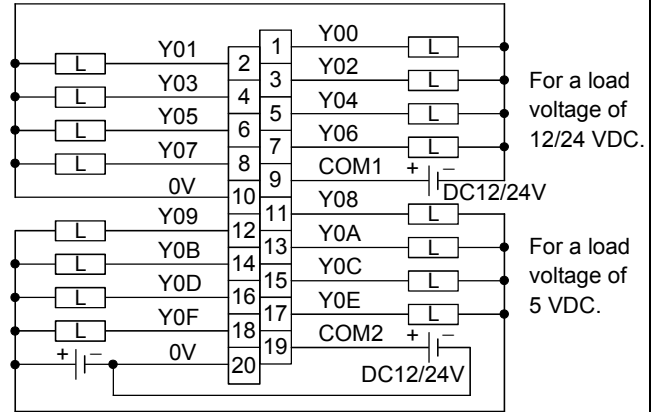
*   When using a working load voltage of 5VDC, a separate 12/24VDC source is required for the external power supply.

(11)

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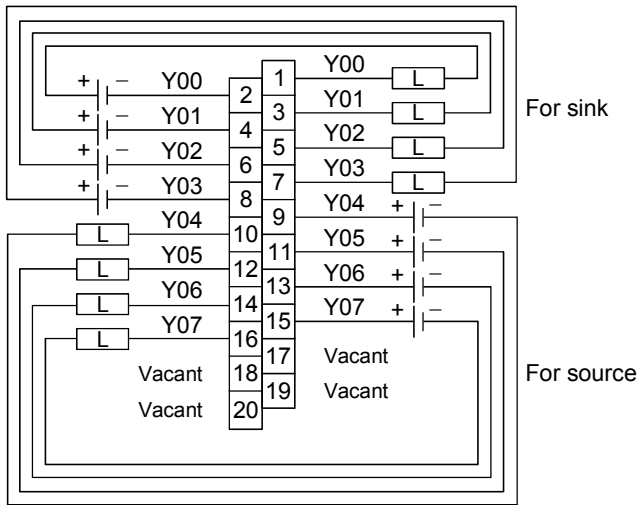
(12)

Model	Rated Load Voltage
A1SY80	12/24 VAC

42
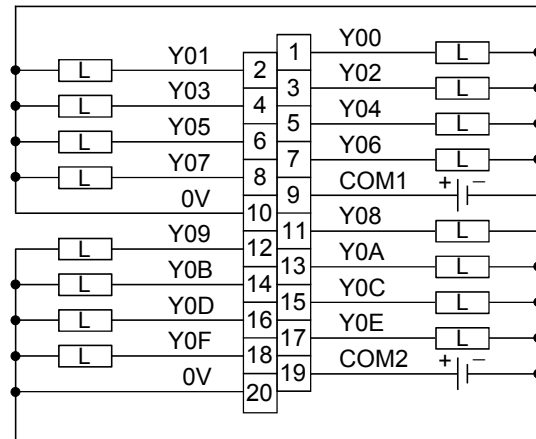
(13)	Model	Rated Load Voltage	
	A1SY41	12/24 VDC	
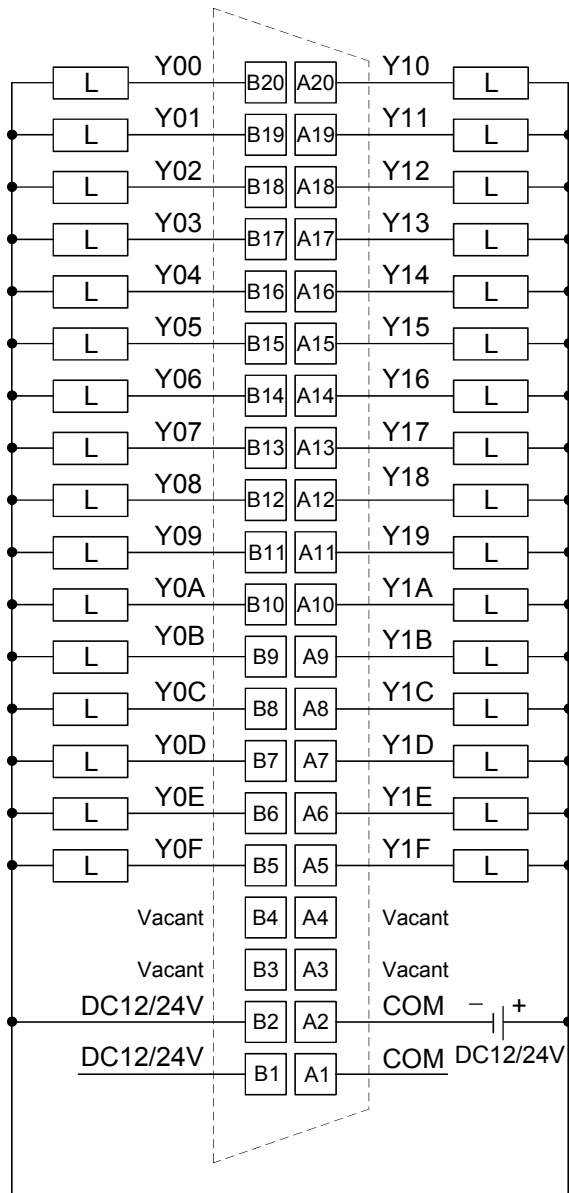
(14)	Model	Rated Load Voltage	
	A1SY42	12/24 VDC	
	A1SY42P		

(13) A1SY41

L	Y00	B20	A20	Y10	L
L	Y01	B19	A19	Y11	L
L	Y02	B18	A18	Y12	L
L	Y03	B17	A17	Y13	L
L	Y04	B16	A16	Y14	L
L	Y05	B15	A15	Y15	L
L	Y06	B14	A14	Y16	L
L	Y07	B13	A13	Y17	L
L	Y08	B12	A12	Y18	L
L	Y09	B11	A11	Y19	L
L	Y0A	B10	A10	Y1A	L
L	Y0B	B9	A9	Y1B	L
L	Y0C	B8	A8	Y1C	L
L	Y0D	B7	A7	Y1D	L
L	Y0E	B6	A6	Y1E	L
L	Y0F	B5	A5	Y1F	L
	Vacant	B4	A4	Vacant	
	Vacant	B3	A3	Vacant	
	DC12/24V	B2	A2	COM	− +
	DC12/24V	B1	A1	COM	DC12/24V

*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) A1SY42 / A1SY42P

L	Y00	B20	A20	Y10	L
L	Y01	B19	A19	Y11	L
L	Y02	B18	A18	Y12	L
L	Y03	B17	A17	Y13	L
L	Y04	B16	A16	Y14	L
L	Y05	B15	A15	Y15	L
L	Y06	B14	A14	Y16	L
L	Y07	B13	A13	Y17	L
L	Y08	B12	A12	Y18	L
L	Y09	B11	A11	Y19	L
L	Y0A	B10	A10	Y1A	L
L	Y0B	B9	A9	Y1B	L
L	Y0C	B8	A8	Y1C	L
L	Y0D	B7	A7	Y1D	L
L	Y0E	B6	A6	Y1E	L
L	Y0F	B5	A5	Y1F	L
	Vacant	B4	A4	Vacant	
	Vacant	B3	A3	Vacant	
	DC12/24V	B2	A2	COM	− +
	DC12/24V	B1	A1	COM	DC12/24V

*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
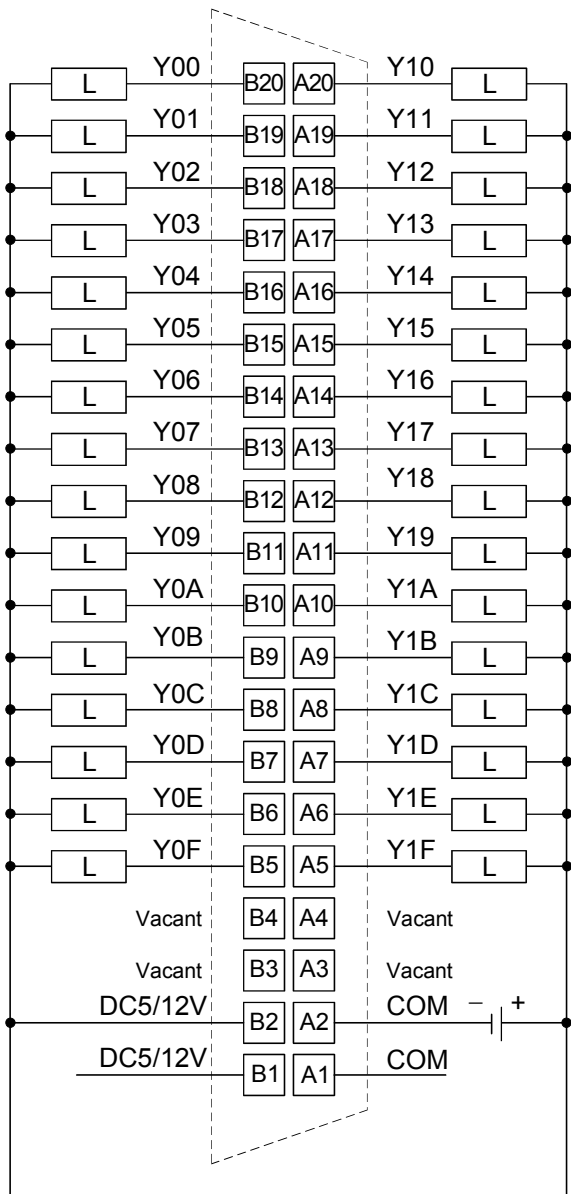
(16)	**Model**	**Rated Load Voltage**
	A1SY81 A1SY81EP	12/24 VDC

(15) A1SY71

L	Y00	B20	A20	Y10	L
L	Y01	B19	A19	Y11	L
L	Y02	B18	A18	Y12	L
L	Y03	B17	A17	Y13	L
L	Y04	B16	A16	Y14	L
L	Y05	B15	A15	Y15	L
L	Y06	B14	A14	Y16	L
L	Y07	B13	A13	Y17	L
L	Y08	B12	A12	Y18	L
L	Y09	B11	A11	Y19	L
L	Y0A	B10	A10	Y1A	L
L	Y0B	B9	A9	Y1B	L
L	Y0C	B8	A8	Y1C	L
L	Y0D	B7	A7	Y1D	L
L	Y0E	B6	A6	Y1E	L
L	Y0F	B5	A5	Y1F	L
	Vacant	B4	A4	Vacant	
	Vacant	B3	A3	Vacant	
	DC5/12V	B2	A2	COM − +	
	DC5/12V	B1	A1	COM	

*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) A1SY81 / A1SY81EP

L	Y01	20	1	Y00	L
L	Y03	21	2	Y02	L
L	Y05	22	3	Y04	L
L	Y07	23	4	Y06	L
L	Y09	24	5	Y08	L
L	Y0B	25	6	Y0A	L
L	Y0D	26	7	Y0C	L
L	Y0F	27	8	Y0E	L
L	Y11	28	9	Y10	L
L	Y13	29	10	Y12	L
L	Y15	30	11	Y14	L
L	Y17	31	12	Y16	L
L	Y19	32	13	Y18	L
L	Y1B	33	14	Y1A	L
L	Y1D	34	15	Y1C	L
L	Y1F	35	16	Y1E	L
	COM	36	17	COM + −	
	0V	37	18	COM	
			19	0V	

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

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(17)	**Model**	**Rated Load Voltage**		**Pin Arrangement**
	A1S42Y	12/24 VDC		

Pin Arrangement

```
B12  o  o  A12
B11  o  o  A11
B10  o  o  A10
B9   o  o  A9
B8   o  o  A8
B7   o  o  A7
B6   o  o  A6
B5   o  o  A5
B4   o  o  A4
B3   o  o  A3
B2   o  o  A2
B1   o  o  A1
```

Seen from front face of the module

Pin No.	Signal Name (HF)	Pin No.	Signal Name (HF)
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.

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5.3 Input/output combined modules

5.3.1 Input/output combined module specifications

Specifications of input/output combined modules are shown in the following table.

(1) Input specifications

Model	Type	No. of Points	Rated Input Voltage	Input Current	Insulation Withstand Voltage	Operating Voltage		Maximum Simultaneous Input Points (Percentage Simultaneously ON)	
						ON Voltage	OFF Voltage		
A1SH42	DC input (sink type)	32	12/24 VDC	2/5mA	500VAC	8VDC or higher	4VDC or lower	60% (24VDC)	
A1SX48 Y18		8	24VDC	7mA		14VDC or higher	6.5VDC or lower	100% (26.4VDC)	
A1SX48 Y58		8	24VDC	7mA		14VDC or higher	6.5VDC or lower	100% (26.4VDC)	

(2) Output specifications

Model	Type	No. of Points	Rated Load Voltage	Max. Load Current	Dielectric Withstand Voltage	Max. Output Response Time		
						OFF to ON	ON to OFF	
A1SH42	Transistor output	32	12/24VDC	0.1A/pt, 0.8A/com	500VAC	0.4ms	0.4ms	
A1SX48 Y18	Relay output	8	240VAC, 50/60Hz 24VDC	2A/pt, 8A/com	1500VAC	10ms	12ms	
A1SX48 Y58	Transistor output	8	12/24VDC	0.5A/pt, 2A/com	500VAC	2ms	2ms	

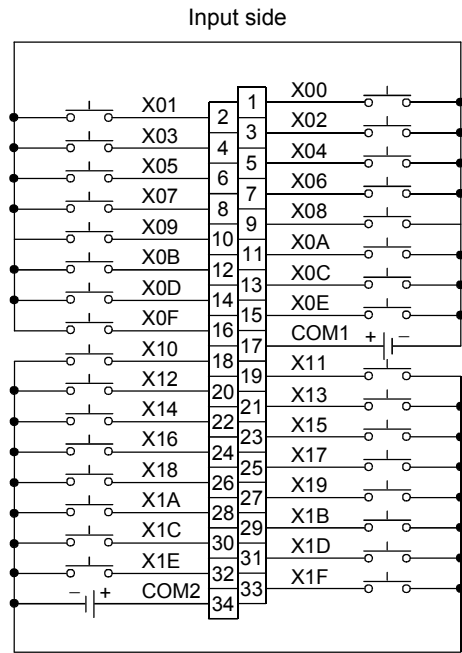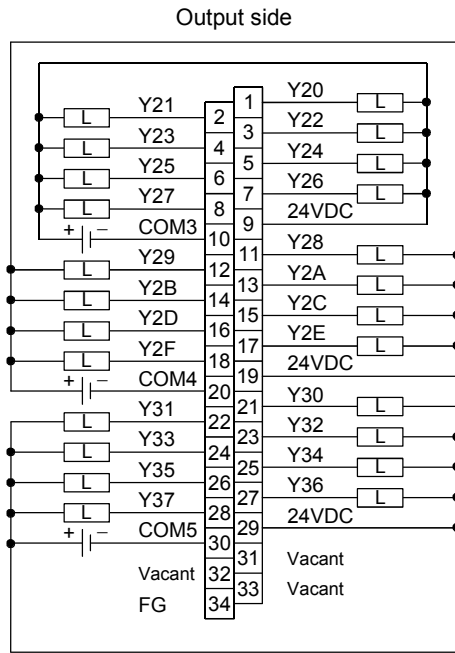|	Max. Response Time		Field Wiring	Applicable Wire Size	Points/ Common	Noise Durability	Internal Current Consumption (5VDC)	No. of Occupied Points	Power Supply Requirement
	OFF to ON	ON to OFF							
	10ms	10ms	40-pin connector	0.3mm^2 AWG22	32	500VAC	0.05A	32	
	10ms	10ms	Terminal	0.75 to 1.25mm^2 AWG15 to 19	8	500VAC	0.05A	16	SELV power supply required
	10ms	10ms	Terminal		8	500VAC	0.05A	16	

	Field Wiring	Applicable Wire Size	Points/ Common	Surge Suppression	Fuse Rating	Noise Durability	External Power Supply	
							Current	Requirement
	40-pin connector	0.3mm^2 AWG22	32	None	None	500VAC	0.08A	
	Terminal	0.75 to 1.25mm^2 AWG15 to 19	8	Zener diode	3.2A	1000VAC	0.045A	SELV power supply required
	Terminal		8	None	None	500VAC	0.06A	

5.3.2 Input/output composite module connections

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


```
F  (Input side)                          L  (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.
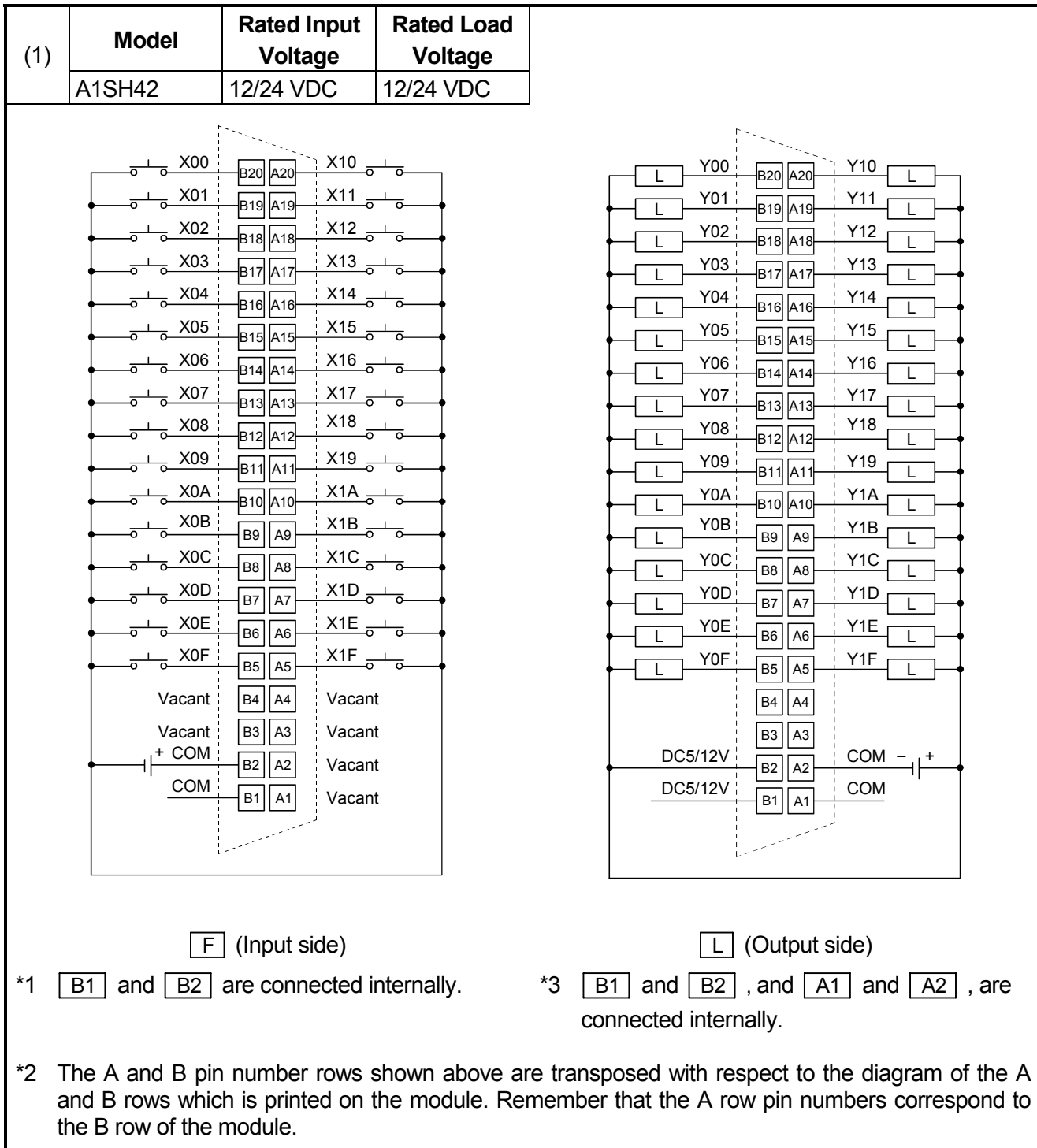
(2)	Model	Rated Input Voltage	Rated Load Voltage
	A1SJ-56DT	24 VDC	24 VDC

Output side

Input side

(3)	Model	Rated Input Voltage	Rated Load Voltage
	A1SJ-56R	24 VDC	100/200 VDC

Output side

Input side
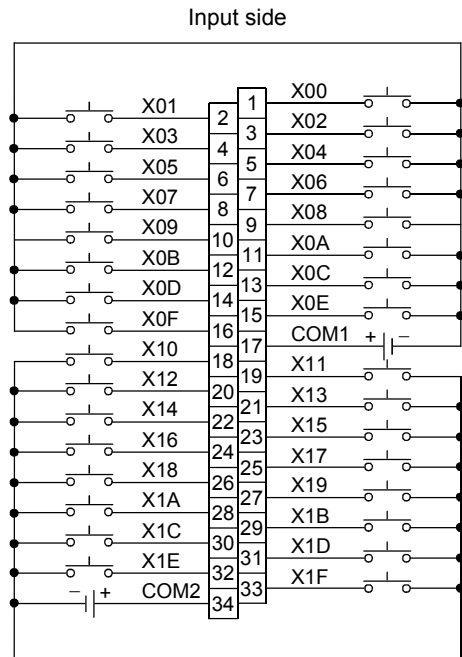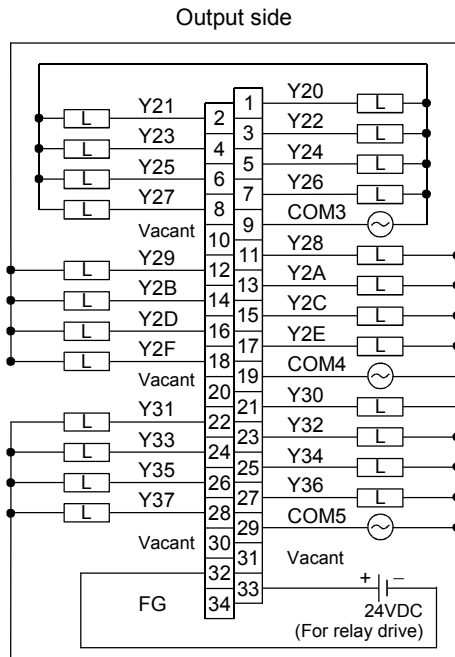
⬦DANGER	● Do not touch terminal while the power is supplied. It may result in eletric shock and erroneous operation.

	Model	Rated Input Voltage	Rated Load Voltage	
(4)	A1SX48Y18	24 VDC	24 VDC/ 240 VAC	

	Model	Rated Input Voltage	Rated Load Voltage	
(5)	A1SX48Y58	24 VDC	12/24 VDC	

50
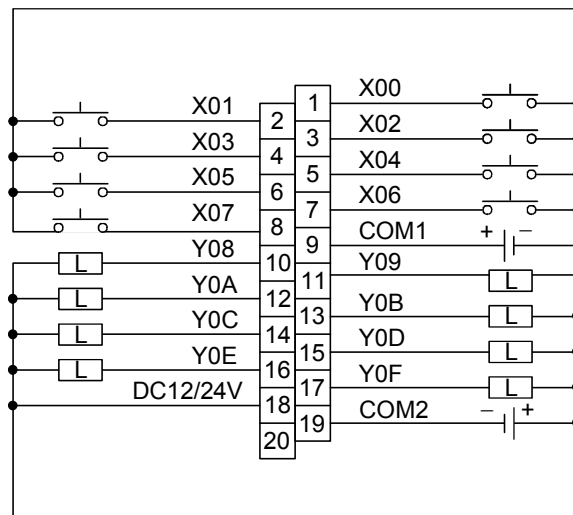
6.1 Error Code List

If an error occurs in the RUN mode, an error display or error code (including a step number) is stored in the special register by the self-diagnosis function. The error code reading procedure and the causes of and corrective actions for errors are shown in Table 6.1.

6.1.1 Error codes

The following are the explanation about the descriptions and the causes of the error messages, error codes and the detailed error codes, and their correctives actions.
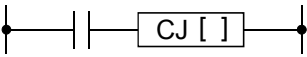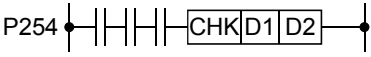
The detailed error codes are stored in D9092 only when using the dedicated instruction for CC-Link.

Table 6.1 Error codes

Error message	Contents of special register D9008 (BIN value)	Deaile error code (D9092)	CPU status	Error and cause	Corrective action
INSTRCT CODE ERR.	10	—	STOP	An instruction code which cannot be decoded by the CPU is included in the program. (1) A memory cassette containing an invalid instruction code has been loaded. (2) The occurrence of an error destroyed the memory contents, adding an instruction code that cannot be read to the memory.	(1) Read the error step by using a peripheral device and correct the program at that step. (2) In the case of the memory cassette, rewrite the contents of the ROM, or replace with a memory cassette whose contents have been correctly written.

Error message	Contents of special register D9008 (BIN value)	Deaile error code (D9092)	CPU status	Error and cause	Corrective action
INSTRCT CODE ERR.	10	101	STOP	An instruction code which cannot be decoded by the CPU is included in the program. (1) A memory cassette containing an invalid instruction code has been loaded. (2) The occurrence of an error destroyed the memory contents, adding an instruction code that cannot be read to the memory.	(1) Read out the steps where the error occurred using a peripheral device, and correct the program. (2) Check if the used ROM contains instruction codes that cannot be interpreted, and insert the correct ROM.
		103		The device specified in the extension applied instruction is incorrect.	Read the error step by using a peripheral device and correct the program at that step.
		104		Program configuration of the extension applied instruction is incorrect.	
		105		The command name of the extension applied instruction is incorrect.	
PARAMETER ERROR	11	—	STOP	The contents of the memory installed in the PC CPU have been destroyed because of noise, or the failure of the memory cassette.	(1) Check the loading of the PC CPU memory cassette and load it correctly. (2) Read the parameter data from the PC CPU by using a periperhal device. Make any necessary corrections and write it to the PC CPU again.
MISSING END INS.	12	—	STOP	(1) There is no END (FEND) instruction in the program.	(1) Write END instruction at the end of the program.

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Error message	Contents of special register D9008 (BIN value)	Deaile error code (D9092)	CPU status	Error and cause	Corrective action
CAN'T EXECUTE (P)	13	—	STOP	(1) There is no jump destination for plural destinations specified by the CJ, SCJ, CALL, CALLP or JMP instructions. (2) Although there is no CALL instruction, the RET instruction exists in the program and has been executed. (3) The CJ, SCJ, CALL, CALLP or JMP instruction has been executed with its jump destination located below the END instruction. (4) The number of FOR instructions dose not match the number of NEXT instructions. (5) The JMP instruction specified between FOR and NEXT has caused the execution to deviate from between FOR and NEXT. (6) The JMP instruction has caused the execution to deviate from the subroutine before the RET instruction is executed. (7) The JMP instruction has caused execution to jump to a step or subroutine between FOR and NEXT.	(1) Read the error step by using a peripheral device and correct the program at that step. (Make corrections such as the insertion of a jump destination or the changing of jump destinations to one destination.)

Error message	Contents of special register D9008 (BIN value)	Deaile error code (D9092)	CPU status	Error and cause	Corrective action
CHK FORMAT ERR.	14	—	STOP	(1) There are instructions (including NOP) other than LD X , LDI X , AND X. and ANI X in the CHK instruction circuit block. (2) There is more than one CHK instruction. (3) The number of contact points in the CHK instruction circuit block exceeds 150. (4) The X device number in the CHK instruction circuit block exceeds X7FE. (5) There is no circuit block in front of the CHK instruction circuit block. ├──┤ ├──┤ CJ [ ] ├──┤ (6) D1 device (number) of the CHK/D1/D2 instructions is different from the contact device (number) above the CJ [ ] instruction. (7) Pointer P254 is not attached to the start of the CHK instruction circuit block. P254 ├─┤ ├┤ ├┤ ├─CHK D1 D2─┤	(1) Check the program of the CHK instruction circuit block (1) to (7) in the left column. Correct errors using a peripheral device and restart the operation. (2) This error code is only valid when the direct method is used for I/O control.

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Error message	Contents of special register D9008 (BIN value)	Deaile error code (D9092)	CPU status	Error and cause	Corrective action
CAN'T EXECUTE (I)	15	—	STOP	(1) Although the interrupt module is used,, there is no number for interrupt pointer I, which corresponds to that module,, in the program, or more than one number for pointer I exists in the program. (2) No IRET instruction has been entered in the interrupt program. (3) There is an IRET instruction somewhere besides the interrupt program.	(1) Check for the presence of interrupt program which corresponds to the interrupt module and create an interrupt program or reduce the number of Is to one. (2) Check if there is an IRET instruction in the interrupt program and enter the IRET instruction. (3) Check if there is an IRET instruction somewhere besides the interrupt program and delete that IRET instruction.
ROM ERR	17	—	STOP	Parameters and/or sequence programs are not correctly written to the mounted memory cassette.	(1) Correctly write parameters and/or sequence programs to the memory cassette. (2) Remzove the memory cassettes that contain no parameters or sequence programs.
				Parameters stored in the memory cassette have exceeded the limit of available program capacity. Ex.) Default parameters (program capacity: 6k steps) are written to A1NMCA-2KE.	(1) Adjust the program capacity for parameters to the memory cassette used. (2) Use the memory cassette of which memory capacity is larger than the program capacity for parameters.

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Error message	Contents of special register D9008 (BIN value)	Deaile error code (D9092)	CPU status	Error and cause	Corrective action
RAM ERROR	20	—	STOP	(1) The PC CPU has checked if write and read operations can be performed properly with respect to the data memory area of the PC CPU. Normal writing and/or read/write turned out to be impossible.	Since this is a PC CPU hardware fault, consult your nearest Mitsubishi representative.
OPE. CIRCUIT ERR.	21	—	STOP	(1) The operation circuit, which performs the sequence processing in the PC CPU, does not operate properly	
WDT ERROR	22	—	STOP	Scan time exceeds watchdog monitoring time. (1) Scan time of user program is excessive. (2) Scan time has lengthened due to instantaneous power interruption which occurred during the scan.	(1) Calculate and check the scan time of the user program and reduce the scan time by the use of CJ instructions, etc. (2) Monitor the contents of special register D9005 by using a peripheral device. If the contents are other than 0, the line voltage is insufficient. Therefore, check the power and eliminate the voltage fluctuation.
END NOT EXECUTE	24	—	STOP	(1) When the END instruction is executed, it is read as another instruction code due to noise, etc. (2) The END instruction has changed to another instruction code.	(1) Perform reset and RUN. If the same error is displayed again, it is a PC CPU hardware fault. Therefore, consult your nearest Mitsubishi representative.
WDT ERROR	25	—	STOP	The END instruction cannot be executed with the program looped.	Check for an endless loop and correct the program.

Error message	Contents of special register D9008 (BIN value)	Deaile error code (D9092)	CPU status	Error and cause	Corrective action
module VERIFY ERR.	31	—	STOP (RUN)	I/O module data is different from that at power ON. (1) The I/O module (including the special function module) is incorrectly disengaged or has been removed, or a different module has been loaded.	(1) Among special registers D9116 to D9123, the bit corresponding to the module verify error is set to "1". Therefore, monitor the registers by using a peripheral device and check for the module whose bit is "1". (2) When the fault has been corrected, reset the PC CPU.
FUSE BREAK OFF	32	—	RUN (STOP)	(1) There is an output module with a blown fuse. (2) The external power supply for the output load is OFF or not connected.	(1) Check the blown fuse indicator LED of the output module and change the fuse in the module whose LED is ON. (2) Checking modules for blown fuses can also be done with a peripheral device. Among special registers D9100 to D9107, the bit corresponding to the module with a blown fuse is set to "1". Therefore, check by monitoring the registers. (3) heck the ON/OFF status of the external power supply for the output load.
CONTROL-BUS ERR.	40	—	STOP	The FROM and TO instructions cannot be executed. (1) Control bus error in the special function module.	(1) This is a special function module, CPU module or base module hardware fault. Therefore, change the module and check the defective module. Consult your nearest Mitsubishi representative about the defective module.

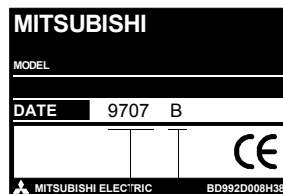| Error message	Contents of special register D9008 (BIN value)	Deaile error code (D9092)	CPU status	Error and cause	Corrective action
SP. module DOWN	41	—	STOP	When FROM and TO instructions cannot be executed. (1) Control bus error in the special function module.	This is a hardware fault in a special function module to which access has been made. Therefore, consult your nearest Mitsubishi representative about the defective module..
I/O INT. ERROR	43	—	STOP	Although the interrupt module is not installed, an interruption has occurred.	(1) This is a module hardware fault. Therefore, change the module and check the defective module. Consult your nearest Mitsubishi representative about the defective module.
SP. module LAY. ERR.	44	—	STOP	(1) Three or more computer link modules are installed in a single CPU module. (2) Two or more data link modules are installed. (3) Two or more interrupt modules are installed. (4) In the parameter setting of the peripheral device, while an I/O module is actually installed, a special function module has been set in the I/O assignment, or vice versa.	(1) Reduce the number of computer link modules to two or less. (2) Use one data link module. (3) Use one interrupt module. (4) Reset the I/O assignment in the parameter setting according to the actually loaded special function module by using a peripheral device.

Error message	Contents of special register D9008 (BIN value)	Deaile error code (D9092)	CPU status	Error and cause	Corrective action
SP. module ERROR	46	—	STOP (RUN)	(1) Access (execution of FROM/TO instruction) has been made to a location where there is no special function module.	(1) Read the error step by use of peripheral device, and check and correct the content of the FROM/TO instruction at that step by using a peripheral device.
		462		(1) The model name of the module specified in the CC-Link dedicated instruction is different from that specified by I/O allocation parameter. (2) The module specified by a CC-Link dedicated instruction is not a master module.	(1) Match the model name specified by I/O allocation parameter with that specified in the CC-Link dedicated instruction. (2) Read the error step with a peripheral device. Check and correct the CC-Link dedicated instruction in the step.
LINK PARA.ERROR	47	—	RUN	(1) The contents which have been written to the parameter area of the link by setting the link range in the parameter setting of peripheral device are different from the link parameter contents. (2) The setting for the total number of slave stations is 0	(1) Write the parameters again and check. (2) If this message is displayed again, there is a hardware fault. Therefore, consult your nearest Mitsubishi representative.
OPERATION ERROR	50	—	RUN (STOP)	(1) The result of BCD conversion has exceeded the specified range (9999 or 99999999). (2) A setting has been done which exceeds the specified device range and the operation cannot be done. (3) File registers are used in the program without performing the capacity setting of file registers.	(1) Use a peripheral device to read the error step and check and correct the program at that step. (Check device setting range, BCD conversion value, etc.)

Error message	Contents of special register D9008 (BIN value)	Deaile error code (D9092)	CPU status	Error and cause	Corrective action
OPERATION ERROR	50	503	RUN (STOP)	The storage data or constant for the specified device is out of range.	Read the error step by using a pheripheral device and correct the program at that step.
		504		The set number of data to be handled exceeds the usable range.	
		509		The number of CC-Link dedicated instructions for one scan exceeds 64.	Decrease the number of CC-Link dedicated instructions executed for one scan to 64 or less
				CC-Link dedicated instruction was executed to the CC-Link module in which parameters are not set.	Set the parameters.
BATTERY ERROR	70	—	RUN	(1) The battery voltage is below 24 V DC. (2) The battery lead is disconnected.	(1) Change the battery. (2) When RAM or power interruption compensation is used, connect the battery.

POINT

When using the CC-Link dedicated instructions, use a master module with the rating plate indicating "9707 B" or later in its DATE column.

```
MITSUBISHI
MODEL
DATE      9707   B
                         CE
MITSUBISHI ELECTRIC    BD992D008H38
```
                                    Function version
                                    Manufacture of year and month

Appendix 1 CPU-by-CPU Startup Names

CPU	Startup Name	CPU Name to Be Selected If the CPU Name Given on the Left Is Not Found
A1SJHCPU-S8	A1SJH	A3

Appendix 2 Transportation Precautions

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

Appendix 2.1 Controlled Models

The battery for A1SJHCPU-S8 is classified as follows:

Product Name	Model	Product supply status	Classification for transportation
A series battery	A6BAT	Lithium battery	Non-dangerous goods
Q series memory card battery	Q2MEM-BAT	Lithium coin battery	
Q series memory card	Q2MEM-1MBS	Packed with lithium coin battery (Q2MEM-BAT)	

Appendix 2.2 Transport Guidelines

Comply with IATA Dangerous Goods Regulations, IMDG code and the local transport regulations when transporting products after unpacking or repacking, while Mitsubishi ships products with packages to comply with the transport regulations.

Also, contact the transporters.

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.

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U.K	Mitsubishi Electric Europe B.V. UK Branch Travellers Lane, Hatfield, Hertfordshire., AL10 8XB, U.K. Tel : +44-1707-276100	Korea	Mitsubishi Electric Automation Korea Co., Ltd. 1480-6, Gayang-dong, Gangseo-ku Seoul 157-200, Korea Tel : +82-2-3660-9552
Italy	Mitsubishi Electric Europe B.V. Italian Branch Centro Dir. Colleoni, Pal. Perseo-Ingr.2 Via Paracelso 12, I-20041 Agrate Brianza., Milano, Italy Tel : +39-039-60531	Singapore	Mitsubishi Electric Asia Pte, Ltd. 307 Alexandra Road #05-01/02, Mitsubishi Electric Building, Singapore 159943 Tel : +65-6470-2460
Spain	Mitsubishi Electric Europe B.V. Spanish Branch Carretera de Rubi 76-80, E-08190 Sant Cugat del Valles, Barcelona, Spain Tel : +34-93-565-3131	Thailand	Mitsubishi Electric Automation (Thailand) Co., Ltd. Bang-Chan Industrial Estate No.111 Moo 4, Serithai Rd, T.Kannayao, A.Kannayao, Bangkok 10230 Thailand Tel : +66-2-517-1326
France	Mitsubishi Electric Europe B.V. French Branch 25, Boulevard des Bouvets, F-92741 Nanterre Cedex, France TEL: +33-1-5568-5568	Indonesia	P.T. Autoteknindo Sumber Makmur Muara Karang Selatan, Block A/Utara No.1 Kav. No.11 Kawasan Industri Pergudangan Jakarta - Utara 14440, P.O.Box 5045 Jakarta, 11050 Indonesia Tel : +62-21-6630833
South Africa	Circuit Breaker Industries Ltd. Private Bag 2016, ZA-1600 Isando, South Africa Tel : +27-11-928-2000	India	Messung Systems Pvt, Ltd. Electronic Sadan NO:III Unit No15, M.I.D.C Bhosari, Pune-411026, India Tel : +91-20-2712-3130
		Australia	Mitsubishi Electric Australia Pty. Ltd. 348 Victoria Road, Rydalmere, N.S.W 2116, Australia Tel : +61-2-9684-7777

▲ MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS : 1-14, YADA-MINAMI 5-CHOME, HIGASHI-KU, NAGOYA, JAPAN

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