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MELSEC A series

Programmable Controller
User´s Manual

type A1S(S1)/A1SC24-R2/A2S(S1)/A1SH/ A2SHCPU(S1)/A2ASCPU(S1/S30/S60) (Hardware)

MITSUBISHI ELECTRIC EUROPE B.V.
FACTORY AUTOMATION

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● 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 precautions apply only to Mitsubishi equipment. Refer to the CPU module user's manual for a description of the PC system safety precautions.

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.

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[DESIGN PRECAUTIONS]

⚠ DANGER

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

  (1) Outside the PC, construct mechanical damage preventing interlock circuits such as emergency stop, protective circuits, positioning upper and lower limits switches and interlocking forward /reverse operations.

  (2) When the PC detects the following problems, it will stop calculation and turn off all output.
  - The power supply module has over current protection equipment and over voltage protection equipment.
  - The PC CPUs self diagnostic functions, such as the watchdog timer error, detect problems. In addition, all output will be turned on when there are problems that the PC CPU cannot detect, such as in the I/O controller. Build a fail safe circuit exterior to the PC that will make sure the equipment operates safely at such times.

  Refer to Section 5.1 of this user's manual for example fail safe circuits.

  (3) Output could be left on or off when there is trouble in the output module relay or transistor. So build an external monitoring circuit that will monitor any single output 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 PC main module power is turned on. If the external power supply is turned on first, it could result in erroneous output or erroneous operation.

- When there are communication problems with the data link, the communication problem station will enter the following condition.
  Build an interlock circuit into the PC program that will make sure the system operates safely by using the communication state information. Not doing so could result in erroneous output or erroneous operation.

  (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 state when there are communication problem.

⚠ 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 100mm(3.94inch) or more from each other. Not doing so could result in noise that would cause erroneous operation.

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[INSTALLATION PRECAUTIONS]

⚠ DANGER

- Use the PC in an environment that meets the general specifications contained in this manual. Using this PC 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.
- Install so that the pegs on the bottom of the module fit securely into the base unit peg holes, and use the specified torque to tighten the module's fixing screws. Not installing the module correctly could result in erroneous operation, damage, or pieces of the product falling.
- Tightening the screws too far may cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.
- When installing more cables, be sure that the base unit and the module connectors are installed correctly. After installation, check them for looseness. Poor connections could result in erroneous input and erroneous output.
- Correctly connect the memory cassette installation connector to the memory cassette. After installation, make sure that the connection is not loose. A poor connection could result in erroneous operation.
- Do not directly touch the module's conductive parts or electronic components. Doing so could cause erroneous operation or damage of 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 unit'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 PC, 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. If the terminal screws are too tight, it may cause falling, short circuit or erroneous operation due to damage of the screws or module.
- Tighten the terminal screws with the specified torque. If the terminal screws are loosen, 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.

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[WIRING PRECAUTIONS]

⚠ CAUTION

- External connections shall be crimped or pressure welded with the specified tools, or correctly soldered. For information regarding the crimping and pressure welding tools, refer to the I/O module's user's manual. Imperfect connections could result in short circuit, fires, or erroneous operation.

[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 tightening the terminal screws. Not doing so could result in electric shock. If the screws are too tight, it may cause falling, short circuit or erroneous operation due to damage of the screws or modules.
- Tightening the screws too far may 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 trouble of the module.
- Do not disassemble or modify the modules. Doing so could cause trouble, erroneous operation, injury, or fire.
- 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.

[DISPOSAL PRECAUTIONS]

⚠ CAUTION

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

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REVISIONS

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

Print Date	*Manual Number	Revision
Apr.,1994	IB (NA) 66468-A	First edition
Dec.,1994	IB (NA) 66468-B	Correction CONTENTS, Detailed manuals, Related manuals, 1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 3.1, 3.2 Addition 1.4, 1.5, 1.6
Jun.,1995	IB (NA) 66468-C	Overall revision
Oct.,1995	IB (NA) 66468-D	Correction CONTENTS, 1, 2.2.1, 2.2.2, 2.2.3, 3.3, 3.5, 4.3.1, 4.3.2, 5.2, 7.2
Jan., 1996	IB (NA) 66468-E	Correction CONTENTS, 4.1, 4.2, 5.1, 5.2, 6.1, 6.2, 6.3, 6.4, 6.5, 7.1, 7.2 Addition 3.2, 4.3.3
Apr., 1997	IB(NA) 66468-F	Addition of models A1SHCPU, A2SHCPU(S1) Addition Grneral specifications, Low voltage instruction, 3.1, 5.3, 7.2, Appendix Correction Safety precautions, 4.2
Aug., 1997	IB(NA) 66468-G	Correction CONTENTS, 3.4, 7.1, 7.3, Appendix 2, Appendix 5

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INTRODUCTION

Thank you for choosing the Mitsubishi MELSEC-A Series of General Purpose Programmable Controllers. Please read this manual carefully so that the product is used to its optimum. A copy of this manual should be forwarded to the end user.

This manual describes specifications and requirements related to safety, installations, wiring and maintenance of the AnS series PC. For functional information, please refer to detail manuals of each module.

Guidelines for the safety of the user and protection of the AnS series PC

This manual provides information for the installation and use of the AnS series PC. The manual has been written to be used by trained and competent personnel. Please read the manual carefully before installation and/or operations of the product. If the product is used in a manner not specified by the manual, the protection provided by the product may be impaired.

Note: Definition of 'trained and competent personnel' is as follows:

a) Any engineer who is responsible for the planning, design and construction of automatic equipment using the product associated with this manual should be of a competent nature, (trained and qualified to the local and national standards required to fulfill that role). These engineers should be fully aware of all aspects of safety with regards to automated equipment.

b) Any commissioning or service engineer must be of a competent nature, trained and qualified to the local and national standards required to fulfill that job. These engineers should also be trained in the use and maintenance of the completed product. This includes being completely familiar with all associated documentation for the said product. All maintenance should be carried out in accordance with established safety practices.

c) All operators of the completed product should be trained to use that product in a safe and co-ordinated manner in compliance to established safety practices. The operators should also be familiar with all documentation which is connected with the actual operation of the completed equipment.

Note: the term 'completed equipment' refers to a third party constructed device which contains or uses the product associated with this manual.

Note's on the symbols used in this manual

At various times through out this manual, certain symbols are used to highlight points of information which are intended to ensure the users personal safety and protect the integrity of the equipment. Whenever any of the following symbols are encountered, its associated note must be read and understood. Each of the symbols used are listed with a brief description of its meaning.

 DANGER — Indicates that the identified danger could possibly cause serious physical injury and/or death.

 CAUTION — Indicates that the identified danger could possibly cause physical injury or property damage.

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Notification of CE marking

The following products have shown compliance through direct testing (to the identified standards) and design analysis (forming a technical construction file) to the European Directive for Electromagnetic Compatibility (89/336/EEC)

Products: Type: Programmable Logic Controller
(Open Type equipment, Installation category II)
Model: AnS-Series
(Applicable units listed below)

Harmonised European Standards

Reference No.	Date of Issue
EN50081-2	1992
prEN50082-2	1992
EN50082-2	1995

IEC Standards

Reference No.	Date of Issue
IEC801-2	1984
IEC801-3	1984
IEC801-4	1988

AnS-Series Programmable Logic Controllers
Range of products:

Models					
A1S32B	A1S63P	A1SG62	A1SJHCPU	A1SY18A	A2SHCPU
A1S33B	A1S64AD	A1SH42	A1SP60	A1SY18AEU	A2SHCPU-S1
A1S35B	A1S65B	A1SH42	A1ST60	A1SY22	A64DAIC
A1S38B	A1S65B-S1	A1SI61	A1SX10EU	A1SY28A	A64DAVC
A1S52B	A1S68AD	A1SJ51T64	A1SX20EU	A1SY28EU	A68ADC
A1S52B-S1	A1S68B	A1SJ71AP21	A1SX30	A1SY40	AD61C
A1S55B	A1S68B-S1	A1SJ71AP21-S3	A1SX40	A1SY41	AJ55TB2-4R
A1S55B-S1	A1S68DAI	A1SJ71AR21	A1SX40-S1	A1SY42	AJ55TB2-8R
A1S58B	A1S68DAV	A1SJ71AT21B	A1SX40-S2	A1SY50	AJ55TB3-4D
A1S58B-S1	A1S68TD	A1SJ71E71-B2	A1SX41	A1SY60E	AJ55TB3-8D
A1S61P	A1SCPU	A1SJ71E71-B5	A1SX41-S2	A1SY68A	AJ55TB32-4DR
A1S61PEU	A1SCPU-S1	A1SJ71LP21	A1SX42	A1SY71	AJ55TB32-8DR
A1S61PN	A1SHCPU	A1SJ71PT32-S3	A1SX42-S2	A1SY80	AX40Y50C
A1S62DA	A1SD51S	A1SJ71C24-PRF	A1SX80	A1SY81	AX80Y14CEU
A1S62DA	A1SD61	A1SJ71C24-R2	A1SX80-S1	A1SY81EP	AX80Y80C
A1S62P	A1SD70	A1SJ71C24-R4	A1SX80-S2	A2ASCPU	AX41C
A1S62PEU	A1SD71-S2	A1SJ71UC24-PRF	A1SX81	A2ASCPU-S1	AX81C
A1S62PN	A1SD71-S7	A1SJ71UC24-R2	A1SX81-S2	A2ASCPU-S30	AY15CEU
A1S62RD3	A1SD75-P1	A1SJ71UC24-R4	A1SY10	A2ASCPU-S60	AY51C
A1S62RD4	A1SD75-P2	A1SJ72T25B	A1SY10EU	A2SCPU	AY81C
A1S63ADA	A1SD75-P3	A1SJCPU-S3	A1SY14EU	A2SCPU-S1	

The products listed above must be used as directed by the associated documentation in order to provide full compliance. Please contact your local Mitsubishi Sales office or distributor for further details.

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This manual describes cautions on handling, connection to I/O modules, and error codes of A1SCPU(S1), A2SCPU(S1), A2ASCPU(S1/S30/S60), and A1SHCPU, A1SHCPU(S1), A1SCPUC24-R2 (hereafter called “the CPU”).

Refer to the following manuals when necessary.

Detailed manuals

- **A1SCPU/A1SCPUC24-R2/A2SCPU User’s Manual (IB-66320)**
  This manual describes the specifications and functions of A1S, A1SC24-R2 and A2SCPU(S1), and specifications etc. of the memory cassettes, the power supply module and extension base unit.
- **A2ASCPU(S1) User’s Manual (IB-66455)**
  This manual describes the specifications and functions of A2ASCPU(S1) and the specifications of the memory cassettes, the power supply modules and extension base units that can be used with it.
- **A1SJHCPU/A1SHCPU/A2SHCPU(S1) User’s Manual (IB-66779)**
  This manual describes the specifications and functions of A1SJHCPU, A1SH, and A2SHCPU(S1) and the specifications of the memory cassettes, the power supply modules and extension base units that can be used with it.

Related manuals

- **ACPU Programming Manual (Fundamentals) (IB-66249)**
  This manual describes programming methods required to create programs, device names, parameters, types of program, configuration of the memory area, etc.
- **ACPU Programming Manual (Common Instructions) (IB-66250)**
  This manual describes how to use the sequence instructions, basic instructions, application instructions and micro-computer programs.
- **AnACPU/AnUCPU Programming Manual (Dedicated Instructions) (IB-66251)**
  This manual describes the extended instructions for the A2ASCPU(S1).
- **AnACPU/AnUCPU Programming Manual (AD57 control instructions) (IB-66257)**
  This manual describes the dedicated instructions used to control AD57(S1)/AD58 CRT/LCD control modules with an A2ASCPU(S1).
- **AnACPU/AnUCPU Programming Manual (PID control instructions) (IB-66258)**
  This manual describes the dedicated instructions used to execute PID control with an A2ASCPU(S1).
- **AnS Module type I/O User’s Manual (IB-66541)**
  This manual gives the specifications for AnS module type I/O modules.
- **Computer Link Module User’s Manual (Comms. link func./ Print func.) (SH-3511)**
  This manual describes communication between the A1SCPUC24-R2 and external devices using the dedicated protocol, no protocol, and bidirectional modes, and the settings, wiring, programming, troubleshooting, etc., for this module.
- **Computer Link Module Guidebook (SH-3510)**
  This manual gives the basic information required to execute data communication with external devices (computers, for example), in each mode of the computer link function.
- **MELSECNET, MELSECNET/B Data Link System Reference Manual (IB-66350)**
  This manual describes the performance, functions and programming methods for the MELSECNET and MELSECNET/B data link systems.

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1. GENERAL SPECIFICATIONS

This product has been designed to be installed in the following environmental conditions.
Please place the product in places where environmental conditions satisfies the specifications.

<table>
<tr><th>Item</th><th colspan="6">Specifications</th></tr>
<tr><td>Ambient operating temperature</td><td colspan="6">0 to 55°C</td></tr>
<tr><td>Ambient storage temperature</td><td colspan="6">-20 to 75°C</td></tr>
<tr><td>Ambient operating humidity</td><td colspan="6">10 to 90% RH, Non-condensing</td></tr>
<tr><td>Ambient storage humidity</td><td colspan="6">10 to 90% RH, Non-condensing</td></tr>
<tr><td rowspan="5">Vibration resistance</td><td rowspan="5">Conforming to JIS B 3501, IEC 1131-2</td><td></td><td>Frequency</td><td>Acceleration</td><td>Amplitude</td><td>No. of sweeps</td></tr>
<tr><td rowspan="2">Under intermittent vibration</td><td>10 to 57Hz</td><td>—</td><td>0.075mm (0.003inch)</td><td rowspan="3">10 times each in X, Y, Z directions (for 80 min.)</td></tr>
<tr><td>57 to 150Hz</td><td>9.8m/s² {1G}</td><td>—</td></tr>
<tr><td rowspan="2">Under continuous vibration</td><td>10 to 57Hz</td><td>—</td><td>0.035mm (0.001inch)</td></tr>
<tr><td>57 to 150Hz</td><td>4.9m/s² {0.5G}</td><td>—</td></tr>
<tr><td>Shock resistance</td><td colspan="6">Conforming to JIS B3501, IEC 1131-2
(147m/s² {15G}, 3 times in each of 3 directions X Y Z)</td></tr>
<tr><td>Operating ambience</td><td colspan="6">No corrosive gases</td></tr>
<tr><td>Operating elevation</td><td colspan="6">2000m (6562 feet) max.</td></tr>
<tr><td>Installation location</td><td colspan="6">Control panel</td></tr>
<tr><td>Over voltage category *1</td><td colspan="6">II max.</td></tr>
<tr><td>Pollution level *2</td><td colspan="6">2 max.</td></tr>
</table>

*1: This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within the 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 300V is 2500V.

*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 condensation must be expected occasionally.

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2. MODULE SPECIFICATIONS

2.1 Power Supply Modules

Specifications of power supply modules are shown in the following table

Item		Specifications			
		A161P	A1S62P	A1S63P	
Base loading slot		Power supply module loading slot			
Rated input voltage		100 to 120 VAC+10%/-15%(85 to 132 VAC)		24 VDC +30%/-35% (15.6 to 31.2VDC)	
		200 to 240 VAC+10%/-15%(170 to 264 VAC)			
Rated input frequency		50/60 Hz ±3%		——	
Max. input apparent power		105 VA		41 Ω	
Inrush current		20 A 8 ms or lower		81 A 1 ms or lower	
Rated output current	5 VDC	5 A	3 A	5 A	
	24 VDC±10%	——	0.6 A	——	
Overcurrent protection	5 VDC	5.5 A or higher	3.3 A or higher	5.5 A or higher	
	24 VDC	——	0.66 A or higher	——	
Overvoltage protection	5 VDC	5.5 to 6.5 V			
	24 VDC	——			
Efficiency		65% or higher			
Allowable momentary power failure time *3		20ms or lower		1ms or lower	
Dielectric withstand voltage	Between primary and 5 VDC	1500 VAC *1	1500 VAC *1	500 VAC	
	Between primary and 24 VDC	——	1500 VAC *1	——	
Insulation resistor		5M Ω or highter at insulation resistance tester			
Noise durability		Noise voltage 1500Vp-p, Noise width 1 µs, Noise frequency 25 to 60Hz (noise simulator condition)		Noise voltage 500Vp-p, Noise width 1 µs, Noise frequency 25 to 60Hz (noise simulator condition)	
Power indication		Power LED indication (light at the time of output of 5VDC)			
Terminal screw size		M3.5 × 7			
Applicable wire size		0.75 to 2mm^2 (AWG18 to 14)			
Applicable solderless terminal		RAV1.25 to 3.5, RAV2 to 3.5			
Applicable tightenig torque		59 to 88 N·cm (6 to 9kg·cm)			
External dimension mm (inch)		130 × 55 × 93.6 (5.12 × 2.17 × 3.69)			
Weight kg (lb)		0.53 (1.17)	0.55 (1.21)	0.5 (1.1)	

*1: Overcurrent protection

The overcurrent protection device shuts off the 5V, 24 VDC circuit and stops the system if the current flowing in the circuit exceeds the specified value. When this device is activated, the power supply module LED is switched OFF or dimly lit. If this happens, eliminate the cause of the overcurrent and start up the system again.

*2: Overvoltage protection

The overvoltage protection device shuts off the 5 VDC circuit and stops the system if a voltage of 5.5 to 6.5 V is applied to the circuit. When this device is activated, the power supply module LED is switched OFF. If this happens, switch the input power OFF, then ON to restart the system. The power supply module must be changed if the system is not booted and the LED remains OFF.

*3: Allowable momentary power interruption time

This value indicates the momentary power interruption time allowed for the PC CPU and varies according to the power supply module used with the PC CPU module. The allowable momentary power interruption time for a system in which an A1S63P is used is defined as starting when the primary power supply of the 24 VDC stabilized power supply of the A1S63P is turned OFF and lasting until the 24 VDC becomes less than the specified voltage (15.6 VDC).

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	A1S61PEU	A1S62PEU	A1S61PN	A1S62PN
	200 to 240 VAC (10%/-15%) (170 to 264VAC)		100 to 240 VAC(10%/-15%) (85 to 264VAC)	
	50/60 Hz ±5%			
	105VA			
	40 A 8ms or lower		20A 8ms or lower	
	5 A	3A	5A	3A
	——	0.6A	——	0.6A
	5.5 A or higher	3.3 A or higher	5.5 A or higher	3.3 A or higher
	——	0.66A or higher	——	0.66 A or higher
	20ms or higher			
	1780 VAC	1780 VAC	AC across input/LG and output/FG 2830VAC rms/3cycle (2000m)	
	——	1780 VAC		
	5M Ω or highter at insulation resistance tester		AC across input/LG and output/FG5M Ω or highter, mesured with a 500VDC insulation resistance tester	
	(1) Noise voltage 1500Vp-p, Noise width 1 µs, Noise frequency 25 to 60Hz (noise simulator condition) (2) Noise voltage IEC801-4, 2kV			
	RAV1.25 to 3.5, RAV2 to 3.5		RAV1.25 to 4, RAV2 to 4	
	59 to 88 N·cm (6 to 9 kg·cm)		83 to 113 N·cm (8.5 to 11.5 kg·cm)	
	130 × 55 × 93.6 (5.12 × 2.17 × 3.69)		130 × 54.5 × 93.6 (5.12 × 2.15 × 3.69)	
	0.53 (1.17)	0.55 (1.21)	0.60(1.32)	

*4: A1S61PEU and A1S62PEU comply with EN61010-1 and safety aspects of IEC1131-2 to meet the Low Voltage Directive which will be mandatory from the 1st of January 1997.

*5: Do not apply over 400 Voltage between AC and LG as the Varistor is installed between the AC and LG.

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2.2 Digital I/O Modules

2.2.1 Input modules

Specifications of input modules are shown in the following table.

Model	Type	No. of Points	Rated Input Voltage	Input Current	Dielectric Withstand Voltage	Operating Voltage		Maximum Simultaneous Input Points (Percentage Simultaneously ON)
						ON Voltage	OFF Voltage	
A1SX10	AC input	16	100 to 120 VAC, 50/60 Hz	6 mA	1500 VAC	80 VAC or higher	30 VAC or lower	100% (110 VAC) 60% (132 VAC)
A1SX10EU		16		7 mA	1780 VAC			100%
A1SX20		16	200 to 240 VAC, 50/60 Hz	9 mA	1500 VAC	80 VAC or higher	30 VAC or lower	60% (220 VAC)
A1SX20EU		16		11 mA	2830 VAC			
A1SX30	AC/DC input	16	12/24 VAC, 50/60 Hz 12/24 VDC	4.2/8.6 mA	500 VAC	7 VAC/VDC or higher	2.7 VAC/VDC or lower	75% (26.4 VAC)
A1SX40	DC input (sink type)	16	12/24 VDC	3/7 mA		8 VDC or higher	4 VDC or lower	100% (26.4 VDC)
A1SX40-S1		16	24 VDC	7 mA		14 VDC or higher	6.5 VDC or lower	100% (26.4 VDC)
A1SX40-S2		16	24 VDC	7 mA		14 VDC or higher	6.5 VDC or lower	100% (26.4 VDC)
A1SX41		32	12/24 VDC	3/7 mA		8 VDC or higher	4 VDC or lower	60% (26.4 VDC)
A1SX41-S2		32	24 VDC	7 mA		14 VDC or higher	6.5 VDC or lower	60% (26.4 VDC)
A1SX42		64	12/24 VDC	2/5 mA		8 VDC or higher	4 VDC or lower	50% (24 VDC)
A1SX42-S2		64	24 VDC	5 mA		17.5 VDC or higher	7 VDC or lower	50% (24 VDC)
A1SX71	DC input (sink/source)	32	5/12 VDC	1.2/3.3 mA		3.5 VDC or higher	1 VDC or lower	100%
A1SX80		16	12/24 VDC	3/7 mA		8 VDC or higher	4 VDC or lower	100% (26.4 VDC)
A1SX80-S1		16	24 VDC	7 mA		17 VDC or higher	5 VDC or lower	100% (26.4 VDC)
A1DX80-S2		16	24 VDC	7 mA		13 VDC or higher	6 VDC or lower	100% (26.4 VDC)
A1SX81		32	12/24 VDC	3/7 mA		8 VDC or higher	4 VDC or lower	60% (26.4 VDC)
A1SX81-S2		32	24 VDC	7 mA		13 VDC or higher	6 VDC or lower	60% (26.4 VDC)
A1S42X	DC input (dynamic)	16/32/ 48/64	12/24 VDC	4/9 mA		8 VDC or higher	4 VDC or lower	100% (26.4 VDC)

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Specifications of input modules are shown in the following table.

Max. Response Time		Field Wiring	Applicable Wire Size	Points/ Common	Noise Immunity	Internal Current Consumption (5 VDC)	No. of Occupied Points	Power Supply Requirement
OFF to ON	ON to OFF							
20 ms	35 ms	Terminal	0.75 to 1.25 mm^2 AWG 15 to 19	16	1000 VAC	0.05 A	16	
		Terminal		16	1000 VAC	0.05 A	16	
30 ms	55 ms	Terminal		16	1500 VAC	0.05 A	16	
		Terminal		16	1000 VAC	0.05 A	16	
25 ms 20 ms	20 ms 20 ms	Terminal		16	1500 VAC	0.05 A	16	SELV power supply is required
10 ms	10 ms	Terminal		16	500 VAC	0.05 A	16	
0.1 ms	0.2 ms	Terminal		16	500 VAC	0.05 A	16	
10 ms	10 ms	Terminal		16	500 VAC	0.05 A	16	
10 ms	10 ms	40-pin connector	0.3 mm^2 AWG22	32	500 VAC	0.08 A	32	
10 ms	10 ms	40-pin connector		32	500 VAC	0.08 A	32	
10 ms	10 ms	40-pin connector		32	500 VAC	0.09 A	64	
10 ms	10 ms	40-pin connector		32	500 VAC	0.09 A	64	
1.5 ms	3 ms	40-pin connector		32	500 VAC	0.075 A	32	
10 ms	10 ms	Terminal	0.75 to 1.25 mm^2 AWG15 to 19	16	1000 VAC	0.05 A	16	
0.4 ms	0.5 ms	Terminal		16	1000 VAC	0.05 A	16	
10 ms	10 ms	Terminal		16	1000 VAC	0.05 A	16	
10 ms	10 ms	37-pin connector	0.3 mm^2 AWG22	32	1000 VAC	0.08 A	32	
10 ms	10 ms	37-pin connector		32	1000 VAC	0.08 A	32	
0.4 ms	0.4 ms	24-pin connector		——	500 VAC	0.08 A	16/32/48/64	

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2.2.2 Output modules

Specifications of output modules are shown in the following table.

Model	Type	No. of Points	Rated Load Voltage	Max. Load Current	Dielectric Withstand Voltage		Max. Output Response Time	
							OFF to ON	ON to OFF
A1SY10	Relay output	16	240 VAC, 50/60 Hz 24 VDC	2 A/pt, 8 A/com	1500 VAC		10 ms	12 ms
A1SY10EU	Relay output (for 24 VDC)	16	120 VAC, 24 VDC	2 A/pt, 8 A/com	AC terminal-Relay coil, 5 VAC	1780 VAC	10 ms	12 ms
					Relay coil, 5 VAC	500 VAC		
A1SY14EU	Relay output	12	240 VAC, 24 VDC	2 A/pt, 8 A/com	AC terminal-Relay coil, 5 VAC	2830 VAC	10 ms	12 ms
					Relay coil, 5 VAC	500 VAC		
A1SY18A	Relay output	8	240 VAC, 50/60 Hz 24 VDC	2 A/pt, 8 A/module	1500 VAC		10 ms	12 ms
A1SY18AEU	Relay output	8	240 VAC, 24 VDC	2 A/pt	AC terminal-Relay coil, 5 VAC	2830 VAC	10 ms	12 ms
					Relay coil, 5 VAC	500 VAC		
A1SY22	Triac output	16	240 VAC, 50/60 Hz	0.6 A/pt, 2.4 A/com	1500 VAC		1 ms	0.5 cycle + 1 ms
A1SY28A	Triac output	8	240 VAC, 50/60 Hz	1 A/pt, 4 A/module	1500 VAC		1 ms	0.5 cycle + 1 ms
A1SY28EU	Triac output	8	100 - 240 VAC	0.6 A/pt, 1.9 A/com	2830 VAC		1 ms	0.5 cycle + 1 ms
A1SY40	Transistor output	16	12/24 VDC	0.1 A/pt, 0.8 A/com	500 VAC		2 ms	2 ms
A1SY41		32	12/24 VDC	0.1 A/pt, 2 A/com			2 ms	2 ms
A1SY42		64	12/24 VDC	0.1 A/pt, 1.6 A/com			2 ms	2 ms
A1SY50		16	12/24 VDC	0.5 A/pt, 2 A/com			2 ms	2 ms
A1SY60		16	24 VDC	2 A/pt, 4 A/com			2 ms	2 ms
A1SY60E		16	5/12/24 VDC	2 A/pt, 4 A/com			3 ms	10 ms
A1SY68A		8	5/12/24 VDC	2 A/pt			3 ms	10 ms
A1SY71		32	5/12 VDC	16 mA/pt, 256 mA/com			1 ms	1 ms
A1SY80		16	12/24 VDC	0.8 A/pt, 3.2 A/com			2 ms	2 ms
A1SY81		32	12/24 VDC	0.1 A/pt, 2 A/com			2 ms	2 ms
A1SY81EP		32	12/24 VDC	0.1 A/pt, 2 A/com 0.05 A/pt, 1.6 A/com			0.5ms	1.5ms
A1S42Y		64	12/24 VDC	0.1 A/pt			2 ms	2 ms

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Field Wiring	Applicable Wire Size	Points/ Common	Surge Suppression	Fuse Rating	Noise Durability	External Power Supply		Internal Current Consumption (5 VDC)	No of Occupied Points
						Current	Requirement		
Terminal	0.75 to 1.25 mm^2 AWG15 to 19	8	None	None	1000 VAC	0.09 A	SELV power supply required	0.12 A	16
Terminal		8	None	None	1000 VAC	0.09 A		0.12 A	16
Terminal		4	None	None	1000 VAC	0.1 A		0.12 A	16
Terminal		1	None	None	1000 VAC	0.075 A		0.24 A	16
Terminal		——	None	None	1000 VAC	0.75 A		0.24 A	16
Terminal		8	CR	5 A	1500 VAC	0.02 A		0.27 A	16
Terminal		1	CR	None	1500 VAC	——		0.13 A	16
Terminal		4	CR	None	1000 VAC	——		0.27 A	16
Terminal		8	Zener diode	1.6 A	500 VAC	0.08 A	SELV power supply required	0.27 A	16
40-pin connector	0.3 mm^2 AWG22	32	Zener diode	3.2 A	500 VAC	0.08 A		0.5 A	32
40-pin connector		32	Zener diode	3.2 A	500 VAC	0.08 A		0.93 A	64
Terminal	0.75 to 1.25 mm^2 AWG15 to 19	8	Zener diode	3.2 A	500 VAC	0.06 A		0.12 A	16
Terminal		8	Zener diode	5 A	500 VAC	0.015 A		0.12 A	16
Terminal		8	Zener diode	7 A	500 VAC	0.01 A		0.2 A	16
Terminal		1	Zener diode	None	500 VAC	——		0.11 A	16
40-pin connector.	0.3mm^2 AWG22	32	None	1.6 A	500 VAC	0.15 A		0.4 A	32
Terminal	0.75 to 1.25 mm^2 AWG15 to 19	8	Zener diode	5 A	1000 VAC	0.02 A		0.12 A	16
37-pin connector	0.3 mm^2 AWG22	32	Zener diode	3.2 A	1000 VAC	0.08 A		0.5 A	32
37-pin connector		32	Clamping diode	None	1000VAC	0.08A		0.5A	32
24-pin connector		——	None	1.6 A	500 VAC	0.08 A		0.1 A	16/32/48/64

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2.2.3 Input/output combined modules

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 Voltagee		Maximum Simultaneous Input Points (Percentage Simultaneously ON)
						ON Voltage	OFF Voltage	
A1SH42	DC input (sink type)	32	12/24 VDC	2/5 mA	500 VAC	8 VDC or higher	4 VDC or lower	60% (24 VDC)
A1SX48Y18		8	24 VDC	7 mA		14 VDC or higher	6.5 VDC or lower	100% (26.4 VDC)
A1SX48Y58		8	24 VDC	7 mA		14 VDC or higher	6.5 VDC or lower	100% (26.4 VDC)

(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	12/24 VDC	0.1 A/pt, 0.8 A/com	500 VAC	0.4 ms	0.4 ms
A1SX48Y18	Relay output	8	240 VAC, 50/60 Hz 24 VDC	2 A/pt, 8 A/com	1500 VAC	10 ms	12 ms
A1SX48Y58	Transistor output	8	12/24 VDC	0.5 A/pt, 2 A/com	500 VAC	2 ms	2 ms

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

Field Wiring	Applicable Wire Size	Points/ Common	Surge Suppression	Fuse Rating	Noise Durability	External Power Supply	
						Current	Requirement
40-pin connector	0.3 mm^2 AWG22	32	None	None	500 VAC	0.08 A	SELV power supply required
Terminal	0.75 to 1.25 mm^2 AWG 15 to 19	8	Zener diode	3.2 A	1000 VAC	0.045 A	
Terminal		8	None	None	500 VAC	0.06 A	

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MEMO

3. INSTALLATION

3.1 General Safety Requirements

⚠ CAUTION

This product is an open type equipment and itself does not comply with IP2X protection. The product must be installed in a suitable enclosure which should be selected and installed in accordance to the local and national standards.

An enclosure which contains the product can be opened only under any of the following conditions (a) to (c) in order to protect operators from electrical shock in normal operations. The following measures must be taken:

(a) The use of a key or tool is necessary. This method is only allowed for access by skilled or instructed persons.

(b) Disconnection of supplied power before the enclosure is opened.

(c) Barriers should be provided for all live parts except those supplied by Extra-Low Voltage.

This products must be installed and used in environment specified as the environmental specifications. Otherwise, using in different environment could cause electrical shock, fire, malfunction, damage of the products and/or decrease of product capability.

When mounting a module onto a base unit, securely insert the fixing hook on the bottom of the module into the hole provided on the base unit at first, then plug the body of module on the base unit. If the modules are not mounted correctly they may fall, malfunction or fail to operate correctly.

Extension base cables must be securely connected. Make sure that no unsecured connection is made. Unsecured connection could cause PC to read and/or write wrong status from/to input or output modules.

A memory cassette module or memory chips must be securely loaded on a connector or socket. Make sure that no unsecured loading was made or malfunction may occur.

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

The EMC Directive (89/336/EEC) will 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 either 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 electro-magnetic 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.

3.2.1 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 electric wave released by the product.	30M-230MHz QP : 30dBμV/m (30m measurement) *1 230M-1000MHz QP : 37dBμV/m (30m measurement)
	EN55011 Conduction noise	Measure the noise released by the product to the power line.	150k-500kHz QP: 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 radiating an 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
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
	ENV50140 Radiated electromagnetic field AM modulation*2	Immunity test by radiating an electric field to the product.	10V/m, 80-1000MHz, 80% AM modulation@1kHz
	ENV50204 Radiated electromagnetic field Pulse modulation*2	Immunity test by radiating an electric field to the product.	10V/m, 900MHz, 200Hz pulse modulation, 50% duty
	ENV50141 Conduction noise	Immunity test by inducting electromagnetic field to the power line signal cable.	10Vrms, 0.15-80MHz, 80% modulation@1kHz

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(*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 box.
The tests for the corresponding items were perfomed while the PC was installed to inside the control box.

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3.2.2 Installation instructions for EMC

3.2.2.1 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. (22 mm^2 wire or thicker is recommended.)

(5) Holes made in the control cabinet must be 10 cm diameter or less. If the holes are 10 cm 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.

3.2.2.2 Connection of power and earth wires

Earthing 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 30 cm 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 highly efficient antenna at high frequency.

(2) The earth wire lead 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 A1S61PEU and A1S62PEU, short between FG and LG terminals by a short jumper wire.

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3.2.2.3 Cables

The cables led from the control cabinet contain a high frequency noise element and outside the control panel these cables act as antenna and radiate noise. The cables connected to input/output modules or special modules which leave the control panel must 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: 2 kV 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 (refer to section 3.2.2.4), the noise immunity level is less than 2 kV

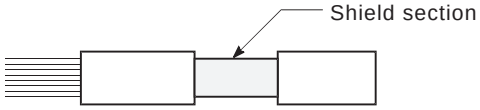
Note) prEN50082-2 specifies the noise resistance level based on the signal wire application
Signals involved in process control: 2 kV
Signals not involved in process control: 1 kV

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.

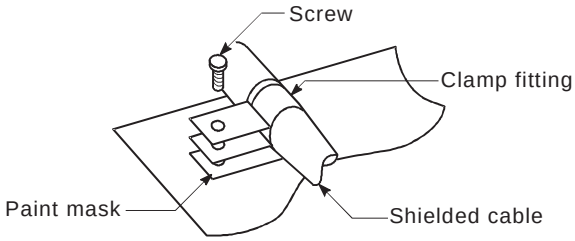
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3.2.2.4 Shield earthing

When a shield of shield 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.

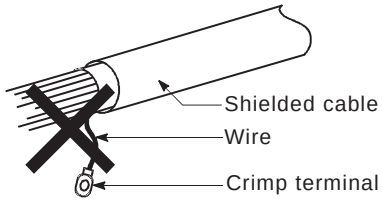


(a) Peal the cable insulation off and expose the shield section.



(b) Sandwich the exposed shield section with the clamp and earth to the control cabinet over a wide area.

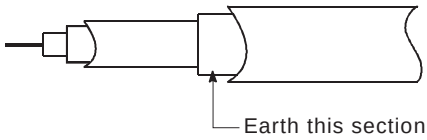
Note) The method of earthing by soldering a wire onto the shield section of the shielded cable as shown below is not recommended. The high frequency impedance will increase and the shield will be ineffective.



3.2.2.5 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 30 MHz or higher can be suppressed by using a triax cable. Earth the outer shield by the method described in Section 3.2.2.4.

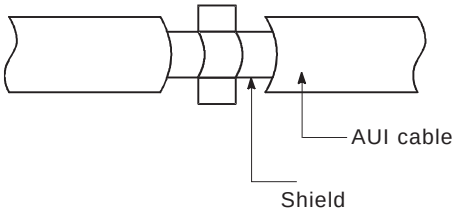


(2) Always mount a ferrite core onto the triaxial cable. Mount the ferrite core near the control cabinet outlet of each cable. Use of the TDK ZCAT3035 ferrite core is recommended.

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3.2.2.6 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.



(2) Always use a triaxial cable for the coaxial cable connected to the A1SJ71E71-B2. The earthing precautions are the same as Section 3.2.2.5.

(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.

3.2.2.7 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 3.2.2.4 if the cables go outside of the control cabinet.

3.2.2.8 Power supply module

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

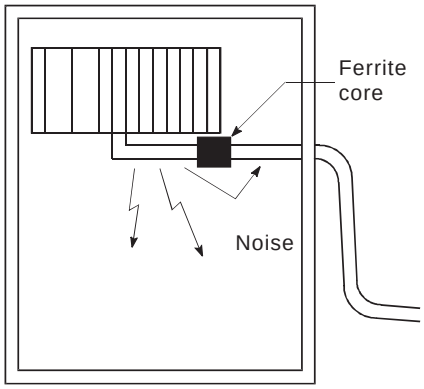
Model	Precautions
A1S61P A1S62P A1S63P (*1)	Always mount one of the filters listed in section 3.2.2.10 to the incoming power supply lines.
A1S61PEU A1S62PEU A1S61PN A1S62PN	None

(*1) If a sufficient filter circuitry is built into a 24 VDC external power supply unit, the noise generated by A1S63P will be absorbed by that filter circuit, so a line filter may not be required.

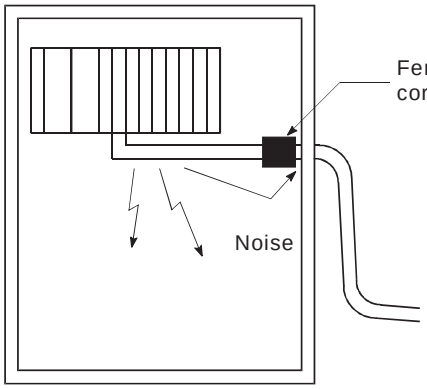
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3.2.2.9 Ferrite core

A ferrite core is effective for reducing noise in the band of 30 MHz to 100 MHz. Mounting of a ferrite core is not necessary except for some particular models described in Section 3.2.2.5 and 3.2.2.6. However if further attenuation 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 forrite, thus the effect will be halved.



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

3.2.2.10 Noise filter (power supply line filter)

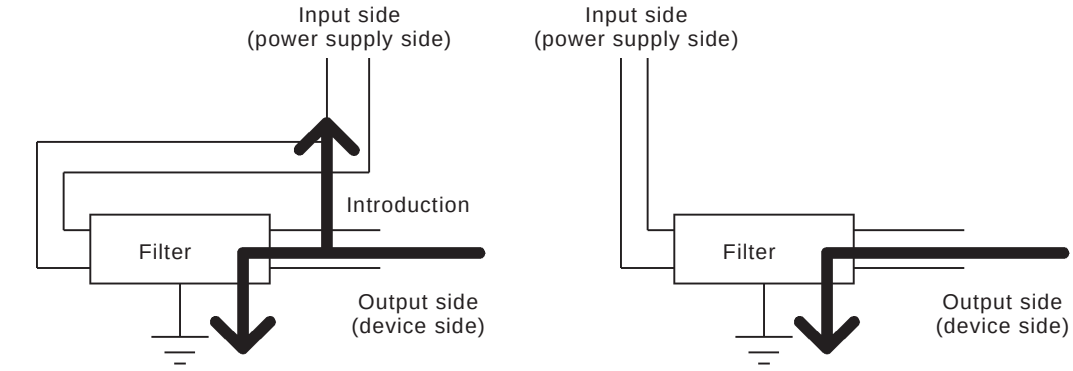
The noise filter (power supply line filter) is a device effective to reduce conducted noise. Except some particular models described in Section 3.2.2.8, installation of a noise filter onto the power supply lines is not necessary. However conducted noise can be reduced if it is installed. (The noise filter is generally effective for reducing conducted noise in the band of 10 MHz 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	3 A	6 A	3 A
Rated voltage	250 V		

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

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



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

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

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

3.3 Requirement to Conform to the Low-Voltage Instruction

The low-voltage instruction, one of the European Instructions, is now regulated.

The low-voltage instruction require 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 3.3.1 to 3.3.7, cautions on installation and wiring of the MELSEC-AnS series PC to conform to the low-voltage instruction regulation are described.

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

3.3.1 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. (See Appendix 4.)

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

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3.3.2 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. (See Appendix 4.)

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. (See Appendix 4.)

For I/O module with 24VDC rated input, a conventional model can be used.

(3) CPU module, memory cassette, base module

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 smaller.

(5) Display device

Use an A870GOT CE compatible model.

3.3.3 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 a thunderbolt. Category I has the lowest durability; category IV has the highest durability.

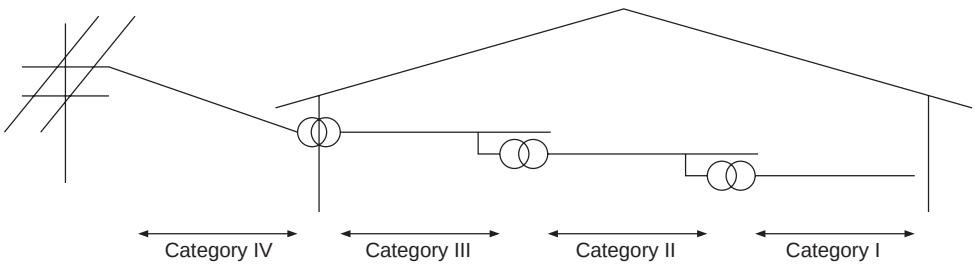


Figure 1. : Installation Category

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

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3.3.4 Control box

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

(1) Electrical shock prevention

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

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

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

(2) Dustproof and waterproof features

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

Pollution level 1:	An environment where the air is dry and conductive dust does not exist.
Pollution level 2:	An environment where conductive dust does not usually exist, but occasional temporary conductivity occurs due to the accumulated dust. Generally, this is the level for inside the control box equivalent to IP54 in a control room or on the floor of a typical factory.
Pollution level 3:	An environment where conductive dust exits and conductivity may be generated due to the accumulated dust. An environment for a typical factory floor.
Pollution level 4:	Continuous conductivity may occur due to rain, snow, etc. An outdoor environment.

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

3.3.5 Module installation

(1) Installing modules contiguously

In AnS 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 make an open slot, be sure to install the blank module (A1SG60).

When using the A1S5aB expansion base with no power supply, attach the cover packaged with the expansion base to the side of the leftmost module.

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3.3.6 Grounding

There are two kinds of grounding terminals as shown below. Either grounding terminal must be used grounded.

Be sure to ground the protective grounding for the safety reasons.

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

Functional grounding : Improves the noise resistance.

3.3.7 External wiring

(1) 24VDC external power supply

For special modules that require a 24VDC I/O module or external power supply, user a model whose 24VDC circuit is intensively insulated from the hazardous voltage circuit.

(2) External devices

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

(3) Intensive insulation

Intensive insulation refers to the insulation with the dielectric withstand voltage shown in table 2.

Table 2: Intensive Insulation Withstand Voltage (Installation Category II, source: IEC664)

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

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3.4 Module Handling

⚠ CAUTION

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

When wiring, be sure there are no foreign substances such as sawdust or wiring debris inside the module. Such debris could cause fires, damages, 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. If the terminal screws are too tight, it may cause falling, short circuit or erroneous operation due to damage of the screws or module.

Install so that the pegs on the bottom of the module fit securely into the base unit peg holes, and use the specified torque to tighten the module's fixing screws. Not installing the module correctry could result in erroneous operation, damage, or pieces of the product falling. If the terminal screws are too tight, it may cause falling, short circuit or erroneous operation due to damage of the screws or module.

Do not directry touch the module's conductive parts or electronic componets. Doing so could cause erroneous operation or damage of the module.

(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.

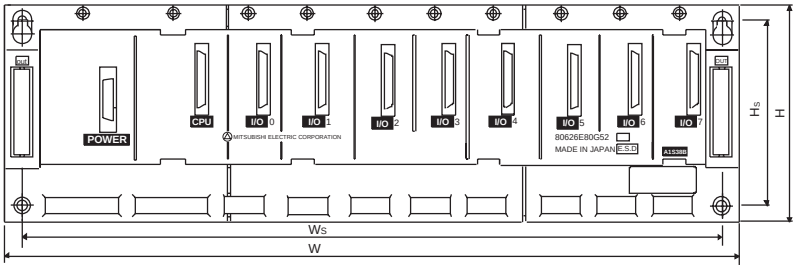
Screw	Tightenig Torque N·cm (kg·cm) [lb·inch]
Module mounting screws (M4)	78 to 118 (8 to 12) [6.9 to 10.4]
I/O module terminal screw (M3.5)	59 to 88 (6 to 9) [5.2 to 7.8]
Power spply module terminal screws (M3.5)	59 to 88 (6 to 9) [5.2 to 7.8]

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3.5 Base Mounting

(1) Mounting dimension

Mounting dimensions of each base unit are as follows:



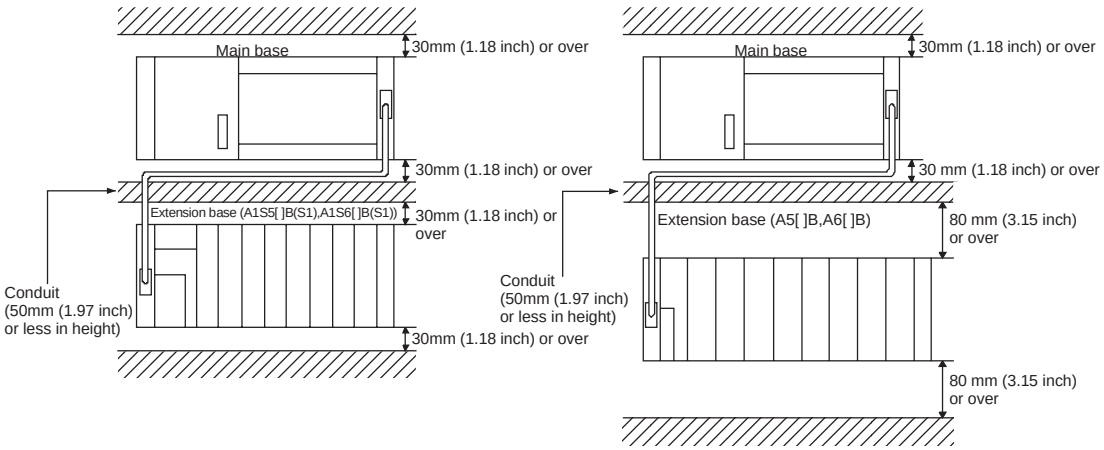
Dimensions mm (inch)

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

(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.

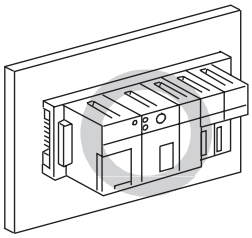
Main base, Extension base (A1S5[ ]B(S1),A1S6[ ]B(S1))	30 mm (1.18 inch) or over
Extension base (A5[ ]B, A6[ ]B)	80 mm (3.15 inch) or over



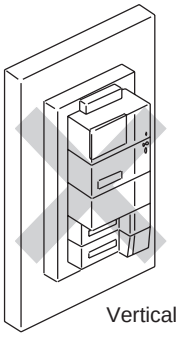
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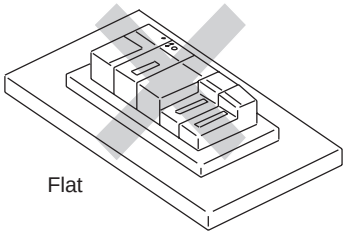
(3) Unit mounting orientation

(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.





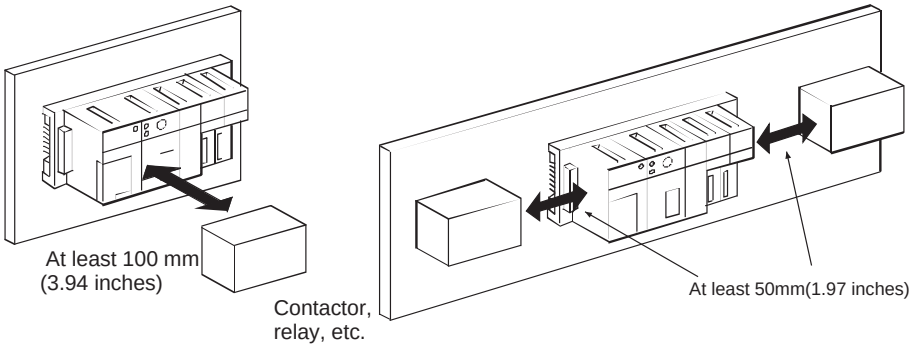
(4) Mount base unit on a flat surface. If the mounting surface is not even, this may strain the printed circuit boards and cause malfunctions.

(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 100 mm (3.94 inches)

Required clearance on the right and left of <R>: at least 50 mm (1.97 inches)



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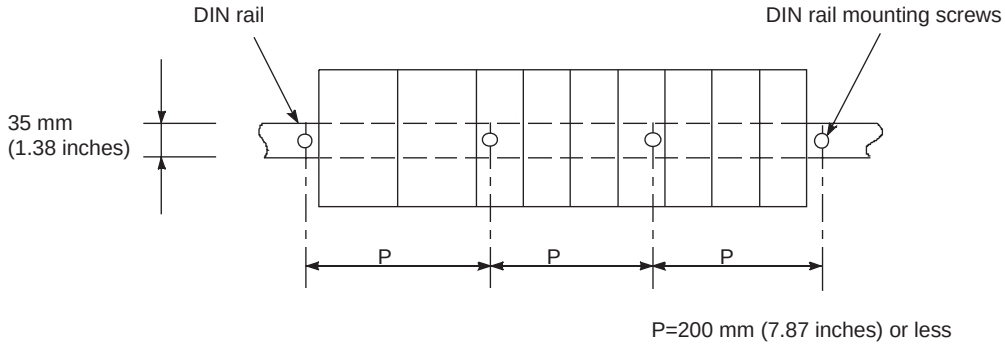
(7) If you want to mount base units on a DIN rail, please note the following points.

(a) Suitable DIN rail types 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 200 mm (7.87 inch) or less in order to ensure that the rail has sufficient strength.



P=200 mm (7.87 inches) or less

3.6 Constructions to Reduce EMI Noise

The following measures are effective to reduce EMI noise generated by equipment which contains the AnS products.

(1) Grouding of a control cabinet

Material of the control cabinet should be steel or equivarent conductor so that radiation of noise is protected. However, if grounding of the cabinet is not good enough, the cabinet body to which noise is inducted becomes an antenna to radiate noise. Therefore, impedance of grouding cable of the cabinet should be as low as possible. Use of a flat braided wire at shortest distance to the earth is recommended to minimize high frequency impedance.

Door of the cabinet should be also connected to the body low impedance wires.

(2) Grouding of AnS

Please be aware of the following points for grouding of AnS.

(a) Connect both LG and FG terminal on power supply modules to the control cabinet at shortest distance. Approx. 20cm.

(b) Use thick wire for the earth connections. 2mm^2 or thicker.

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(3) Process signal cables

Please be aware of the following points for process signal cable installations.

(a) Do not install process signal cables with primary voltage lines.

(b) If process cables are installed outside of the cabinet, use of screen cables is effective for EMI noise reduction.

3.7 Precautions When Unfailure Power System (UPS) is Connected

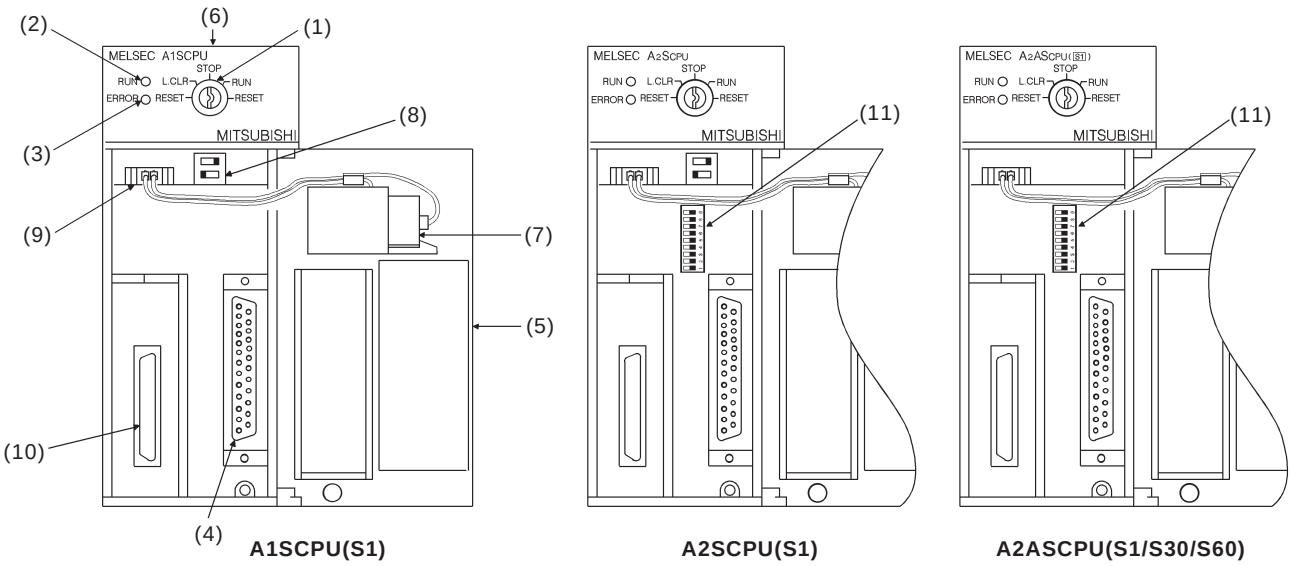
When Unfailure Power System (abbreviated as UPS hereafter) is connected to the CPU system, care must be taken on the following matter:

Use a UPS of inverter power supply type at all time with 5% or less voltage distortion. Do not use a UPS of commercial power supply type.

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3.8 Part Identification of the CPU

This section gives the names of each part of the CPU.



A1SCPU(S1) **A2SCPU(S1)** **A2ASCPU(S1/S30/S60)**

(1) RUN/STOP key switch

RUN/STOP:
Used to start/stop sequence program execution.
L.CLR:
Used to clear the data set in the latch range set in the parameters.

(2) "RUN" LED

ON:
Indicates that the RUN 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 CPU.
- 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.

(3) "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.

(4) RS-422 connector

(5) Cover

(6) Module fixing screws

(7) Battery

(8) Dip switch



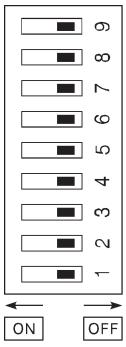
Memory write protect switch ...A1SCPU(S1), A1SCPUC24-R2
(OFF: Memory not protected,
ON : Memory write protected)

I/O control switch
(OFF: Refresh mode, ON: Direct mode)

(9) Battery connector

(10) Memory cassette installing connector

(11) Memory write protect Dip switch

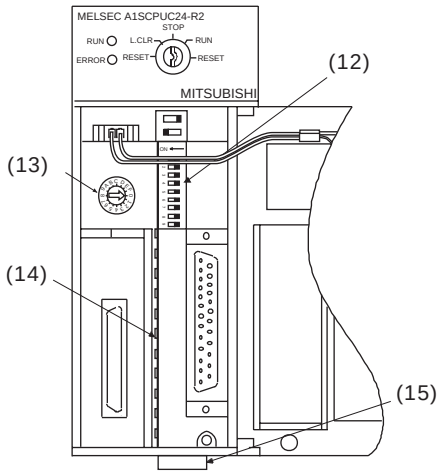


Memory Write Protect Range (kbytes)	Setting Switch	
	A2SCPU A2ASCPU	A2SCPU-S1 A2ASCPU-S1/S30/S60
0 to 16	1: ON	1: ON
16 to 32	2: ON	2: ON
32 to 48	3: ON	3: ON
48 to 64	4: ON	4: ON
64 to 80	Unused	5: ON
80 to 96	Unused	6: ON
96 to 112	Unused	7: ON
112 to 144	Unused	8: ON
144 to 256	Unused	9: ON

Latch clear method

1) Turn the RUN/STOP key switch from the "STOP" position to the "L.CLR" position several times to make the "RUN" LED start flashing.
2) Turn the RUN/STOP switch from the "STOP" position to the "L.CLR" position once more.
3) The latch clear operation is completed when the "RUN" LED goes OFF.

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A1SCPUC24-R2

(12) Transmission specification setting switch



Transmission specification settings (factory setting: all OFF)			
SW	Setting Items	Pisition of Setting Switch	
		ON	OFF
1	Write during RUN enabled/disabled setting	Enabled	Disabled
2	Transmission speed setting	See *1	
3			
4			
5	Data bit setting	8 bit	7 bit
6	Parity bit setting	Set	Not set
7	Even/odd parity setting	Even	Odd
8	Stop bit setting	2 bit	1 bit
9	Sum check setting	Set	Not set

*1 Transmission speed setting

Baud rate (BPS)	300	600	1200	2400	4800	9600	19200
SW05	OFF	ON	OFF	ON	OFF	ON	OFF
SW06	OFF	OFF	ON	ON	OFF	OFF	ON
SW07	OFF	OFF	OFF	OFF	ON	ON	ON

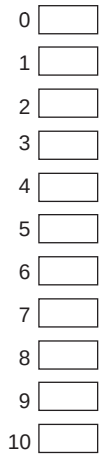
(13) Mode setting switch



MODE

Mode settings (factory setting: 0)	
Mode Setting Switch Number	Setting
0	Unusable
1	Protocol 1
2	Protocol 2
3	Protocol 3
4	Protocol 4
5	No-protocol or printer function
6 to E	Unusable
F	Used for testing the independent module

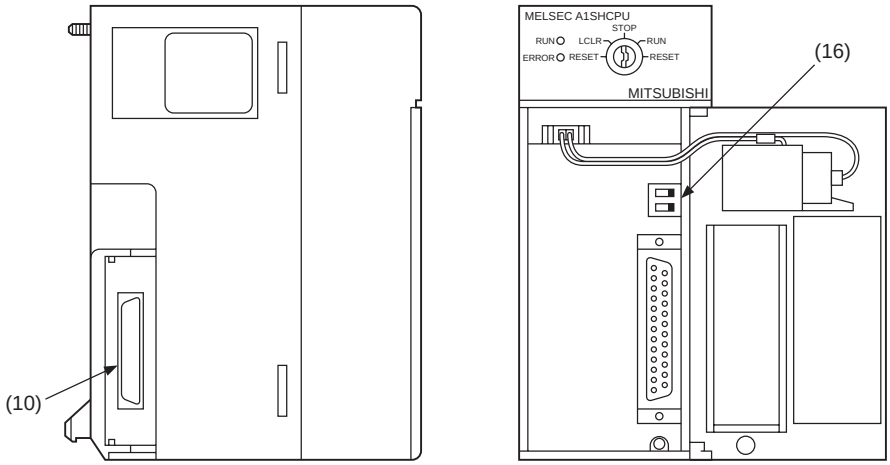
(14) Computer link LED



LED No.	Description	
0	RUN	Normal run Normal: ON Error: OFF
1	SD	Transmitting Flashes during data transmission
2	RD	Receiving Flashes during data receive
3	CPU	Communications with PC CPU Flashes during communications with PC CPU
4	NEU	Neutral Transmission sequence initial state (waiting for ENQ): ON ENQ received: OFF
5	ACK	ACK After sending ACK: ON After sending NAK: OFF
6	NAK	NAK After sending NAK: ON After sending ACK: OFF
7	C/N	Result of PC CPU communications Error: ON Normal: OFF
8	P/S	Parity/Sum check error Error: ON Normal: OFF
9	PRO	Protocol error Communications protocol error: ON Normal: OFF
10	SIO	SIO error Normal: OFF

(15) RS-232C connector

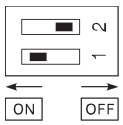
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A1SHCPU/A2SHCPU(S1)

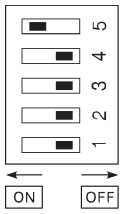
(16) Dip switch

A1SHCPU



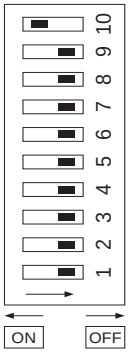
Switch No.	Application
2	Memory write protect setting (RAM and E^{2}PROM) ON: With memory write protection *1 OFF: Without memory write protection
1	I/O select switch setting ON: Direct method OFF: Refresh method

A2SHCPU



Switch No.	Application
5	I/O switch setting ON: Direct method OFF: Refresh method
	I/O select switch setting ON: With memory write protection *1 OFF: Without memory write protection
	Memory write protection range
4	48 to 64k bytes
3	32 to 48k bytes
2	16 to 32k bytes
1	0 to 16k bytes

A2SHCPU-S1



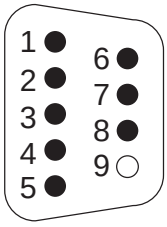
Switch No.	Application
10	I/O select switch setting ON: Direct method OFF:Refresh method
	Memory write protect setting (RAM and E^{2}PROM) ON: With memory write protection *1 OFF:Without memory write protection
	Memory write protection range
9	144 to 192k bytes
8	112 to 144k bytes
7	96 to 112k bytes
6	80 to 96k bytes
5	64 to 80k bytes
4	48 to 64k bytes
3	32 to 48k bytes
2	16 to 32k bytes
1	0 to 16k bytes

*1 When installing the memory cassette, the setting becomes invalid to RAM only.

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3.9 RS232C Interface (A1SCPUC24-R2 only)

(1) RS-232C connector specificatins



Pin Number	Signal Abbreviation	Signal Name	Signal Direction A1SCPUC24-R2↔External Device
1	CD	Receive carrier detection	←
2	RD(RXD)	Receive data	←
3	SD(TXD)	Send data	→
4	DTR(ER)	Data terminal ready	→
5	SG	Signal ground	↔
6	DSR(DR)	Data set ready	←
7	RS(RTS)	Request to send	→
8	CS(CTS)	Clear to send	←

A 9-pin D subconnector is supplied in the same package as the A1SCPUC24-R2 body.

Product name

9-pin Dsub (male), screw mounted
17JE-23090-02-D8A, made by DDK

(2) RS-232C cable

For the RS-232C cable, use a cable that conforms to the RS-232C standard and is no longer than 15 m.

(Recommended cable)

7/0. 127[ ]P HRV-SV.....(RS-232C cable made by Oki Densen)
Specify the number of wire pairs.
For example, if the number of pairs is thirteen:
7/0. 127 13P HRV-SV

(3) Connecting the RS-232C connectors

The standard method for connecting the RS-232C connectors is shown below.
For details on the connection method, refer to the Computer Link Module User's Manual (Com. link func./Print func.).

(a) Example connection to an external device in which the CD signal (pin No.8) can be switched ON and OFF.

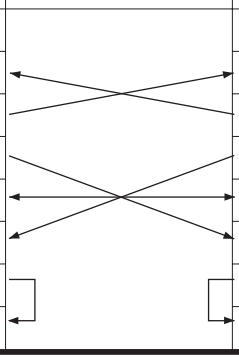
A1SCPUC24-R2		Cable Connections and Signal Directions	External Device
Signal Names	Pin Number		Signal Names
CD	1		CD
RD(RXD)	2		RD(RXD)
SD(TXD)	3		SD(TXD)
DTR(ER)	4		DTR(ER)
SG	5		SG
DSR(DR)	6		DSR(DR)
RS(RTS)	7		RS(RTS)
CS(CTS)	8		CS(CTS)

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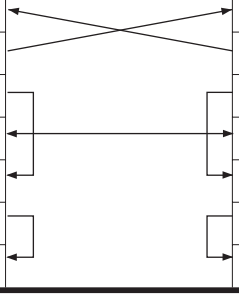
(b) Example connection to an external device in which the CD signal (pin No.8) cannot be switched ON and OFF.

In the case of a connection to a device in which the device's CD signal cannot be switched ON and OFF, set non-execution of the buffer memory address 10BH RS232C CD terminal check.

1) Example connection to an external device in which DC code control or DTR/DSR code control is executed.

A1SCPUC24-R2		Cable Connections and Signal Directions	External Device
Signal Names	Pin Number		Signal Names
CD	1		CD
RD(RXD)	2		RD(RXD)
SD(TXD)	3		SD(TXD)
DTR(ER)	4		DTR(ER)
SG	5		SG
DSR(DR)	6		DSR(DR)
RS(RTS)	7		RS(RTS)
CS(CTS)	8		CS(CTS)

2) Example connection to an external device in which DC code control is executed.

A1SCPUC24-R2		Cable Connections and Signal Directions	External Device
Signal Names	Pin Number		Signal Names
CD	1		CD
RD(RXD)	2		RD(RXD)
SD(TXD)	3		SD(TXD)
DTR(ER)	4		DTR(ER)
SG	5		SG
DSR(DR)	6		DSR(DR)
RS(RTS)	7		RS(RTS)
CS(CTS)	8		CS(CTS)

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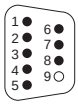
3.10 Self-Loopback Test (A1SCPUC24-R2 only)

The self-loopback test checks whether or not the isolated A1SCPUC24-R2 (not connected to any external devices) will operate correctly.

For details on the self-loopback test, refer to the Computer Link Module User's Manual (Com. link func./Printer func.).

Connect the cables

- Connect cables to the RS-232C connectors.



Pin Number	Signal Abbreviation	Signal Name	Cable Connections
1	CD	Receive carrier detection	
2	RD(RXD)	Receive data	
3	SD(TXD)	Send data	
4	DTR(ER)	Data terminal ready	
5	SG	Signal ground	
6	DSR(DR)	Data set ready	
7	RS(RTS)	Request to send	
8	CS(CTS)	Clear to send	

Set the mode setting switch

- Set the mode setting switch to "F".

Execute the self-loopback test

- Turn the PC CPU power supply ON or reset the PC CPU.

Check the LED display status

Check Item	Display When Normal		Display in Error Status	
PC CPU communications check	C/N	OFF	C/N (LED No.7)	ON
	CPU	Flicker		
RS-232C communications check	SIO	OFF	SIO (LED No.10)	ON
	SD	Flicker		
	RD			

Completed

- Turn the power supply OFF.

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4. WIRING

4.1 General Safety Requirements

DANGER

All external power supply must be turned off during installation and wiring. Unless all phases are cut off from the products, it could cause electrical shock or damage on the products.

Before connecting the power to the products, put terminal covers back onto the terminals.
Otherwise, it could cause electrical shock.

A protective earth terminal which is marked with "⏚ (LG)" must be connected to the earth.
Otherwise, it could cause electrical shock.

All electrical connections should be carried out by trained and competent personnel, and must comply with the requirements of all relevant local and national wiring regulations for installation wiring.

Particular attention is required when preparing the installation wiring for connection to terminal to ensure that hazardous live wiring are adequately separated from the Safety Extra Low Voltage wiring.

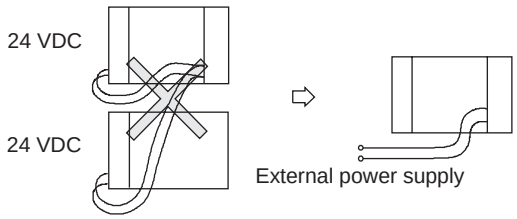
All external power supplies and signals connected to other devices or equipment, of which rated voltage is 24 V or lower, should not compromise the Safety Extra Low Voltage requirements.

A readily accessible switch or circuit breaker should be included in the equipment which contains the product so that the power supply for the product can be disconnected if necessary.

CAUTION

Rated voltage and terminal assignment of each module should be confirmed before wiring is carried out. Connection of different voltage or wrong connection could cause fire and/or malfunction of the products.

Do not supply 24 VDC 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.



Terminal screws should be tighten by the specified torque. Loose connection could cause short-circuit, fire and/or malfunction of the products.

During wiring, be sure that no off-cut of wires or other conductive dusts go into modules. It could cause fire, malfunction and/or failure of the products.

Wiring for modules which provide connector for external wiring should be securely carried out with the specified tools or by soldering. Unsecured connection could cause short-circuit, fire, and/or malfunction of the products.

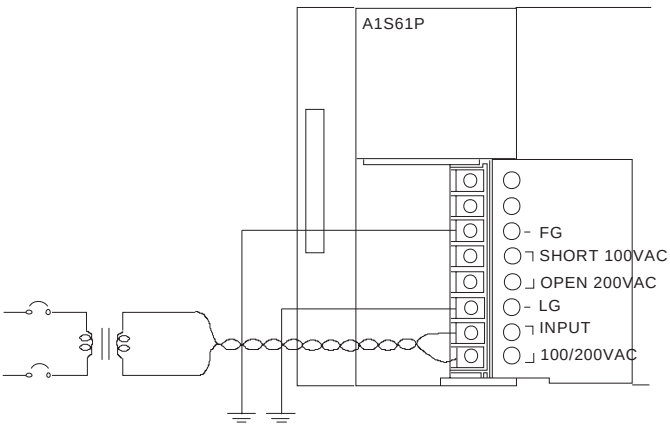
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Do not place process control signal cables and/or communication cables nearby main power cables or actuation power cables so that risk of noise trouble can be minimized. It is recommended to keep a distance of 100 mm or more between those cables.

4.2 Power Supply Modules

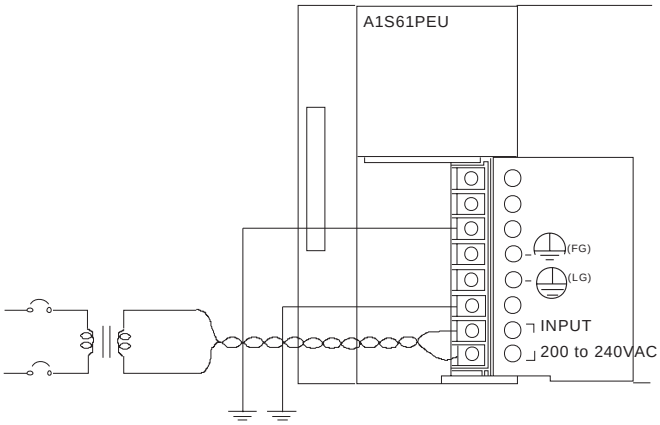
(1) Terminal assignment

(a) A1S61P



Terminal Name	Wiring Instructions
INPUT AC100/200V	Connect 100 to 120/200 to 240 VAC power supply wires to these terminals. Either terminal can be connected to either live or neutral line.
SHORT 100VAC OPEN 200VAC	These are voltage selection terminals. Short the terminals for 100 to 120 VAC input, and open them for 200 to 240 VAC input.
LG	This is a functional earth terminal to be connected to the noise free earth. **WARNING: If this terminal is not connected to the earth, the terminal holds half of the supplied voltage.**
FG	This is a functional earth terminal to be connected to the noise free earth.

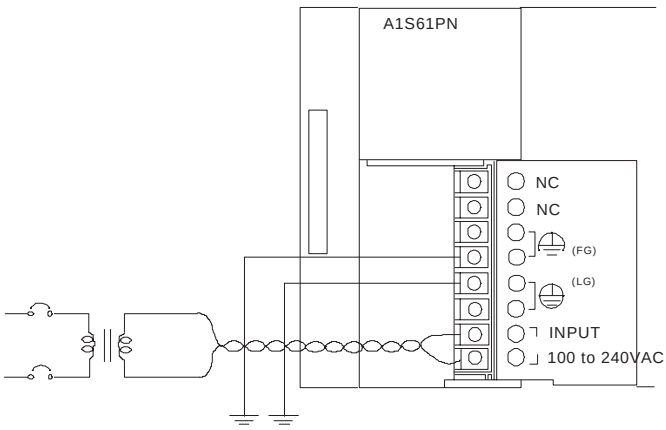
(b) A1S61PEU



Terminal Name	Wiring Instructions
INPUT 200 to 240 VAC	Connect 200 to 240 VAC power supply wires to these terminals. Either terminal can be connected to either live or neutral line.
(LG)	This is a protective earth terminal to be connected to the earth. **WARNING: This terminal must be connected to the earth, otherwise, the secondary circuit cannot be ensured as safe.**
(FG)	This is a functional earth terminal to be connected to the noise free earth.

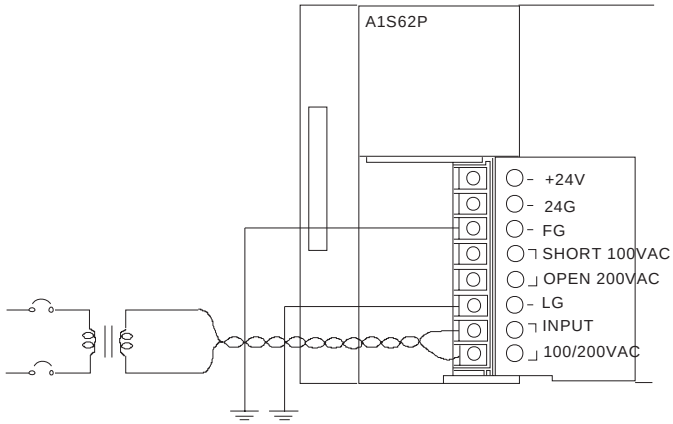
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(c) A1S61PN



Terminal Name	Wiring Instructions
INPUT 100 to 240 VAC	Connect 100 to 240 VAC power supply wires to these terminals. Either terminal can be connected to either live or neutral line.
(LG)	This is a protective earth terminal to be connected to the earth. **WARNING: This terminal must be connected to the earth, otherwise, the secondary circuit cannot be ensured as safe.**
(FG)	This is a functional earth terminal to be connected to the noise free earth.
NC	No Connectable

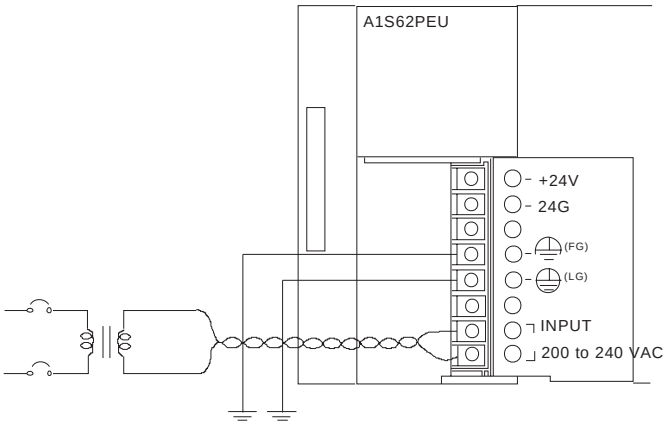
(d) A1S62P



Terminal Name	Wiring Instructions
INPUT 100/200VAC	Connect 100 to 120/200 to 240 VAC power supply wires to these terminals. Either terminal can be connected to either live or neutral line.
SHORT 100VAC OPEN 200VAC	These are voltage selection terminals. Short the terminals for 100 to 120 VAC input, and open them for 200 to 240 VAC input.
LG	This is a functional earth terminal to be connected to the noise free earth. **WARNING: If this terminal is not connected to the earth, the terminal holds half of the supplied voltage.**
FG	This is a functional earth terminal to be connected to the noise free earth.
+24V 24G	These are output terminals of 24 VDC service power which can be used as I/O load power and/or other purposes.

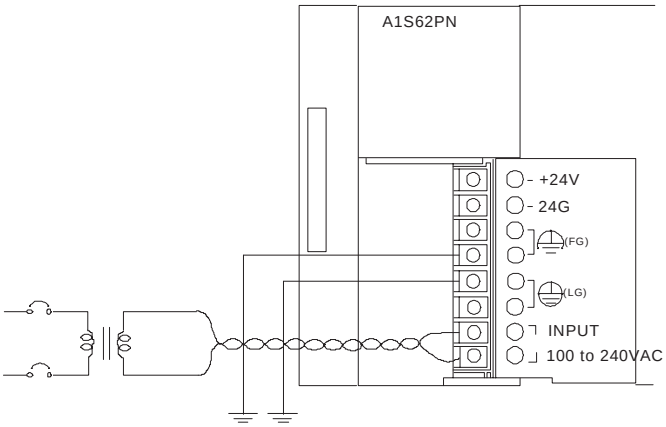
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(e) A1S62PEU



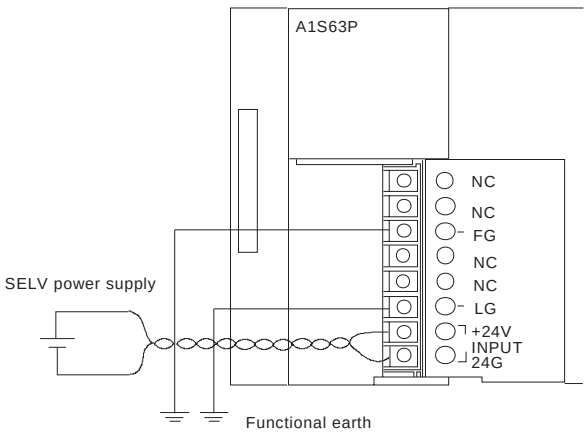
Terminal Name	Wiring Instructions
INPUT 200 to 240 VAC	Connect 200 to 240 VAC power supply wires to these terminals. Either terminal can be connected to either live or neutral line.
(LG)	This is a protective earth terminal to be connected to the earth. **WARNING: This terminal must be connected to the earth, otherwise, the secondary circuit cannot be ensured as safe.**
(FG)	This is a functional earth terminal to be connected to the noise free earth.
+24V 24G	These are output terminals of 24 VDC service power which can be used as I/O load power and/or other purposes.

(f) A1S62PN



Terminal Name	Wiring Instructions
INPUT 100 to 240 VAC	Connect 100 to 240 VAC power supply wires to these terminals. Either terminal can be connected to either live or neutral line.
(LG)	This is a protective earth terminal to be connected to the earth. **WARNING: This terminal must be connected to the earth, otherwise, the secondary circuit cannot be ensured as safe.**
(FG)	This is a functional earth terminal to be connected to the noise free earth.
+24V 24G	These are output terminals of 24 VDC service power which can be used as I/O load power and/or other purposes.

(g) A1S63P

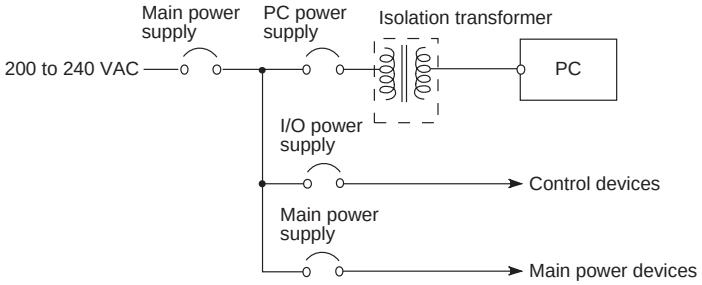


Terminal Name	Wiring Instructions
INPUT +24V 24G	Connect 24 VDC power supply wires to these terminals. A 24 VDC SELV power supply is required.
LG	This is a functional earth terminal to be connected to the noise free earth.
FG	This is a functional earth terminal to be connected to the noise free earth.
NC	No Connectable

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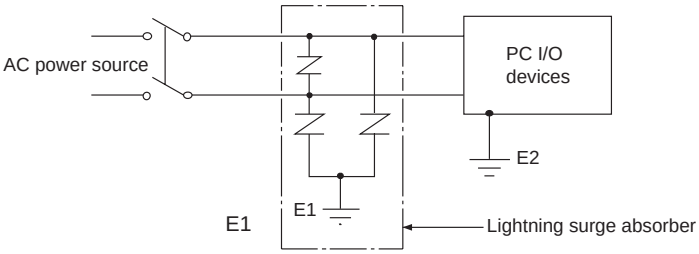
(2) Take following measures so that electrical noise is minimized.

(a) Provide separate wiring for the PC power, I/O devices, and other operating devices as shown below. Further more, insert an isolated transformer if intensive noise is expected.



(b) Power supply wires should be twisted as tightly as possible, and connect to power supply modules at the shortest distance. To minimize voltage drop, use wires as thick as possible.

(c) As a measure against lightning surges, insert surge absorbers as shown below.



POINTS

(1) Provide separator grounding for the lightning surge absorber (E1) and for the PC (E2).

(2) Select a lightning surge absorber of which maximum allowable line voltage is higher than input voltage of the power supply module.

4.3 Digital I/O Modules

The following instructions should be observed for I/O module wiring.

(1) I/O signal wires must be installed at least 100 mm (3.94 inch) away from high-voltage and large-current main power wires so that noise induction from such high power circuit is minimized.

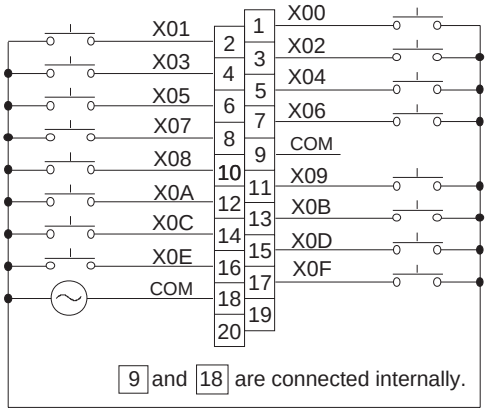
(2) If the I/O signal wires cannot be separately installed from the high power wires, use shielded cables for I/O signal and connect their shield to the earth.

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4.3.1 Input module connections

(1)

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

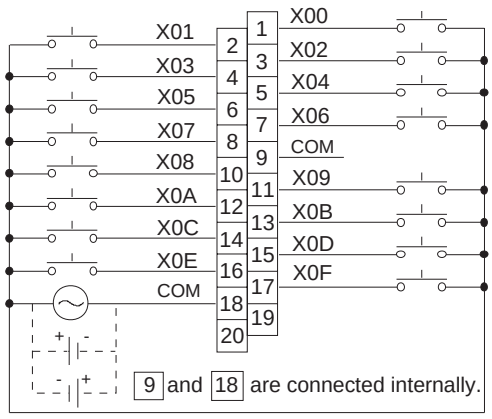


DANGER

Do not touch terminals while the power is supplied.

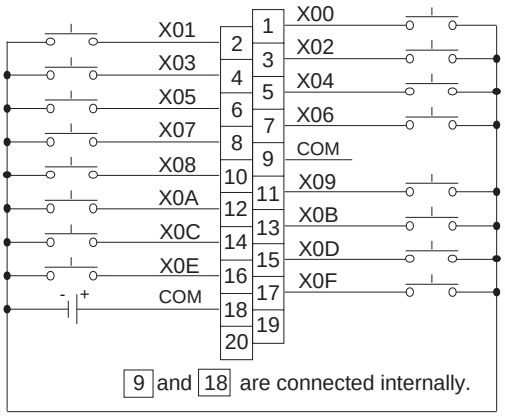
(2)

Model	Rated Input Voltage
A1SX30	12/24 VAC/DC



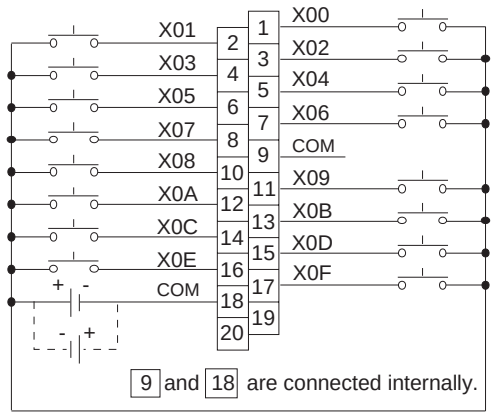
(3)

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



(4)

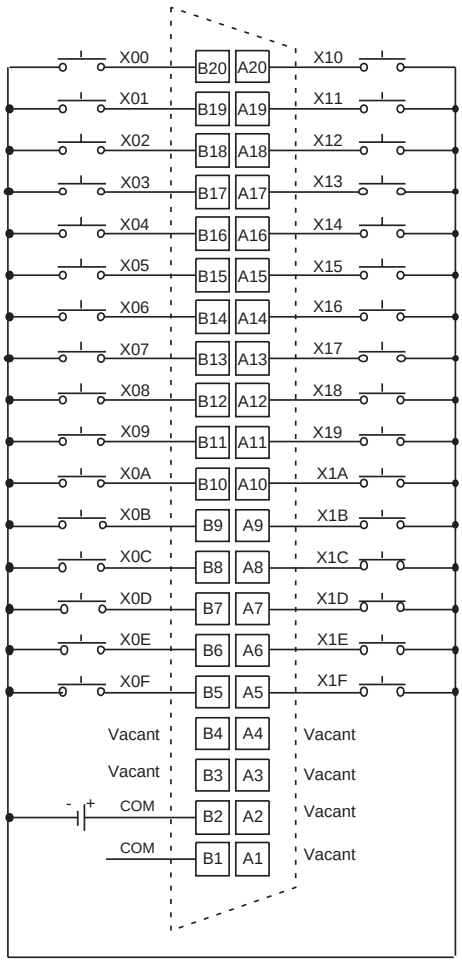
Model	Rated Input Voltage
A1SX80	12/24 VDC
A1SX80-S1	24 VDC
A1SX80-S2	



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(5)

Model	Rated Input Voltage
A1SX41	12/24 VDC
A1SX41-S2	24 VDC
A1SX42	12/24 VDC
A1SX42-S2	24 VDC

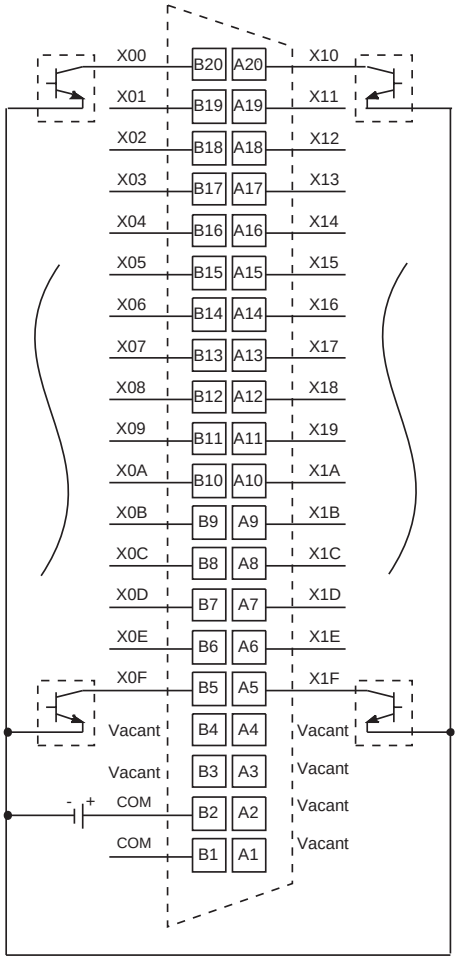


*1 The figure above indicates F (the first half 32 points).
The connections for L (the latter half 32 points) are the same as for F (regard X00 to X1F as X20 to X3F.)
B1 and B2 are connected internally.

*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.

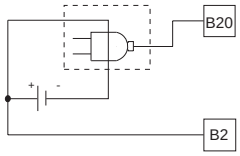
(6)

Model	Rated Input Voltage
A1SX71	5/24 VDC

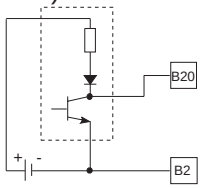


*1 The figure above shows the connections for the open collector (sink) type.
B1 and B2 are connected internally.

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



- Sensor (source) connection

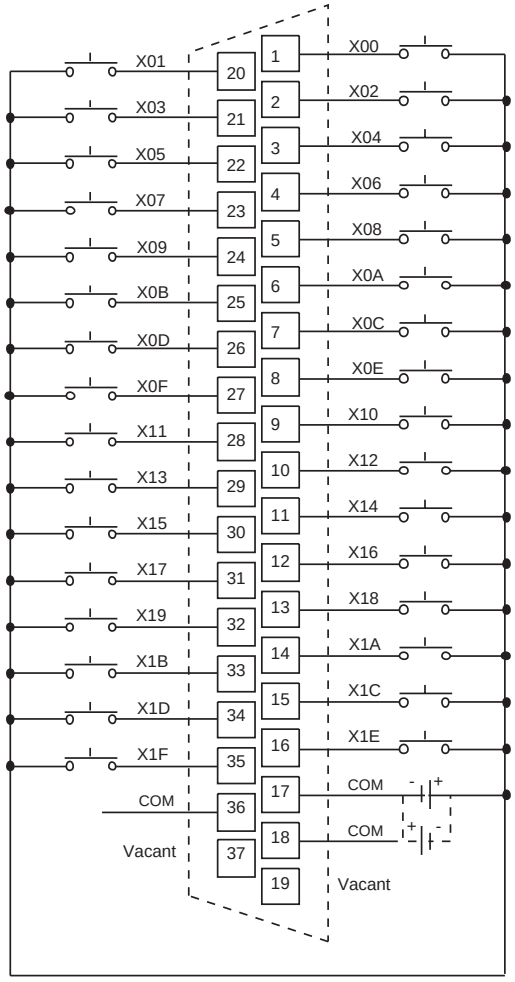


*2 The A and B pin number rows shown above are transposed with respect to the diagram of the A and B rows which is printed on the module. Remember that the A row pin numbers correspond to the B row of the module.

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(7)

Model	Rated Input Voltage
A1SX81	12/24 VDC
A1SX81-S2	24 VDC

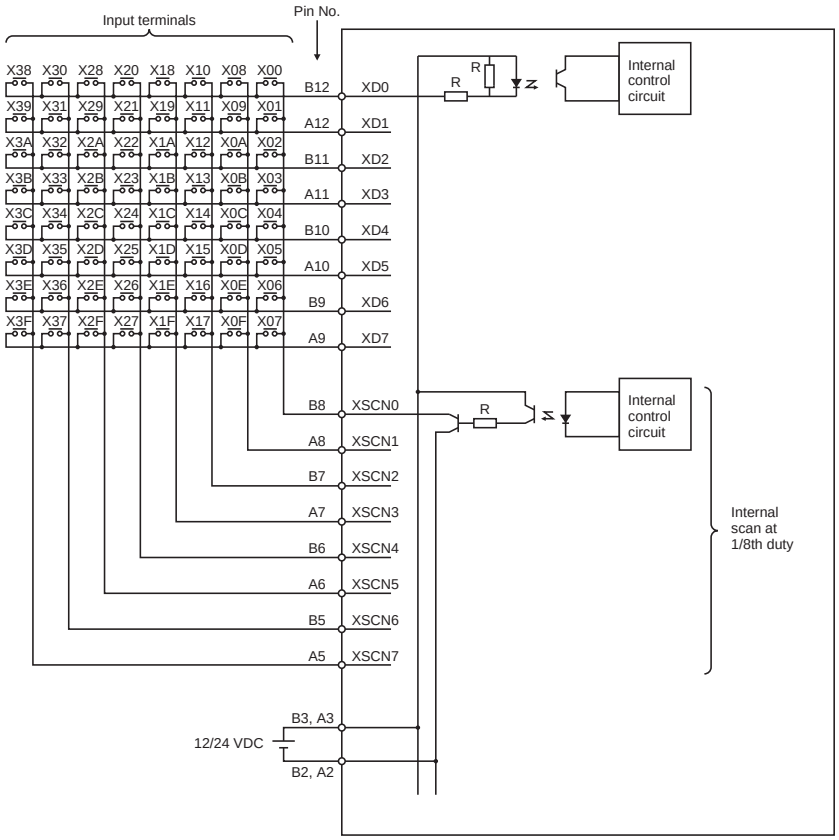


- 17 , 18 and 36 are connected internally.

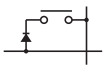
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(8)

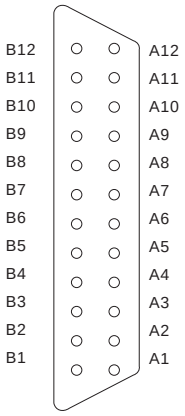
Model	Rated Input Voltage
A1S42X	12/24 VDC



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



Pin Arrangement



Seen from front face of the module

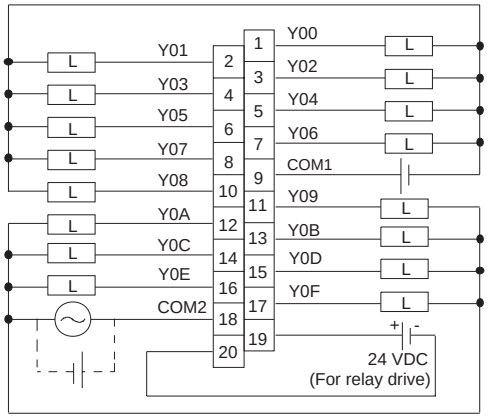
Pin No.	Signal Name	Pin No.	Signal Name
B12	XD0	A12	XD1
B11	XD2	A11	XD3
B10	XD4	A10	XD5
B9	XD6	A9	XD7
B8	XSCN0	A8	XSCN1
B7	SXCN2	A7	XSCN3
B6	XSCN4	A6	XSCN5
B5	XSCN6	A5	XSCN7
B4	Vacant	A4	Vacant
B3	12/24 VDC	A3	12/24 VDC
B2	0V	A2	0V
B1	FG	A1	FG

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4.3.2 Output module connections

(1)

Model	Rated Load Voltage
A1SY10	240 VAC, 24 VDC

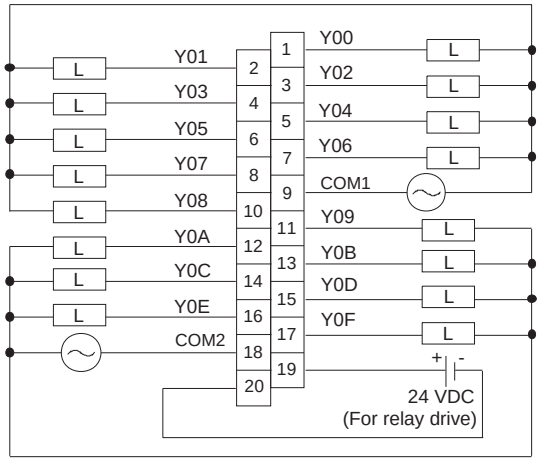


DANGER

Do not touch terminals while the power is supplied.

(2)

Model	Rated Load Voltage
A1SY10EU	120 VAC, 24 VDC

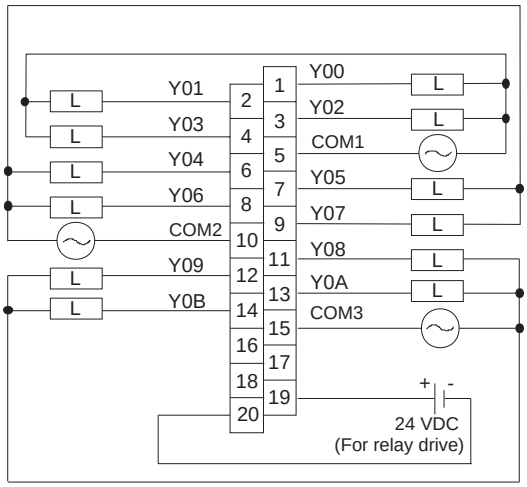


DANGER

Do not touch terminals while the power is supplied.

(3)

Model	Rated Load Voltage
A1SY14EU	240 VAC, 24 VDC

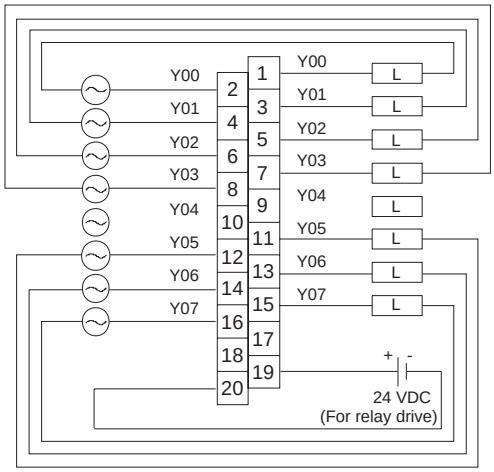


DANGER

Do not touch terminals while the power is supplied.

(4)

Model	Rated Load Voltage
A1SY18A	240 VAC,24 VDC
A1SY18AEU	



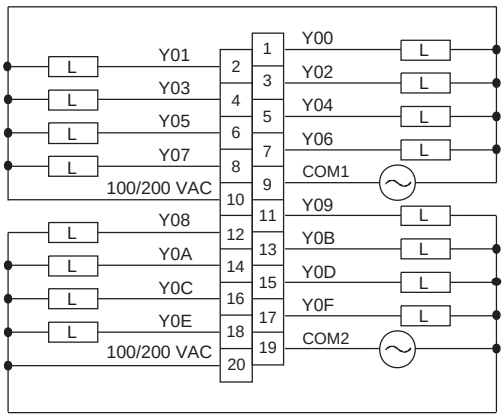
DANGER

Do not touch terminals while the power is supplied.

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(5)

Model	Rated Load Voltage
A1SY22	100/200 VAC

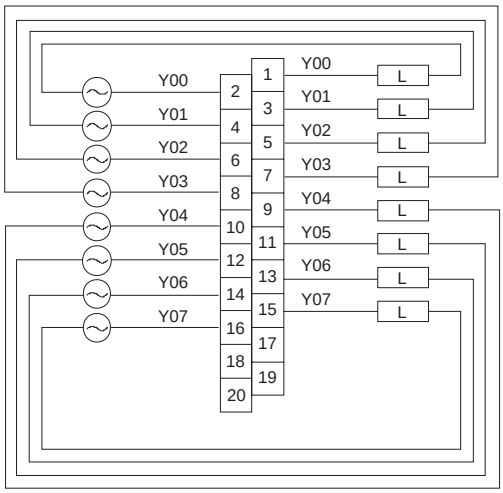


DANGER

Do not touch terminals while the power is supplied.

(6)

Model	Rated Load Voltage
A1SY28A	100/200 VAC

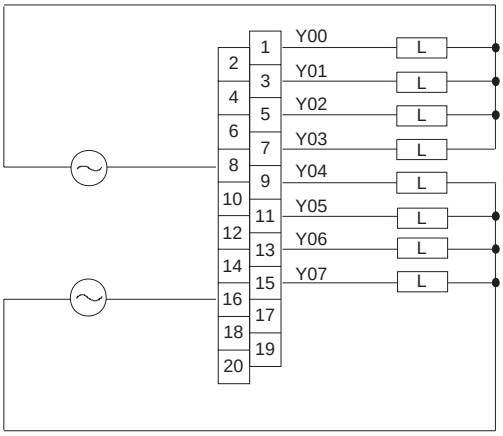


DANGER

Do not touch terminals while the power is supplied.

(7)

Model	Rated Load Voltage
A1SY28EU	100-240 VAC

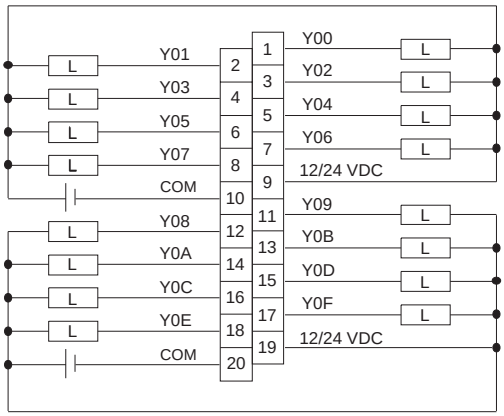


DANGER

Do not touch terminals while the power is supplied.

(8)

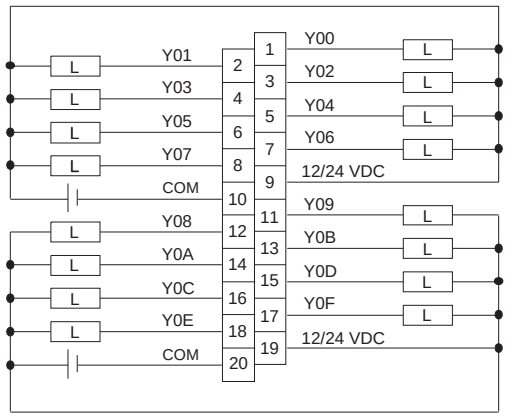
Model	Rated Load Voltage
A1SY40	12/24 VDC



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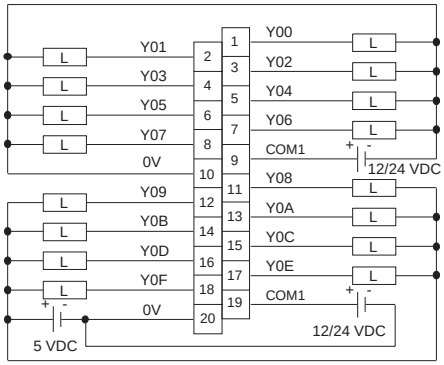
(9)

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



(10)

Model	Rated Load Voltage
A1SY60E	5/12/24 VDC



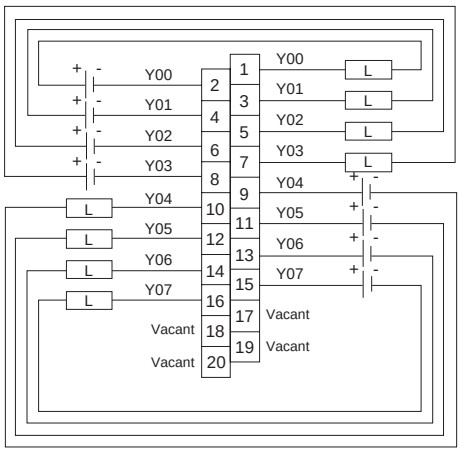
For a load voltage of 12/24 VDC.

For a load voltage of 5 VDC.

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

(11)

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

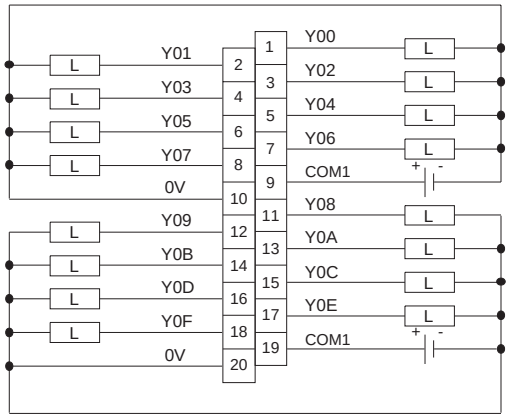


For sink

For source

(12)

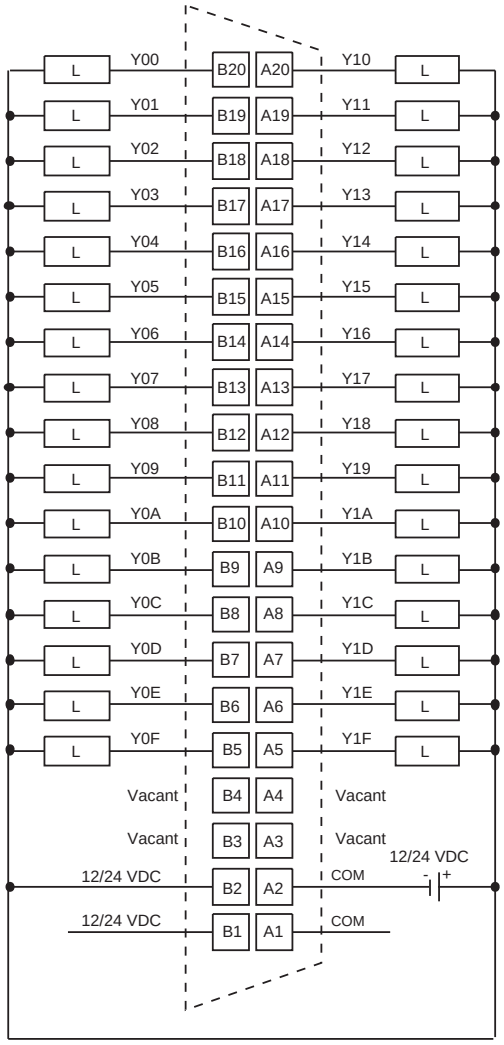
Model	Rated Load Voltage
A1SY80	12/24 VDC



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(13)

Model	Rated Load Voltage
A1SY41	12/24 VDC

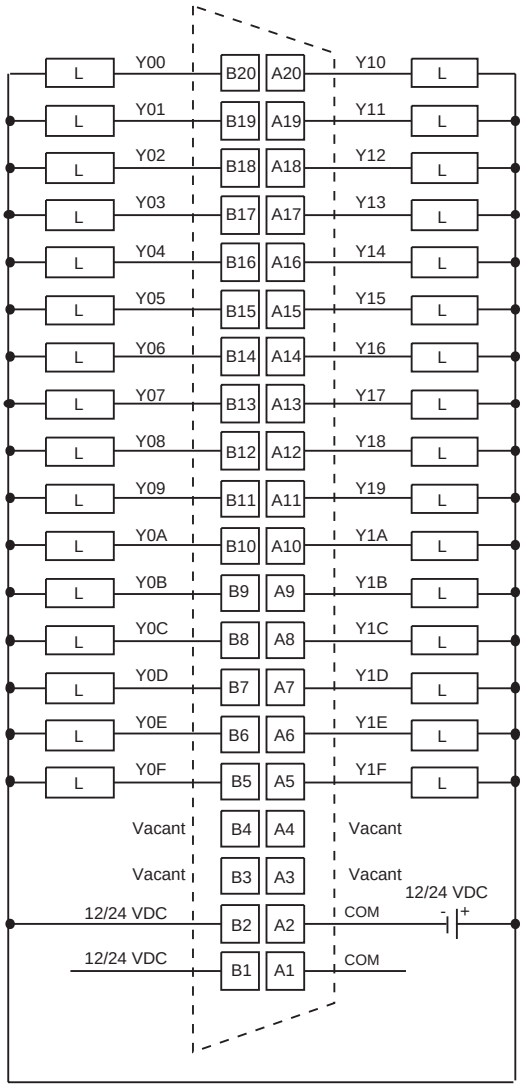


*1 B1 and B2, and A1 and A2 are connected internally.

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

(14)

Model	Rated Load Voltage
A1SY42	12/24 VDC



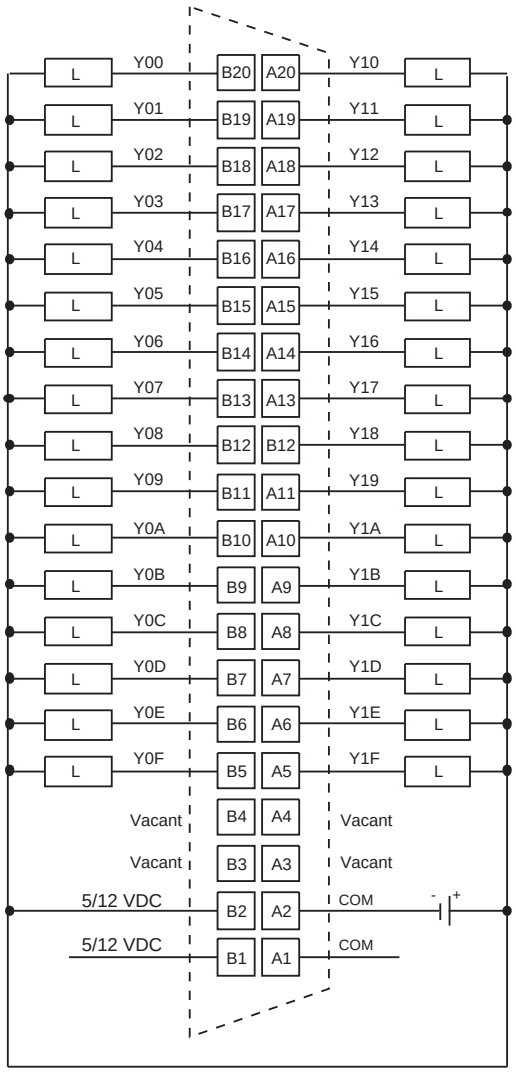
*1 The figure above indicates F (the first half 32 points).
The connections for L (the latter half 32 points) are the same as for F (regard Y00 to Y1F as Y20 to Y3F.)
B1 and B2, and A1 and A2, are connected internally.

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

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(15)

Model	Rated Load Voltage
A1SY71	5/12 VDC

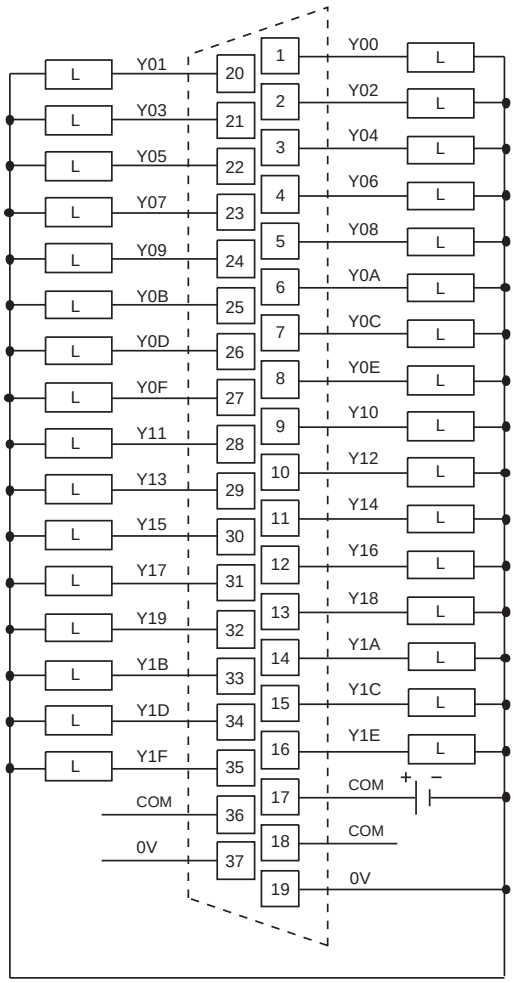


*1 B1 and B2, and A1 and A2, are connected internally.

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

(16)

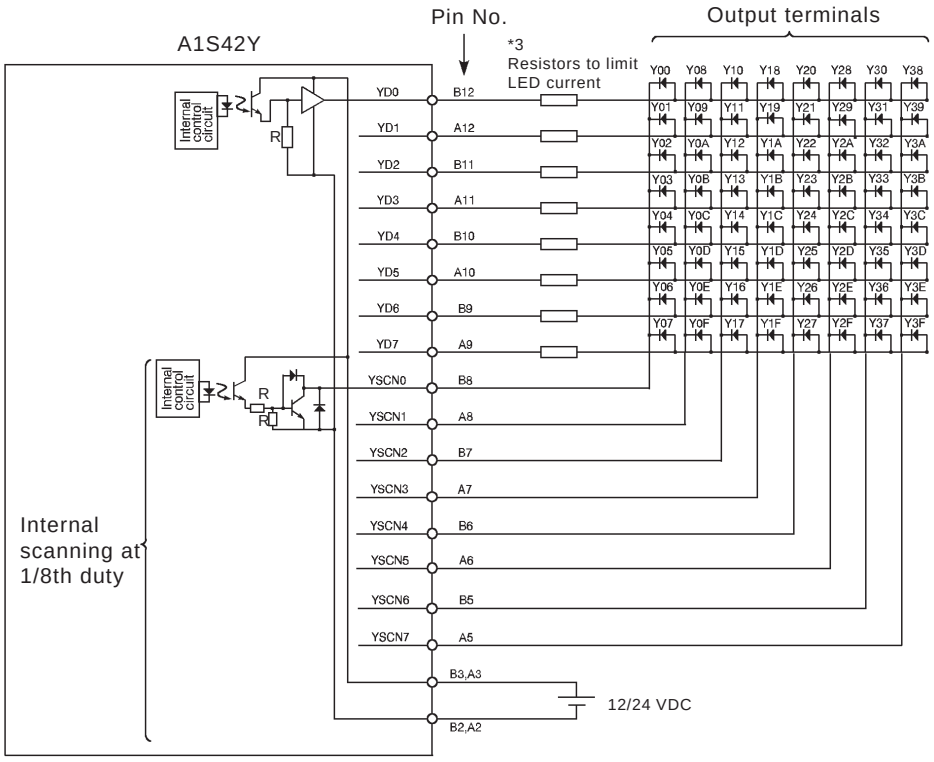
Model	Rated Load Voltage
A1SY81 A1SY81EP	12/24 VDC



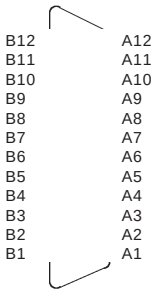
- 17 and 18 and 36, and 19 and 37 are connected internally.

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



Pin Arrangement



Seen from front
face of the module

Pin No.	Signal Name (FH)	Pin No.	Signal Name (FH)
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 also come ON when the external power supply is cut.



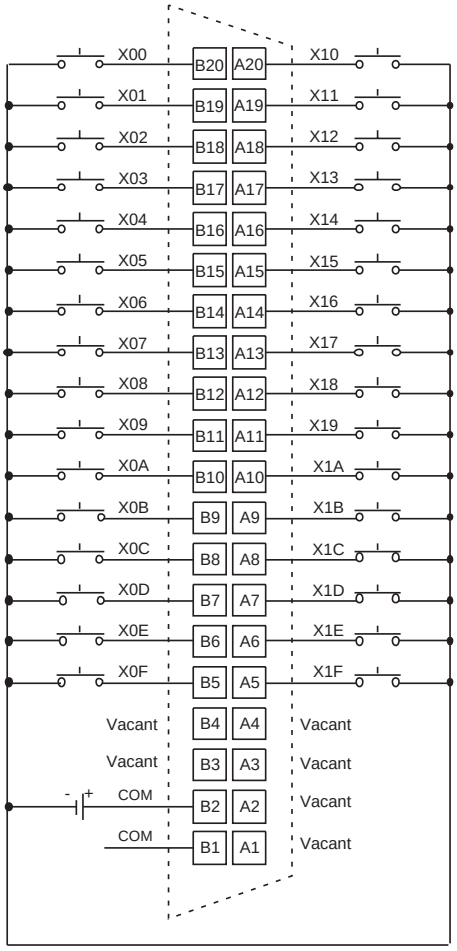
*3 Mount the resistors to limit LED current externally to the A1S42Y.

*4 The power supply voltage (12/24 VDC) 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.

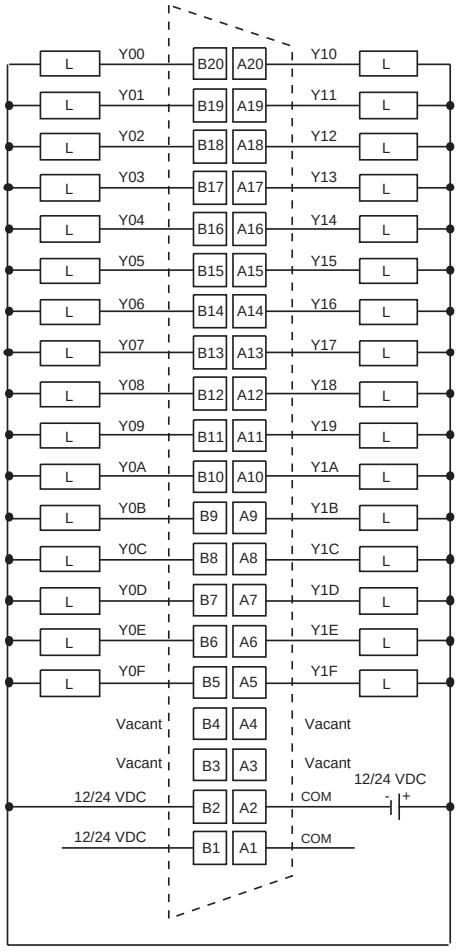
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4.3.3 Input/output composite module connections

(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.

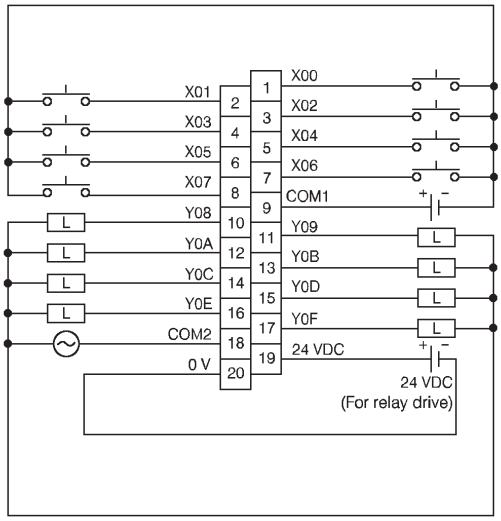
*3 B1 and B2, and A1 and A2, are connected internally.

*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.

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(2)

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

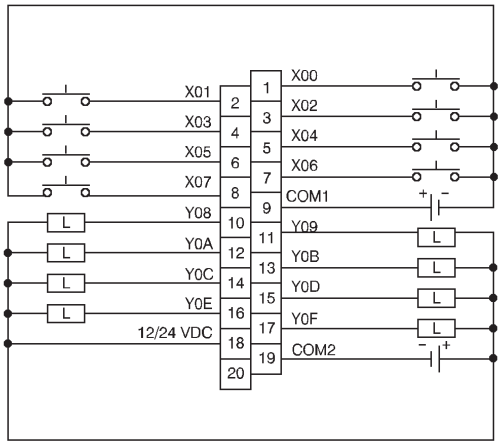


DANGER

Do not touch terminal while the power is supplied.

(3)

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



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5. FAIL-SAFE CONSTRUCTIONS

5.1 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 5.2 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.

5.2 Fail-Safe Circuitry Against to Failure of the PC

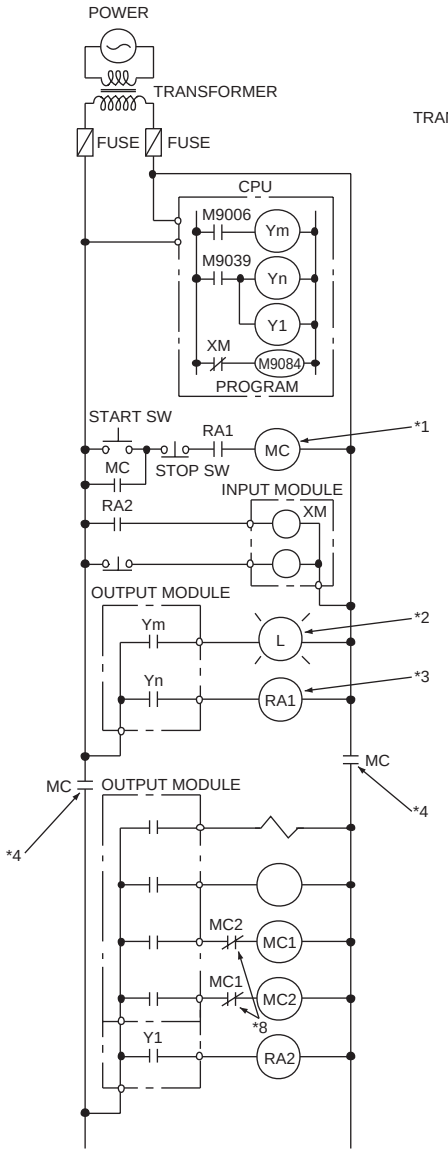
Though Mitsubishi PCs are manufactured under strict quality control, they may cause failure or abnormal operations due to unspecific reasons. To prevent the abnormal operation of the whole system, machine breakdown, and accidents, fail-safe circuitry against to failure of the PC must be constructed outside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

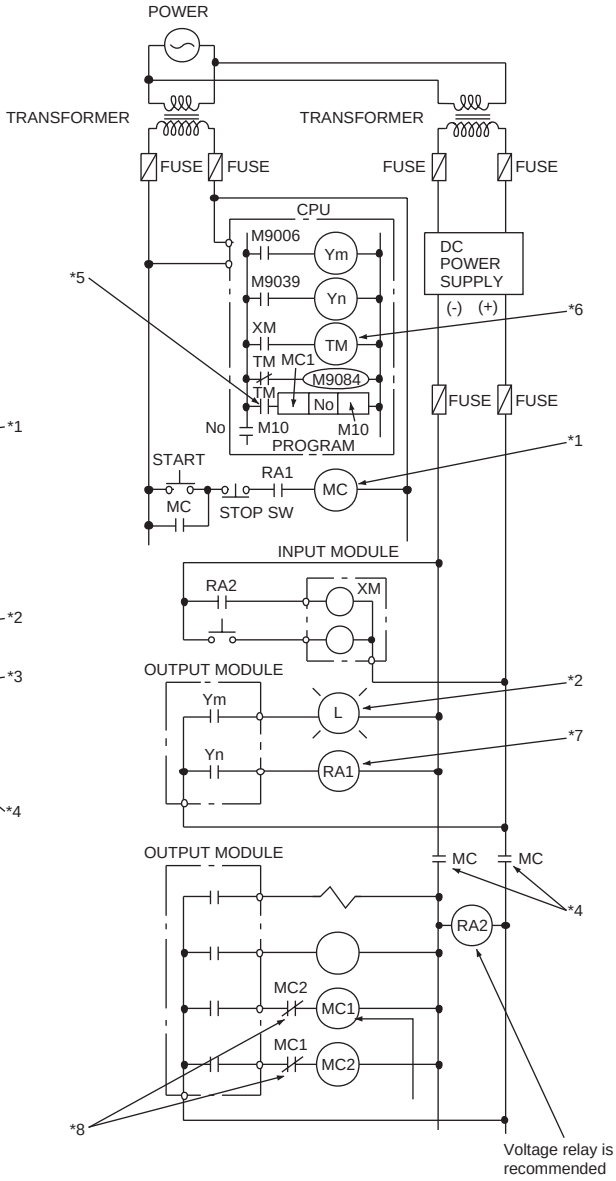
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(1) System design circuit example

ALL AC



Mixed AC and DC



*1: RUN/STOP circuit interlocked with RA1 (run monitor relay)

*2: Low battery alarm (Lamp or buzzer)

*3: RA1 switched ON by M9039 (run monitor relay)

*4: Power to output equipment switched OFF when the STOP signal is given.

In the case of an emergency stop or a stop caused by a limit switch.

*5: Input switched when power supply established.

*6: Set time for DC power supply to be established.

*7: ON when run by M9039

*8: Interlock circuits as necessary.

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

The power-ON procedure is as follows:

For AC

1) Switch CPU to RUN.
2) Set the ON the power.
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.

For AC/DC

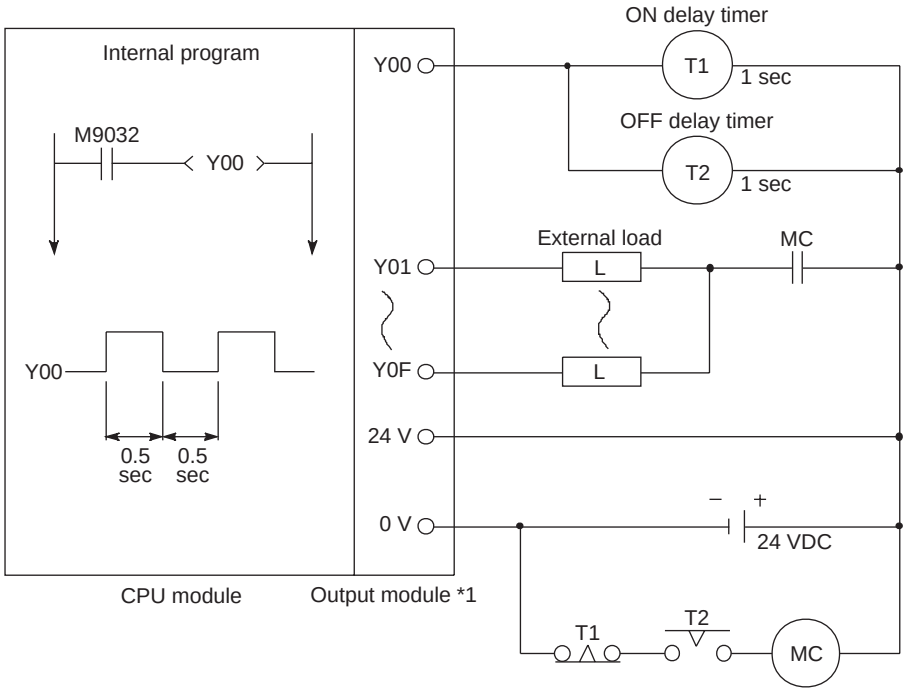
1) Switch CPU to RUN.
2) Set the ON the power.
3) Turn ON the start switch.
4) When DC power is established, RA2 goes ON.
5) Timer (TM) times out after the DC power reaches 100%.

   (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.)

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

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MEMO

6. MAINTENANCE

6.1 General Safety Requirement



DANGER

Maintenance activities for the product should be carried out by trained and competent personnel.

Do not touch terminals while the power is supplied.

Cleaning or screw tightening must be carried out while the power is off.



CAUTION

Do not change program, move switch of RUN, STOP of PAUSE, nor proceed to force output during CPU RUN without confirmation of safety.

Do not disassemble nor modify the products.

Do not mount a module while the power is supplied.

Connect the battery properly. Do not recharge, disassemble, heat, burn, short, nor solder the battery.

Only use A6BAT for battery replacement.

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6.2 Daily Inspection

It is recommended to inspect items listed in the following table to keep the equipment running without trouble.

No.	Check Item		Check Point	Judgment	Corrective Action
1	Base unit mounting conditions		Check for loose mounting screws and cover.	The base unit should be securely mounted.	Retighten screws.
2	Mounting conditions of I/O module, etc.		Check if the module is disengaged or the hook is securely engaged.	The hook should be securely engaged and the module should be positively mounted.	Securely engage the hook.
3	Connecting condition		Check for loose terminal screws.	Screws should not be loose.	Retigten terminal screws.
			Check distance between solderless terminals.	Proper clearance should be provided between solderless terminals.	Correct.
			Check connectors of extension cable.	Connections should not be loose.	Retighten connector mounting screws.
4	CPU module indicator lamps	"POWER" LED	Check that the LED is ON.	ON (OFF indicates an error.)	Refer to User's Manual
		"RUN" LED	Check that the LED is ON during RUN.	ON (OFF or flash indicates an error.)	Refer to User's Manual
		"ERROR" LED	Check that the LED is ON when an error occurred.	OFF (ON when an error occurred.)	Refer to User's Manual
		Input LED	Check that the LED turns ON and OFF.	ON when input is ON. OFF when input is OFF. (Display, which is not as mentioned above, indicates an error.)	Refer to User's Manual
		Output LED	Check that the LED turns ON and OFF.	ON when output is ON. OFF when output is OFF. (Display, which is not as mentioned above, indicates an error)	Refer to User's Manual

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6.3 Periodic Inspection

This section explains the inspection items which are to be checked every six months to one year. This inspection should also be performed when the equipment is moved or modified or the wiring is changed.

No.	Check Item		Checking Method	Judgment	Corrective Action
1	Ambient environment	Ambient temperature	Measure with thermometer and hygrometer. Measure corrosive gas.	0 to 55 °C	When PC is used inside a panel, the temperature in the panel is ambient temperature.
		Ambient humidity		10 to 90 %RH	
		Ambience		There should be no corrosive gases.	
2	Line voltage check.		Measure voltage across 100/200 VAC terminal.	85 to 132 VAC	Change supply power . Change transformer tap.
				170 to 264 VAC	
3	Mounting conditions	Looseness, play	Move the unit.	The module should be mounted securely and positively.	Retighten screws.
		Ingress of dust or foreign material	Visual check.	There should be no dust or foreign material, in the vicinity of the PC.	Remove and clean.
4	Connecting conditions	Loose terminal screws	Retighten.	Connectors should not be loose.	Retighten.
		Distances between solderless terminals.	Visual check.	Proper clearance should be provided between solderless terminals.	Correct.
		Loose connector	Visual check.	Connectors should not be loose.	Retighten connector mounting screws.
5	Battery		Check battery status by monitoring special auxiliary relays M9006 and M9007. Retighten battery if necessary.	Preventive maintenance	If battery capacity reduction is not indicated, change the battery when specified service life is exceeded.

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6.4 Battery Replacement

A lithium battery is used in a CPU module to keep program and data during power failure time. When the voltage of battery comes low, M9006 and/or M9007 internal diagnostic signal come on. Please replace the battery as soon as possible once the signal is activated.

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7. ERROR CODES

When an error occurs while in the PC RUN or RUN state, the self-diagnostic function stores an error indication or error code (including step number) in the special register. This section describes how to read the error code, as well as causes of errors and corrective actions. Table 7.1 shows the error codes for A1SCPU and A2SCPU, Table 7.2 the error codes and detailed error codes for A2ASCPU(S1/S30/S60), and Table 7.3 the error codes and detailed error codes that are detected only in the A1SHCPU and A2SHCPU, respectively.
Take proper action to eliminate the cause of error.

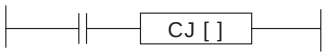
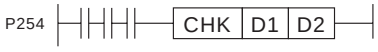
7.1 Error Code List for A1SCPU(S1), A1SCPUC24-R2 and A2SCPU(S1)

Table 7.1 Error Codes

Error Message	Contents of Special Register D9008 (BIN value)	CPU State	Error and Cause	Corrective Action
INSTRUCT CODE ERR.	10	STOP	An instruction code, which cannot be decoded by CPU, is included in the program. (1) A memory cassette containing 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 use of 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.
PARAMETER ERROR	11	STOP	The contents of the memory installed in the PC CPU have been destroyed because of (a) the occurrence of noise, or (b) 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 use of a peripheral device. Make any necessary corrections and write it again to the PC CPU.
MISSING END INS.	12	STOP	(1) There is no END(FEND) instruction in the program.	(1) Write END at the end of the program.
CAN'T EXECUTE (P)	13	STOP	(1) There is no jump destination for plural destinations specified by the CJ, SCJ, CALL, CALLP or JMP instruction. (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 does not match the number of NEXT instructions. (5) The JMP instruction specified between FOR to NEXT has caused the execution to deviate from between FOR to 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 to NEXT.	(1) Read the error step by use of a peripheral device and correct the program at that step. (Make corrections such as the insertion of jump destination or the changing of jump destinations to one.)

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Table 7.1 Error Codes (Continued)

Error Message	Contents of Special Register D9008 (BIN value)	CPU State	Error and Cause	Corrective Action
CHK FORMAT ERR.	14	STOP	(1) There are instructions (including NOP) other than LDX, LDIX, ANDX and ANIX 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.  (6) D1 device (number) of the CHK/D1/D2 instruction 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. 	(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 I/O control uses the direct method.
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 several numbers of pointer I exist 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 and interrupt program or reduce the numbers of I to one. (2) Check if there is 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 (A1SCPU, A1SHCPU)	17	STOP	(1) Parameters and/or sequence programs are not correctly written to the installed memory cassette.	(1) Write parameters and/or sequence programs correctly to the memory cassette (EPROM or E^2PROM). (2) Remove a memory cassette which does not have any parameter and/or sequence program.
RAM ERROR	20	STOP	(1) The PC CPU has checked if write and read operations can be performed properly 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 failure 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 content of special register D9005 by use of a peripheral device. If the content is other than 0, line voltage is insufficient. Therefore, check the power and eliminate the voltage fluctuation.

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Table 7.1 Error Codes (Continued)

Error Message	Contents of Special Register D9008 (BIN value)	CPU State	Error and Cause	Corrective Action
END NOT EXECUTE	24	STOP	(1) When the END instruction is executed, another instruction code has been read 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.
UNIT 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 (a) incorrectly disengaged or has been removed, or (b) a different module has been loaded.	(1) Among special registers D9116 to D9123, the bit corresponding to the module verify error is “1". Therefore, monitor the registers by use of a peripheral device and check for the module with ”1". (2) When the fault has been corrected, reset the PC CPU.
FUSE BREAK OFF	32	STOP (RUN)	(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 the module for a blown fuse can also be done with a peripheral device. Among special registers D9100 to D9107, the bit corresponding to the module of verify error is “1". Therefore, check by monitoring the registers. (3) Check the ON/OFF state of the external power supply for the output load.
CONTROL-BUS ERR.	40	STOP	The FROM and TO instructions cannot be executed. (1) Error of control bus with special-function module.	(1) This is a special-function module, CPU module or base unit hardware fault. Therefore, change the unit and check the defective module. Consult your nearest Mitsubishi representative about the defective module.
SP. UNIT DOWN	41	STOP	When FROM and TO instructions cannot be executed. (1) Control bus error in the special-function module.	This is a special-function module, CPU module or base unit hardware fault. Therefore, change the unit and check the defective module. 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 certain module hardware fault. Therefore, change the module and check the defective module. Consult your nearest Mitsubishi representative about the defective module.
SP. UNIT LAY. ERR.	44	STOP	(1) Three or more computer link modules are installed into a single CPU module. (2) Two or more data modules of MELSECNET(II), MELSECNET/B or MELSECNET/10 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, and vice versa.	(1) reduce the computer link modules to two or less. (2) Use one MELSECNET(II), MELSECNET/B, or MELSECNET/10. (3) Use one interrupt module. (4) Reset the I/O assignment of parameter setting by use of peripheral device according to the actually loaded special-function module.

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Table 7.1 Error Codes (Continued)

Error Message	Contents of Special Register D9008 (BIN value)	CPU State	Error and Cause	Corrective Action
SP. UNIT 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.
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 of the total number of slave stations is 0.	(1) Write the parameters again and check. (2) If this message is displayed again, it 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.)
MAIN CPU DOWN	60	STOP	(1) An interrupt instruction (INT instruction) has been used in a microcomputer program. (2) The CPU has malfunctioned due to noise or some other problem. (3) CPU hardware fault.	(1) INT instructions cannot be used in microcomputer programs: eliminate the INT instruction. (2) Implement countermeasures against noise. (3) Replace the CPU.
BATTERY ERROR	70	RUN	(1) The battery voltage is low. (2) The battery lead is disconnected.	(1) Change the battery. (2) When RAM or power failure compensation is used, connect the battery.

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7.2 Error Code List for A2ASCPU(S1/S30/S60)

Error codes are generated as follows:

Table 7.2 Error Code List

Error Message	Error Code (D9008)	Detailed Error Code (D9091)	Error and Cause	Corrective Action
"INSTRCT CODE ERR."	10	101	(1),(2) An unrecognized instruction code is being used. (3) A CHG instruction was executed when using an A2ASCPU. (4) When using an A2ASCPU(S1), the LED or LEDC instruction was used to operate the LED indicators on the front of the CPU.	(1) Read the error step by peripheral device and correct the program of that step. (2) Check to see if ROM has an undecodable instruction code and replace with ROM which has the correct content. (3) The CHG instruction cannot be used. Delete the ladder block containing the CHG instruction. (4) The LED and LEDC instructions cannot be used to operate the LED indicators on the front of the CPU.
		102	Index is qualifying for a 32-bit constant.	Read the error step by peripheral device and correct the program of that step.
		103	The device specified by extension application instruction is incorrect.	
		104	The program structure of the extension application instruction is incorrect.	
		105	The command name of the extension application instruction is incorrect.	
		106	There is a place where index qualifying with Z or V is made in the program in [LEDA/B|IX] to [LEDA/B|IXEND].	
		107	(1) The device number and set value in the OUT instruction of the timer and counter are qualified by an index. (2) The label number of pointer (P) assigned to a destination head of [CJ], [SCJ], [CALL], [CALLP], [JMP], [LEDA/B|FCALL], [LADA/B|BREAK] instructions or the label number of interrupt pointer (I) assigned to an interrupt program head it is qualified by an index.	
(Checked at STOP → RUN or during instruction execution)		108	Error other than 101 to 107 above	

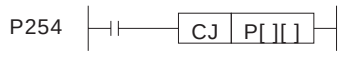
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Table 7.2 Error Code List (Continued)

Error Message	Error Code (D9008)	Detailed Error Code (D9091)	Error and Cause	Corrective Action
"PARAMETER ER-ROR" (Checked at power-on, STOP → RUN, and PAUSE → RUN)	11	111	The capacity settings of the main program, microcomputer programs, file register comments, status latch, sampling trace or extension file registers are not within the usable CPU range.	Read the parameters in the CPU memory and rewrite to the memory after checking and correcting the content.
			A subprogram was used when using an A2ASCPU-S30.	Subprograms cannot be used.
		112	The total of the set capacities of the main program, file register comments, status latch, sampling trace and extension file registers exceed the memory cassette capacity.	Read the parameters in the CPU memory and rewrite to the memory after checking and correcting the content.
		113	The latch range in parameters or the M, L, S setting is incorrect.	
		114	Sum check error	
		115	Parameter remote RUN/PAUSE contacts, the run mode at error occurrence, the annunciator display mode or the STOP → RUN display mode setting are incorrect.	
		116	Parameter MNET-MINI automatic refresh setting is incorrect.	
		117	Parameter timer settings are incorrect.	
		118	Parameter counter settings are incorrect.	
"MISSING END INS." (Checked at STOP → RUN)	12	121	There is no END (FEND) instruction in the main program.	Write END in main program.
"CAN'T EXECUTE (P)" (Checked at the execution of instruction)	13	131	(1) The device number of pointer (P) or interrupt pointer (I) used as the label added to the destination head is duplicated. (2) A CHG instruction was executed when using an A2ASCPU-S30.	(1) Remove the duplicated number of pointer (P) with the destination head and correct so that the number is not duplicated. (2) The CHG instruction cannot be used. Delete the ladder block containing the CHG instruction.
		132	The label of pointer (P) specified by [CJ], [SCJ], [CALL], [CALLP], [JMP], [LEDA/B|FCALL], [LEDA/B|BREAK] instructions is not specified prior to the END instruction.	Read the error step by peripheral device, check the content, and insert destination pointer (P).

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Table 7.2 Error Code List (Continued)

Error Message	Error Code (D9008)	Detailed Error Code (D9091)	Error and Cause	Corrective Action
"CAN'T EXECUTE (P)" (Checked at the execution of instruction)	13	133	(1) Even though the [CALL] instruction is missing, the [RET] instruction has been executed since it is in the program. (2) Even though the [FOR] instruction is missing, the [NEXT] and [LEDA/B|BREAK] instructions have been executed since they are in the program. (3) Since the nesting level for the [CALL], [CALLP], or [FOR] instruction is 6 or deeper, the 6th level nest has been executed. (4) The [RET] or [NEXT] instruction is missing at execution of the [CALL] or [FOR] instruction.	(1) Read the error step by peripheral device, check the content,and correct the program at that step. (2) Nesting level for the [CALL], [CALLP], and [FOR] instructions must be 5 or less.
		134	Even though a subprogram was not set, the [CHG] instruction was found in the program and executed.	Read the error step with the peripheral device, and then elimiinate the [CHG] command circuit.
		135	(1) [LEDA/B|IX] to [LEDA|IXEND] instructions are not written as a set. (2) There are more than 32 sets of [LEDA/B|IX] to [LEDA|IXEND] instructions.	(1) Read the error step by peripheral device, check the content, and correct the program at that step. (2) [LEDA/B|IX] to [LEDA|IXEND] instructions must be less than 33 sets.
"CHK FORMAT ERR." (Checked at STOP/PAUSE → RUN)	14	141	Instructions other than LDX, LDIX, ANDX and ANIX (including NOP) are in the circuit block If the [CHK] instruction.	Refer to the content of the detailed error code, and check and correct programs related to the [CHK] instruction.
		142	There is more than 1 [CHK] instruction.	
		143	The number of contact points in the circuit block of the [CHK] instruction exceeds 150.	
		144	The [LEDA|CHK] and [LEDA|CHKEND] instructions are not written as a set, or there are 2 or more sets.	
		145	The format of the block shown below preceding the circuit block If the [CHK] instruction is abnormal. 	
		146	The D1 device number of the [CHK|D1|D2] instruction does not match the contact device number preceding the [CJP] instruction.	
		147	There is a place where index qualification is made in the check pattern circuit.	

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Table 7.2 Error Code List (Continued)

Error Message	Error Code (D9008)	Detailed Error Code (D9091)	Error and Cause	Corrective Action
"CHK FORMAT ERR." (Checked at STOP/PAUSE → RUN)	14	148	(1) There is more than 1 check pattern circuit of [LEDA|CHK] to [LEDA|CHKEND] instructions. (2) There are 7 or more check condition circuits in [LEDA|CHK] to [LEDA|CHKEND] instructions. (3) The check condition circuits in [LEDA|CHK] to [LEDA|CHKEND] instructions have been created by instructions other than X and Y contact instructions and comparison instructions. (4) The check pattern circuit of [LEDA|CHK] to [LEDA|CHKEND] instructions has been created by 257 or more steps.	Refer to the content of the detailed error code, and check and correct programs related to the [CHK] instruction.
"CAN'T EXECUTE (1)" (Checked at the occurrence of interruption)	15	151	The [IRET] instruction exists outside the interrupt program and has been executed.	Read the error step by peripheral device and erase the [IRET] instruction.
		152	No [IRET] instruction in the interrupt program.	Check and correct use of [IRET] instruction inside or outside interrupt program.
		153	An interrupt module is being used though there is no corresponding interrupt pointer (I). At error occurrence, pointer (I) is stored in D9011.	Monitor special register D9011 by peripheral device, check whether or not there is an interrupt program corresponding to the stored numeric values or whether or not the same number exists for the interrupt pointer (I), and correct.
"RAM ERROR" (Checked at power-on)	20	201	Error of the CPU sequence program storage RAM	Possible hardware fault, consult Mitsubishi representative.
		202	Error of the CPU work area RAM	
		203	CPU device memory error	
		204	CPU address RAM error	
"OPE CIRCUIT ERR" (Cheked at power-on)	21	211	The operation circuit executing index qualification in the CPU is not operating normally.	Possible hardware fault, consult Mitsubishi representative.
		212	The CPU hardware (logic) is not operating normally.	
		213	The operation circuit executing PC sequence program in the CPU is not operating normally.	
"WDT ERROR" (Checked at the execution of END instruction)	22	——	Scan time exceeds watchdog error monitor time. (1) User program scan time has increased. (2) Momentary power failure during program scan has caused apparent scan time to increase.	(1) Check PC program scan time and reduce using the [CJ] instruction. (2) Check for momentary power failures by monitoring special register D9005.

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Table 7.2 Error Code List (Continued)

Error Message	Error Code (D9008)	Detailed Error Code (D9091)	Error and Cause	Corrective Action
"END NOT EXECUTE" (Checked at end of program)	24	241	The entire stored program has been executed without executing the END instruction. (1) The END instruction has been missed (e.g. memory cassette removed during program execution). (2) The END instruction has been corrupted.	(1) Reset CPU If error persists, possible hardware fault, consult Mitsubishi representative.
"MAIN CPU DOWN"	26	——	The main CPU is malfunctioning or broken.	Possible hardware fault, consult Mitsubishi representative.
"UNIT VERIFY ERR." (Checked continuously)	31	——	Verified data is different from the I/O data at power on. (1) An I/O module (including special function module) has been removed or the base unit while the PC power is switched ON, or wrong module is loaded.	Read the detailed error code by peripheral device, check and replace the module corresponding to that numeric value (I/O head number) or monitor special registers D9116 to D9123 by peripheral device, check and replace the module where that data bit is "1".
"FUSE BREAK OFF" (Checked continuously)	32	——	Output module fuse blown.	(1) Check the fuse blown LED indicator of the output module and replace the fuse of the lit module. (2) Read the detailed error code by peripheral device and replace the fuse of the output module corresponding to that numeric value (I/O head number), or monitor special registers D9100 to D9107 by peripheral device and replace the fuse of the output module where that data bit is "1".
"CONTROL-BUS ERR."	40	401	Incorrect FROM/TO instruction execution.	Hardware fault (CPU, special function module and/or base unit). Consult Mitsubishi representative.
		402	Parameter I/O assignment, special function modules cannot be accessed at initial communication. At error occurrence, the head I/O number (the upper 2 digits of a 3 digit expression) of the special function module causing the error is stored in D9011.	
"SP. UNIT DOWN"	41	411	No response from special function unit after execution of FROM/TO instruction.	Hardware error of the accessed special function module. Consult Mitsubishi representative.
		412	During parameter I/O assignment, at initial communication, responses from special function modules have not been returned. At error occurrence, the head I/O number (the upper 2 digits of a 3-digit expression) of the special function module causing the error is stored in D9011.	
"LINK UNIT ERROR"	42	——	A1SJ71AP21/R21, A1SJ71AT21B, AJ71AP21/R21 or AJ71AT21B located in master station.	When using A1SJ71AP21/R21, A1SJ71AT21B, AJ71AP21/R21, or AJ71AT21B modules, set one as the master station and the other as a local station..

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Table 7.2 Error Code List (Continued)

Error Message	Error Code (D9008)	Detailed Error Code (D9091)	Error and Cause	Corrective Action
"I/O INT. ERROR"	43	——	Interrupt signal received with no interrupt module present.	Since a hardware error has occurred in one of the modules, replace the modules one by one to find the faulty module. Consult Mitsubishi representative.
"SP. UNIT LAY. ERR."	44	441	I/O modules allocated in parameter settings by peripheral device have been allocated by special function modules. Or, the opposite settings have been executed.	Reset I/O assignments in parameters by peripheral device according to the loading status of the special function modules.
		442	More than 11 special function modules [except for the AI61 (S1)] which can start interrupts to the CPU have been loaded.	Load less than 10 special function modules [except for the AI61 (S1)] which can start interrupts to the CPU.
		443	More than 1 AJ71AP21/R21s A1SJ71AT21Bs, AJ71AP21/R21s or AJ71AT21Bs has been loaded.	Load only AJ71AP21/R21s, A1SJ71AT21Bs, AJ71AP21/R21s or AJ71AT21Bs.
		444	More than 6 computer link modules, etc., have been loaded to 1 CPU module.	Load no more than 6 computer link modules.
		445	More than 1 AI61 (S1)/A1SI61 has been loaded.	Load only 1 AI61/A1SI61.
		446	The modules MNET/MINI automatic refresh allocated in parameter settings by peripheral device and the names of the modules of actually linked station numbers are incorrect.	Reset the module assignments of the MNET/MINI automatic refresh in parameter settings by peripheral device according to the modules of station numbers actually linked.
		447	The number special function modules which can use dedicated instructions, registered by I/O assignment per one CPU module (number of modules to be loaded) is larger than the specified limit. (The total of computers shown below is 1344 or more.) (Number of loaded AD59 x 5) (Number of loaded AD57(S1)/AD58 x 8) (Number of loaded A1SJ71C24-R2(PRF/R4) x 10) (Number of loaded AJ71C24(S3/S6/S8) x 10) (Number of loaded AJ71UC24 x 10) (Number of loaded AJ71C21(S1) x 29) (Number of loaded A1SJ71PT32-S3 x 125) + (Number of loaded AJ71PT32(S3) x 125) Total > 1344	Decrease the number of loaded special function modules.
		448	(1) More than 4 AJ71LP21/ AJ71BR11 modules are installed. (2) A total of five or more of the following modules is installed: A1SJ71AP21/R21, A1SJ71AT21B, AJ71AP21/R21, AJ71AT21B, AJ71LP21, AJ71BR11.	(1) Load no more than 4 modules. (2) Load a total of 4 or less of the modules.

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Table 7.2 Error Code List (Continued)

Error Massage	Error Code (D9008)	Detailed Error Code (D9091)	Error and Cause	Corrective Action
"SP. UNIT ERROR" (Checked when FROM/TO instruction, or special function module dedicated instruction is specified.)	46	461	There is no special function module in the area specified by the FROM/TO instruction.	Read the error step by peripheral device, check and correct the content of the FROM/TO instruction of that step.
		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) There is no special function module in the area specified by the FROM/TO instruction or there is no corresponding special function 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 by peripheral device, check and correct the content of the special function module dedicated instruction of that step.
"LINK PARA. ERROR"	47	——	(1) The link range is set in parameter settings by peripheral device, and for some reason, the content written to the link parameter area differs from the link parameter content read by the CPU or link parameter is not written. (2) 0 slave stations set.	(1) Re-write link parameters from peripheral programming module to PC. (2) Check station number setting. (3) Persistent error occurrence may be an indication of hardware fault. Consult Mitsubishi representative.
		470	NET/10 network refresh parameter error.	
		471	NET/10 transfer parameter for data link error	
		472	NET/10 routing parameter error	
		473	NET/10 network parameter error (first module)	
		474	NET/10 network parameter error (second module)	
		475	NET/10 network parameter error (third module)	
		476	NET/10 network parameter error (fourth module)	

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Table 7.2 Error Code List (Continued)

Error Message	Error Code (D9008)	Detailed Error Code (D9091)	Error and Cause	Corrective Action
"OPERATION ERROR" (Checked during execution of instruction)	50	501	(1) When using file register (R), operations have been executed exceeding the specified range for the device number and block number of file register (R). (2) The file register is used in the program without executing file register capacity settings.	Read the error step by peripheral device, check and correct the program of that step.
		502	The combination of devices specified by instruction is incorrect.	
		503	The storage data of specified devices or the constants are not within the usable range.	
		504	The quality of settings used for handled data has exceeded the usable range.	
		505	(1) The station number specified by instruction [LEDA/B|LRDP], [LEDA/B|LWTP], [LRDP] or [LWTP] is not a local station. (2) The head I/O number specified by instruction [LEDA/B|RFRP], [LEDA/B|RTOP], [RFRP] or [RTOP] is not a remote station.	

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Table 7.2 Error Code List (Continued)

Error Message	Error Code (D9008)	Detailed Error Code (D9091)	Error and Cause	Corrective Action
"OPERATION ERROR" (Checked during execution of instruction)	50	506	The head I/O number specified by instruction [LEDA/B|RFRP], [LEDA/B|RTOP], [RFRP] or [RTOP] is not a special function module.	Read the error step by peripheral device, check and correct the program of that step.
		507	(1) While the AD57 (S1) or the AD58 is executing instructions by partial processing, other instruction have been output to the same module. (2) While the AD57 (S1) or the AD58 is executing instructions by partial processing, instructions have been output to other AD57 (S1) or AD58 by partial processing.	Read the error step by peripheral device and provide interlock by special relay M9066 or change the program structure and correct. This prevents the execution of other instructions to the same module while executing instructions to the AD57 (S1) or AD58 by partial processing and prevents the execution of instructions to other AD57(S1) or AD58 by partial processing.
		509	(1) An instruction which cannot be executed by remote terminal module connected to the MNET/MINI-S3 was executed to the modules. (2) Another [PRC] instruction has been executed although the number registered in the memory and waiting to be processed has reached 32, and this has caused the mailbox (memory area for instructions waiting for execution) to overflow. (3) A [PIDCONT] instruction has been executed without executing a [PIDINIT] instruction. Or, a [PID57] instruction has been executed without executing a [PIDINIT] instruction or [PIDCONT] instruction.	(1) Read the error step by peripheral device and correct the program, meeting loaded conditions of remote terminal module. (2) Correct by using special register D9081 (number of mailbox vacancies) or special register M9081 (mailbox BUSY signal) to ensure that no registrations can be made in the mailbox (memory area for instructions waiting for execution), and therefore [PRC] instructions cannot be executed, when the mailbox is full. (3) Execute each instruciton, and then, execute the next instruction.
"MAIN CPU DOWN"	60	——	(1) CPU malfunction due to noise. (2) Hardware fault.	(1) Eliminate noise. (2) Hardware fault.
"BATTERY ERROR" (Checked at power-on)	70	——	(1) Battery voltage low. (2) Battery not connected.	(1) Replace the battery. (2) When using RAM memory or the power failure compensation function, load the lead connectors.

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7.3 Error Code List Detected only with A1SHCPU and A2SHCPU(S1)

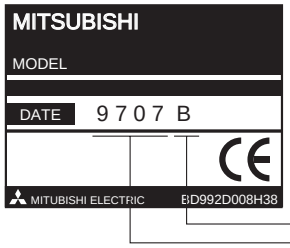
The error codes, error messages, detailed error codes and corrective actions detected only with A1SHCPU and A2SHCPU(S1) are described.
For errors other than above, refer to section 7.1.
CC-Link is the abbreviation for Control & Communication Link.
It will be referred to as CC-Link in this section.

Table 7.3 Error Code List

Error Message	Detailed Error Code (D9092)	Error and Cause	Corrective Action
"INSTRUCT CODE ERR.	101	An error code which the CPU cannot interpret exists in the program.	(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	Wrong device was specified in the extension application instruction.	Read out the steps where the error occurred using a peripheral device, and correct the program.
	104	The program structure of the extension application instruction was wrong.	
	105	Wrong command name was specified in the extension application instruction.	
"SP. UNIT ERROR"	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.
"OPERATION ERROR"	503	The stored data or constant in the specified device is not in the usable range.	Read out the steps where the error occurred using a peripheral device, and correct the program.
	504	The specified number of data to use exceeded the allowed number.	
	509	The number of CC-Link dedicated instructions executed during a scan executed 64.	Reduce the number of CC-Link dedicated instructions executed during a scan to 64 or less.
		A CC-Link dedicated instruction was issued to a master module for which parameters are not set.	Set parameters.

Point

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



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APPENDIX

Appendix 1 Dissimilarities Between A1SHCPU and A1SCPU(S1)

	Item	A1SHCPU	A1SCPU	A1SCPU-S1
1	Processing speed *1	0.33µs	1µs	
2	I/O points	2048 points *2	256 points	512 points
3	File register capacity (R)	Max. 8192 points (R0 to 8191)	Max. 4096 points (R0 to 4095)	
4	Memory capacity	64k bytes	32k bytes	
5	Comment points	Max. 3685 points	Max. 1600 points *3	
6	CC-Link Dedicated Instruction	11 instructions	None	
7	Conventional memory cassette A1SMCA-2KE/8KE/8KP	×	b	b
	New memory cassette A1SNMCA-2KE/8KE/8KP	b	b	b

*1 I/O processing: during refreshing or performing the LD instruction.

*2 Each CPU has 2048 points (X/Y0 to 7FF) of I/O devices, while the actual I/O points are same as in the AnS series. The additional I/O devices can be used for MELSECNET (/B), MELSECNET/MINI, or CC-Link.

*3 The CPU can store 1600 comment points, while the GPP function can create up to 3685 comment points.

Appendix 2 Dissimilarities Between A2SHCPU(S1) and A2SCPU(S1)

	Item	A2SHCPU	A2SHCPU-S1	A2SCPU(S1)
1	Processing speed *4	0.25µs		1µs
2	I/O points	2048 points *5		512 points (1024 points *6)
3	File register capacity (R)	Max. 8192 points (R0 to 8191)		Max. 4096 points (R0 to 4095 *6)
4	Memory capacity	64k bytes	192k bytes	32k bytes (192k bytes *6)
5	CC-Link Dedicated Instruction	11 instructions		None
6	Conventional memory cassette A2SMCA-14KE/14KP	×	b	b
	New memory cassette A2SNMCA-30KE	b	b	b

*4 I/O processing: during refreshing or performing the LD instruction.

*5 Each CPU has 2048 points (X/Y0 to 7FF) of I/O devices, while the actual I/O points are same as in the AnS series. The additional I/O devices can be used for MELSECNET (/B), MELSECNET/MINI, or CC-Link.

*6 When using A2SCPU-S1

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Appendix 3 Dissimilarities Between A2SCPU-S30/S60 and A2ASCPU(S1)

	Item		A2ASCPU-S30	A2ASCPU-S60	A2ASCPU(S1)
1	Memory capacity (built-in RAM)		256k bytes	256k bytes	64k bytes (256k bytes *7)
2	Program capacity	Main	Max. 30k steps	Max. 30k steps	Max. 14k steps
		Sub	None	Max. 30k steps	None
3	No. of input/output points		1024 points	1024 points	512 points (1024 points *7)
4	Max. block No. of expanded file register		Block No. 3	Block No. 16	Block No. 3 (No. 16 *7)
5	Command processing speed	Sequence command	0.20 ms/step	0.15 ms/step	0.20 ms/step
6	Consumed current		0.32A	0.35A	0.32A

*7 When using A2ASCPU-S1

Appendix 4 CE Marking Compatible Modules for Compact PC

Model		Specifications
CPU module	A1SHCPU	256 actual I/O points, 64k byte memory
	A2SHCPU(S1)	512 actual I/O points, 64k byte memory
Power supply module	A1S61PEU	200-240 VAC input, 5 VDC 5A output
	A1S62PEU	200-240 VAC input, 5 VDC 2A 24VDC 0.6A output
	A1S61PN	100-240 VAC input, 5 VDC 5A output
	A1S62PN	100-240 VAC input, 5 VDC 3A 24VDC 0.6A output
Input module	A1SX10EU	16 points, 100-120 VAC input
	A1SX20EU	16 points, 200-240VAC input
Output module	A1SY10EU	16 points, 120VAC output (relay)
	A1SY14EU	12 points, 240VAC output (relay)
	A1SY18AEU	8 points, 240VAC output, independent common (relay)
	A1SY28EU	8 points, 100-240VAC output (Triac)

Appendix 5 CC-Link Dedicated Instructions List

RLPA	Link parameter setting
RRPA	Refresh parameter setting
RIFR	Read from master station buffer memory
RITO	Write to master station buffer memory
RIRD	Read from buffer memory of intelligent remote station
RIWT	Write to buffer memory of intelligent remote station
RIRCV	Read from buffer memory of intelligent remote station (with handshaking)
RISEND	Write to buffer memory of intelligent remote station (with handshaking)
RDGET	Read from the word station link register
RDPUT	Write to the word station link register
RDMON	Monitor the word station link register

* For detailed information and description of CC- Link dedicated instructions, refer to Appendix 1.1 “CC-Link Dedicated Instructions” in the A1SJHCPU/A1SHCPU/A2SHCPU(S1) User’s Manual(IB-66779).

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