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AS Series Hardware Manual

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Chapter 1 Introduction of Products

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1.1 Overview

This manual introduces the programming of the AS Series programmable logic controllers, the basic instructions, and the applied instructions. This manual introduces the electrical specifications for the AS Series programmable logic controllers, the appearances, the dimensions, and etc.

1.1.1 Related Manuals

The related manuals of the AS Series programmable logic controllers are composed of the following.

- AS Series Quick Start
  It guides users to use the system before they read the related manuals.
- AS Series Programming Manual
  It introduces the programming of the AS Series programmable logic controllers, the basic instructions, and the applied instructions.
- ISPSoft User Manual
  It introduces the use of ISPSoft, the programming language (Ladder, IL, SFC, FBD, and ST), the concept of POUs, and the concept of tasks.
- AS Series Hardware Manual
  It introduces electrical specifications, appearances, dimensions, and etc.
- AS Series Operation Manual
  It introduces functions of CPUs, devices, module tables, troubleshooting, and etc.
- AS Series Module Manual
  It introduces the use of special I/O modules. For example, network modules, analog I/O modules, temperature measurement modules, motion control modules, and etc.

1.1.2 Description of Models

Classification	Model Name	Description
Power supply module	AS-PS02	Input: 100~240 VAC, 50/60 Hz Output: 24VDC/2A, 48W (for PLC internal use)
	AS-PS02A	Input: 100~240 VAC, 50/60 Hz Output: 24VDC/1.5A, 36W (for PLC internal use) Output: 24VDC/0.5A, 12W (for external use)
CPU module	AS332P-A	CPU module, PNP output, 2x RS-485 ports, 1x USB port, 1x Micro SD interface, 2x function cards (optional), supporting 32 I/Os (16DI+16DO) and up to 1024 I/Os, the program capacity:128K steps
	AS332T-A	CPU module, NPN output, 1x Ethernet port, 2x RS-485 ports, 1x USB port, 1x Micro SD interface, 2x function cards (optional), supporting 32 I/Os (16DI+16DO) and up to 1024 I/Os, the program capacity:128K steps
	AS324MT-A	CPU module, NPN differential output, 1x Ethernet port, 2x RS-485 ports, 1x USB port, 1x Micro SD interface, 2x function cards (optional), supporting 24 I/Os (12DI+12DO) and up to 1016 I/Os, the program capacity:128K steps

Classification	Model Name	Description
Digital input/output module	AS08AM10N-A	24VDC 5mA 8 inputs Spring-clamp terminal block
	AS08AN01P-A	5 ~ 30VDC 0.5A 8 outputs Sourcing output Spring-clamp terminal block
	AS08AN01R-A	240VAC/24VDC 2A 8 outputs Relay Spring-clamp terminal block
	AS08AN01T-A	5 ~ 30VDC 0.5A 8 outputs Sinking output Spring-clamp terminal block
	AS16AM10N-A	24VDC 5mA 16 inputs Spring-clamp terminal block
	AS16AN01P-A	5 ~ 30VDC 0.5A 16 outputs Sourcing output Spring-clamp terminal block
	AS16AN01R-A	240VAC/24VDC 2A 16 outputs Relay Spring-clamp terminal block
	AS16AN01T-A	5 ~ 30VDC 0.5A 16 outputs

Classification	Model Name	Description
		Sinking output Spring-clamp terminal block
	AS16AP11P-A	24VDC 5mA 8 inputs 5 ~ 30VDC 0.5A 8 outputs Sourcing output Spring-clamp terminal block
	AS16AP11R-A	24VDC 5mA 8 inputs 240VAC/24VDC 2A 8 outputs Relay Spring-clamp terminal block
	AS16AP11T-A	24VDC 5mA 8 inputs 5 ~ 30VDC 0.5A 8 outputs Sinking output Spring-clamp terminal block
	AS32AM10N-A	24VDC 3.2mA 32 inputs MIL connector
	AS32AN02T-A	5 ~ 30VDC 0.1A 32 outputs Sinking output MIL connector
	AS64AM10N-A	24VDC

Classification	Model Name	Description
		3.2mA 64 inputs MIL connector
	AS64AN02T-A	5 ~ 30VDC 0.1A 64 outputs Sinking output MIL connector
Analog input/output module	AS04AD-A	4-channel analog input module Hardware resolution: 16 bits 0~10V, 0/1~5V, -5~+5V, -10~+10V, 0/4~20mA, -20~+20mA Conversion time: 2ms/channel
	AS04DA-A	4-channel analog input module Hardware resolution: 12 bits -10~+10V, 0~20mA, 4~20mA Conversion time: 2ms/channel
	AS06XA-A	4-channel analog input module Hardware resolution: 16 bits 0~10V, 0/1~5V, -5~+5V, -10~+10V, 0/4~20mA, -20~+20mA Conversion time: 2 ms/channel 2-channel analog input module Hardware resolution: 12 bits -10~+10V, 0~20mA, 4~20mA Conversion time: 2ms/channel
Temperature measurement module	AS04RTD-A	4-channe, 2-wire/3-wire RTD Sensor type: Pt100 / Ni100 / Pt1000 / Ni1000 / JPt100 / LG-Ni1000 / Cu50 / Cu100 / 0~300Ω / 0~3000Ω input impedance Resolution: 0.1°C/0.1°F (16 bits) Conversion time: 200ms/channel
	AS04TC-A	4-channe thermocouple Sensor type: J, K, R, S, T, E, N, B and -100~+100 mV Resolution: 0.1°C/0.1°F (24 bits) Conversion time: 200ms/channel
Load cell module	AS02LC-A	2-channel, 4-wire/6-wire load cell sensor Eigenvalue applicable to a load cell: 1, 2, 4, 6, 20, 40, 80

Classification	Model Name	Description
		mV/V Highest precision 1/10000 @ 50ms of the conversion time ADC Resolution : 24 bits Conversion time: 2.5 ~ 400ms (9 options to choose from)
Network module	AS00SCM-A	Serial communication module, 2x communication ports, applicable to communication cards, supporting MODBUS protocols
Remote I/O module	AS00SCM-A + AS-FCOPM	Applicable to AS-FCOPM function cards
Function cards	AS-F232	Serial communication port, RS232, functioning as a master or slave
	AS-F422	Serial communication port, RS422, functioning as a master or slave
	AS-F485	Serial communication port, RS485, functioning as a master or slave
	AS-FCOPM	CANopen communication port, supporting DS301, AS series remote modules and Delta servo systems
	AS-F2AD	2-channel analog input 0~10V (12 bits), 4~20mA (11 bits) Conversion time: 3ms/channel
	AS-F2DA	2-channel analog input 0~10V, 4~20mA (12 bits) Conversion time: 2ms/channel
Programming cable	UC-PRG015-01A (1.5M)	Used for the connection between a PLC and a PC via a mini USB port, applicable for AS332T-A, AS332P-A, and AS324MT-A
	UC-PRG030-01A (3M)	Used for the connection between a PLC and a PC via a mini USB port, applicable for AS332T-A, AS332P-A, AS324MT-A
	UC-PRG030-20A (3M)	Used for the connection between a PLC and a PC via a RJ45 port, applicable for AS332T-A, AS332P-A, AS324MT-A
I/O extension cable	UC-ET010-24B (1M) UC-ET020-24B (2M) UC-ET030-24B (3M)	MIL connector, 40Pin ↔ 40Pin, shielded, applicable for AS32AM10N-A, AS32AN02T-A, AS64AM10N-A, AS64AN02T-A
	UC-ET010-24D (1M)	MIL connector, 40Pin↔ 2x 20Pin, shielded, applicable for

Classification	Model Name	Description
	UC-ET020-24D (2M) UC-ET030-24D (3M)	AS332T-A, AS332P-A, AS324MT-A, AS32AM10N-A, AS32AN02T-A, AS64AM10N-A, AS64AN02T-A
External terminal module	UB-10-ID16A	16 inputs/outputs, 20-Pin MIL connector, applicable for AS332T-A, AS332P-A, AS324MT-A, AS32AM10N-A, AS32AN02T-A, AS64AM10N-A, AS64AN02T-A
	UB-10-ID32A	32 inputs, 40-Pin MIL connector, applicable for AS32AM10N-A, AS64AM10N-A
	UB-10-OR16A	16 relay outputs, 20-Pin MIL connector, NPN, applicable for AS332T-A, AS32AN02T-A, AS64AN02T-A
	UB-10-OR16B	16 relay outputs, 20-Pin MIL connector, PNP, applicable for AS332P-A
	UB-10-OT32A	32 transistor outputs, 40-Pin MIL connector, NPN, applicable for AS32AN02T-A, AS64AN02T-A
Network cables	UC-CMC003-01A (0.3M)	CANopen communication cable, applicable for AS-FCOPM series
	UC-CMC005-01A (0.5M)	CANopen communication cable, applicable for AS-FCOPM series
	UC-CMC010-01A (1M)	CANopen communication cable, applicable for AS-FCOPM series
	UC-CMC015-01A (1.5M)	CANopen communication cable, applicable for AS-FCOPM series
	UC-CMC020-01A (2M)	CANopen communication cable, applicable for AS-FCOPM series
	UC-CMC030-01A (3M)	CANopen communication cable, applicable for AS-FCOPM series
	UC-CMC050-01A (5M)	CANopen communication cable, applicable for AS-FCOPM series
	UC-CMC100-01A (10M)	CANopen communication cable, applicable for AS-FCOPM series
	UC-CMC200-01A (20M)	CANopen communication cable, applicable for AS-FCOPM series

1.2 Characteristics

The characteristics of the AS series CPU module are as follows.

(1) High efficiency

- The AS300 series CPU module adopts a 32-bit high-speed processor. Basic instructions can be executed at 25ns each and the moving instructions at 150ns each. The instructions are executed at a speed of 40k steps/ms (40% of the instructions are basic instructions, and 60% of the instructions are applied instructions.)
- The CPU of the AS300 series is Soc architecture designed; built with 6 high speed counters, the maximum frequency is 200kHz for each counter (differential output models can reach 4mHz); 6-axis high speed position output at 200kHz (differential output models can reach 4mHz).

(2) Supporting more inputs and outputs

- The AS series CPU module supports up to 1024 digital I/Os or 32 I/O modules (any type) or 16 analog I/O modules.
- The AS series can work with SCM communication modules (AS-FCOPM included) to create a remote connection and up to 15 remote modules can be connected.

  Note: For the connected unit of the CPU modues and the connected remoted modules, the I/O points cannot exceed 1024 I/Os or 32 I/O modules (any type) or 16 analog I/O modules.

(3) Multiple I/O modules

- The I/O modules supported by the AS series CPU module are digital input/output modules, analog input/output modules, temperature measurement modules, network modules, and function cards.

Module	Description
Digital input/output module	AS08AM10N-A, AS08AN01T-A, AS08AN01P-A, AS08AN01R-A, AS16AM10N-A, AS16AN01T-A, AS16AN01P-A, AS16AN01R-A, AS16AP11T-A, AS16AP11P-A, AS16AP11R-A, AS32AM10N-A, AS32AN02T-A, AS64AM10N-A, AS64AN02T-A
Analog input/output module (Temperature measurement module)	AS04AD-A, AS04DA-A, AS06XA-A, AS04RTD-A, AS04TC-A

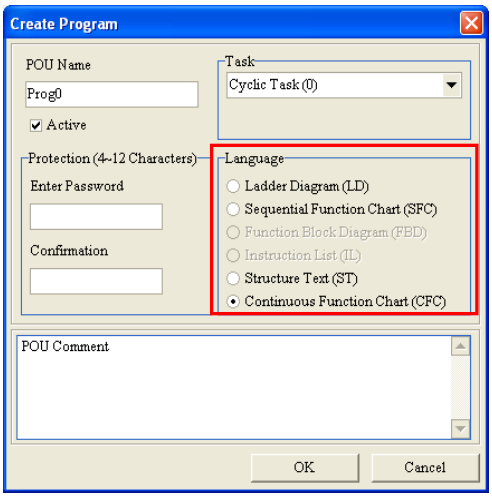
Module	Description
Network module	AS00SCM-A
Communication card	AS-F232, AS-F422, AS-F485, AS-FCOPM
Function card	AS-F2AD, AS-F2DA

(4) Larger program capacity and memory

- The AS series advanced CPU modules (AS332/AS324) have 128k steps of program capacity. 60000 general registers (30000 for specific use and 30000 for programming editing), and 64k words of memory (can be used for storing parameters).

(5) Supporting IEC 61131-3

- The AS series CPU module supports IEC 61131-3.
- The programming languages which are supported are ladder diagrams (LD), sequential function charts (SFC), structured texts (ST), and continuous function chart (CFC).

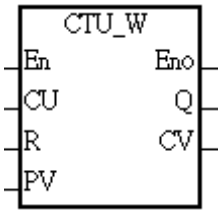


- Users can select a programming language according to their preference and the convenience. The programming languages support one another so that the programs written by different users are related.

(6) Strong function block

- Not only the standard IEC61131-3 function blocks are supported, but also the convenient function blocks provided by Delta Electronics, Inc. are supported. Users can write the program frequently executed in a function block so that the program becomes more structured and can be executed more conveniently.
- The symbol for a function block in a ladder diagram is like an Integrated circuit (IC) in a circuit diagram. Owing to the fact that the ladder diagram is based on the traditional circuit diagram, the operation of a

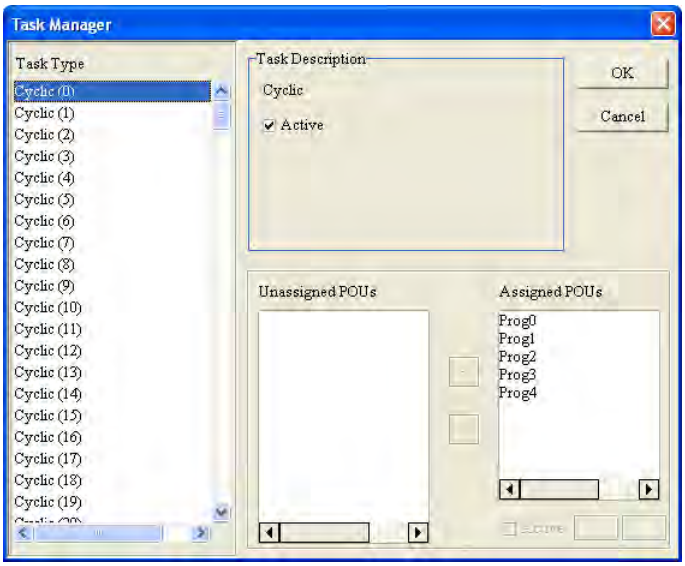
function block is quite similar to the function of an integrated circuit. Users only need to send the signal to the corresponding input of the function block, and they can receive the signal or state which is required. During the whole process, users do not need to consider the processing procedure inside the function block.



- A function block is a program element equipped with the operation function. It is similar to a subroutine, and is a type of POU (Program Organization Unit). It can not operate by itself, and has to be called through the program POU. After the related parameters are transmitted, the function defined by a function block is executed. Besides, the final operation result can be sent to the device or variable used in the superior POU after the execution of the function block is complete.

- The setting of passwords by means of ISPSoft provides the secrecy of function blocks for special businesses. The program inside a function block can not be learned, and the patent of a business will not be infringed.

(7) Task



- The programs can be assigned to 283 tasks at most. Among the 288 tasks, 32 tasks are cyclic tasks, 32 tasks are I/O interrupts, 4 tasks are timer interrupts, 2 tasks are communication interrupts, 1 task is an external 24 V low-voltage interrupt, and 212 tasks are user-defined tasks.

- Users can enable and disable a task during the execution of a program by means of TKON and TKOFF.

(8) Increasing the efficiency of configuring the hardware through an USB cable and ISPSoft

- The AS300 series CPU module provides a standard USB 2.0 interface. USB 2.0 increases the data transfer rate, and decreases the time it takes to download the program, monitor the program and configure the hardware. Besides, users do not need to buy a communication cable for the CPU module. They can use a general USB cable to connect to the AS series CPU module.

(9) Serial control interface with multiple functions

- AS300 series CPU modules provide two RS-485 serial control interfaces, i.e. COM1 and COM2 and can be set as a master or slave.
- Users can use the communication cards to work with 2 extension serial communication ports and to set the port as a master or slave.

(10) High-speed Ethernet communication interface

- AS300 series is equipped with a 10/100 M Ethernet communication interface, and supports emails, webs, and socket services.
- The error message related to the system is sent to users' email boxes immediately. Users do not need to be on the spot to understand the problem.

(11) Memory card

- The memory card has the following functions.

  System backup: The user program, the CPU parameters, the module table, the setting value in the device

  System recovery: The user program, the CPU parameters, the module table, and the setting value in the device

  Parameter storage: The value in the device

  Log storage: The system error log and the system status log

(12) Hot swap

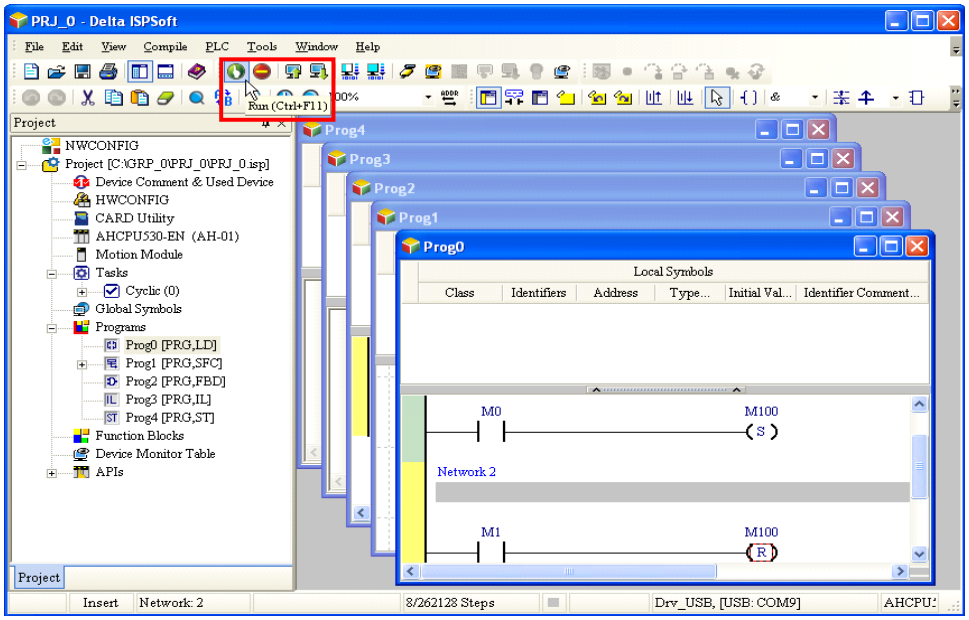
- The AS series I/O modules support the on-line uninterruptible hot swap. When the system runs, users can replace the module which breaks down without disconnecting the module. After the module is replaced, the new module runs normally. Users do not need to set the module manually or switch the state.

(13) Supporting the on-line debugging mode

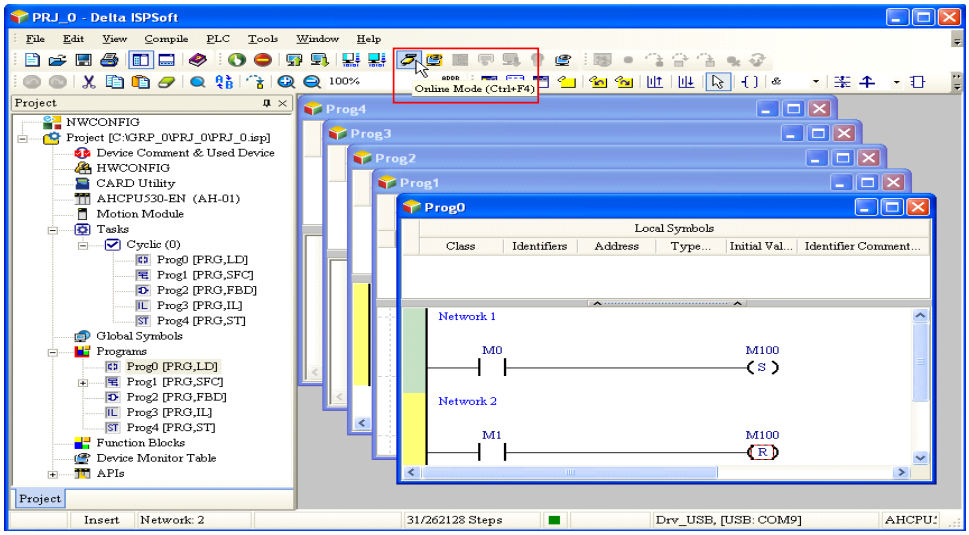
- After a single instruction step has been complete, or after a breakpoint is specified, users can easily find the bug in the program by means of the on-line debugging mode supported by the AS series CPU module.

- If users want to enter the debugging mode, the CPU module must run. After users enable the on-line monitoring function, they have to click  . The debugging screen varies from programming language to programming language, but the same operation applies to these programming languages. For the AS series PLC, structured texts do not support the debugging mode, and sequential function charts support the debugging mode during the action and the transition.

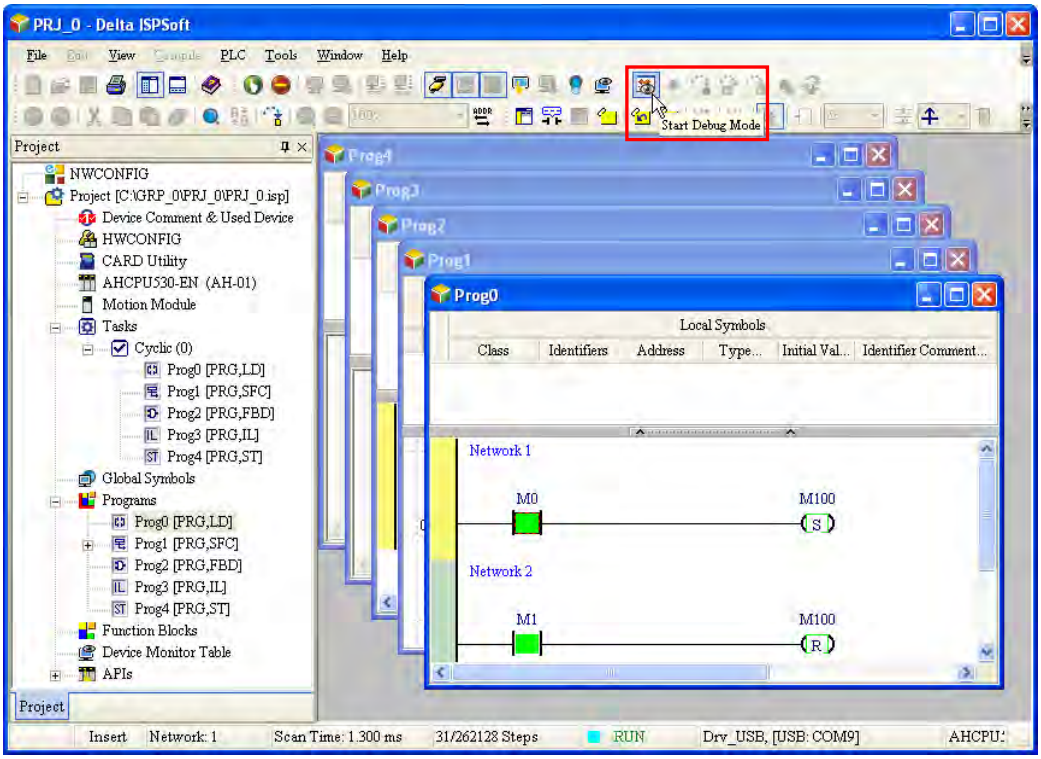
Step 1: Setting the PLC to RUN



Step 2: Entering the on-line mode

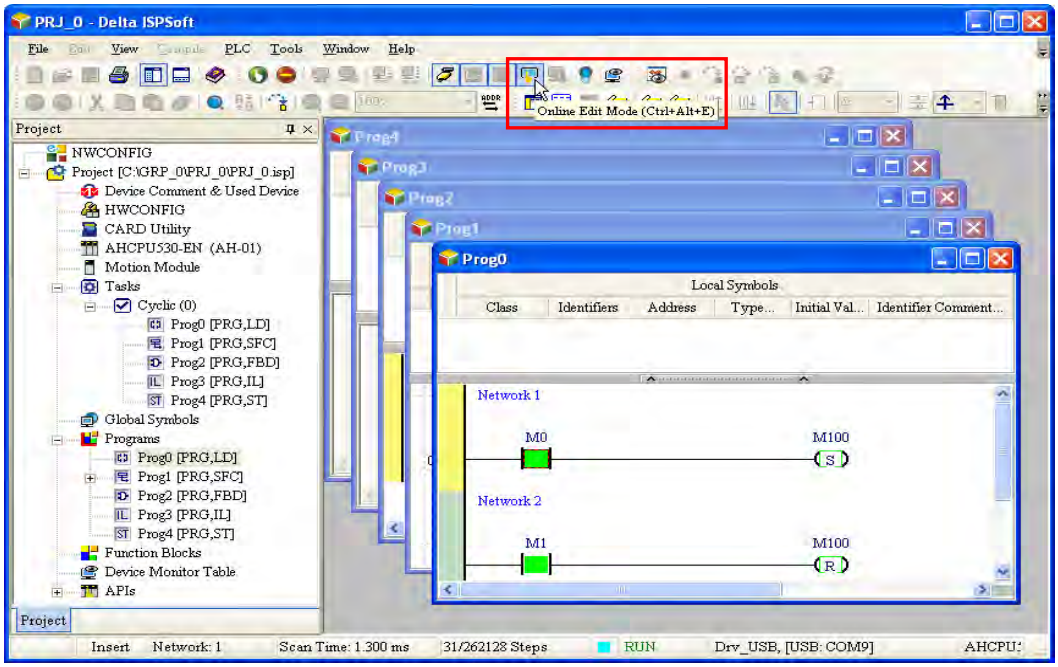


Step 3: Entering the debugging mode

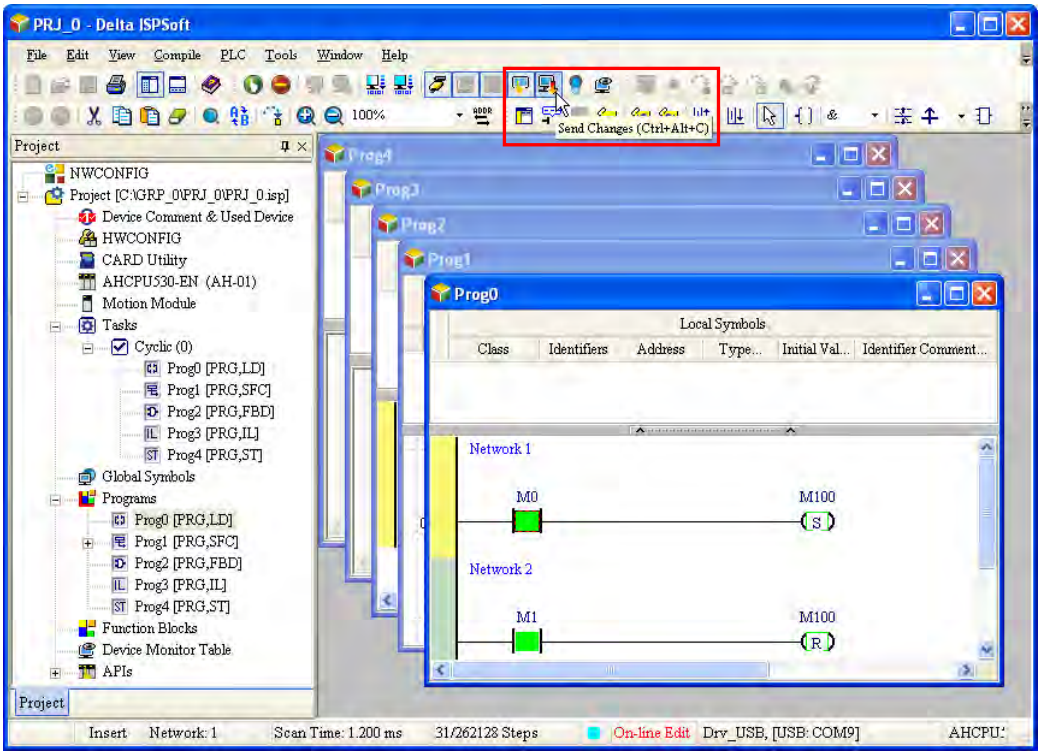


(14) Supporting the on-line editing mode

- When the system runs, users can make use of the on-line editing mode to update the program without affecting the operation of the system.
- When the system is in the on-line monitoring mode, users can enter the on-line editing mode by clicking  .



- After the program is modified and compiled, users can update the program in the CPU module by clicking  .



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Chapter 2 Installing Hardware

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2.1 AS Series Hardware Framework

2.1.1 Component Parts of AS Series Hardware

The AS series programmable logic controller is a medium-to-small type of programmable logic control system. The execution speed and the memory capacity are increased. Besides, the complete program development function of function blocks is supported. In order to meet users' more advanced application requirements, the AS series programmable logic controllers provide more flexible system extension frameworks. Under such system frameworks, users do not need to use several CPU modules to control the system because of the fact that there are too many I/O points or the equipment is too far away. The completeness of the system is retained, and users can be more efficient in developing the projects.

The minimum framework requirement for the AS series system:

To create the AS series system, one CPU module and one power supply module are needed for the operation of the CPU module.

Power supply module + AS series PLC (AS-PS02 + AS332T-A)

Limits for setting up a common framework of the AS PLC system:

Exceeding any one of the limitswill trigger the PLC to send error message.

Limit 1: Up to 32 extension modules can be connected to the PLC. (The power module, CPU module, and remote module are not included.)

Limit 2: The maximum number of the digital I/O point is 1024. (The built-in digital I/O points of the CPU module are included.)

Limit 3: Up to 16 analog modules can be connected to the PLC. (AD, DA, XA, RTD, TC and LC are included.)

Limit 4: Up to 4 communication module (AS00SCM) can be connected to the PLC.

Limit 5: Up to 15 remote modules (AS00SCM+AS-FCOPM) can be connected to the PLC. And the remote modules can work with no more than 8 digital/analog modules.

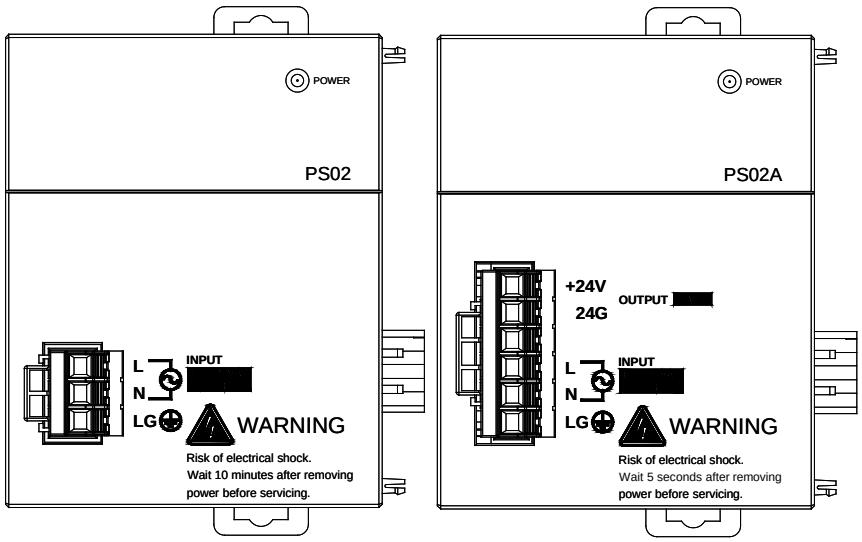
Limit 6: Remote modules can only connect to digital/analog module but not to communication or position control modules.

2.1.1.1 Necessary Components

A complete AS Series system consists of the following four necessary components.

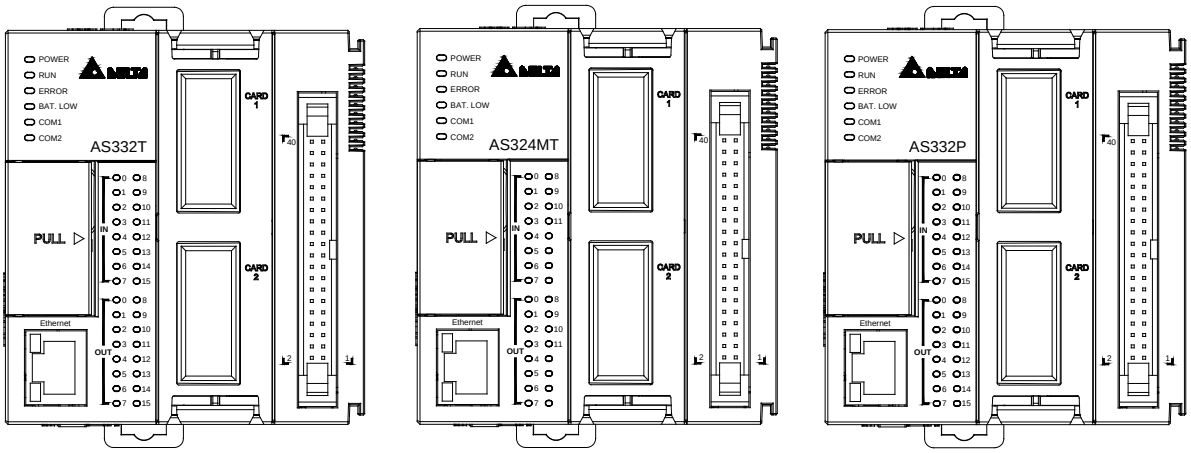
- **Power supply module**

  A power supply module functions to convert alternating current to direct current, or directly provides direct current. It provides power for the modules installed on it.



- **CPU module**

  A CPU module is the nucleus of a complete AS Series system. It is responsible for controlling and managing the whole system. Besides, Delta Electronics, Inc. provides businesses with several types of CPU modules. Users can select a CPU module according to their needs.



- **Communication cable**

  Several communication interfaces are built in a CPU module, and users are provided with many types of network modules. Users can select a suitable Communication cable according to the actual situation.

  Please refer to the following table for information about the communication interfaces and the main applications.

Interface	Connector	Application
Communication port	5-pin removable terminal block	Computer/HMI communication/Industrial control network (2x RS-485)
Ethernet	RJ45	Computer/HMI communication/Remote control/Data exchange/Industrial control network
USB	Mini USB	Computer communication

2.1.1.2 Accessories

The following are the accessories for an AS Series system. Users can select them according to their needs.

- **Extension module**

  Apart from the standard communication ports on a CPU module, the CPU module does not equipped with other I/O functions. If users want to use I/O functions, they can select suitable modules according to the actual situation. The modules which can be used with an AS Series system are listed in the table below.

Digital input/output modules:

AS08AM10N-A	24VDC 5mA 8 inputs Spring-clamp terminal block
AS08AN01P-A	5 ~ 30VDC 0.5A 8 outputs Sourcing output Spring-clamp terminal block
AS08AN01R-A	240VAC/24VDC 2A 8 outputs Relay Spring-clamp terminal block

AS08AN01T-A	5 ~ 30VDC 0.5A 8 outputs Sinking output Spring-clamp terminal block
AS16AM10N-A	24VDC 5mA 16 inputs Spring-clamp terminal block
AS16AN01P-A	5 ~ 30VDC 0.5A 16 outputs Sourcing output Spring-clamp terminal block
AS16AN01R-A	240VAC/24VDC 2A 16 outputs Relay Spring-clamp terminal block
AS16AN01T-A	5 ~ 30VDC 0.5A 16 outputs Sinking output Spring-clamp terminal block
AS16AP11P-A	24VDC 5mA 8 inputs 5 ~ 30VDC 0.5A 8 outputs Sourcing output Spring-clamp terminal block
AS16AP11R-A	24VDC

	5mA 8 inputs 240VAC/24VDC 2A 8 outputs Relay Spring-clamp terminal block
AS16AP11T-A	24VDC 5mA 8 inputs 5 ~ 30VDC 0.5A 8 outputs Sinking output Spring-clamp terminal block
AS32AM10N-A	24VDC 3.2mA 32 inputs MIL connector
AS32AN02T-A	5 ~ 30VDC 0.1A 32 outputs Sinking output MIL connector
AS64AM10N-A	24VDC 3.2mA 64 inputs MIL connector
AS64AN02T-A	5 ~ 30VDC 0.1A 64 outputs Sinking output MIL connector

Analog input/output modules:

AS04AD-A	4-channel analog input module Hardware resolution: 16 bits 0~10V, 0/1~5V, -5~+5V, -10~+10V, 0/4~20mA, -20~+20mA Conversion time: 2ms/channel
AS04DA-A	4-channel analog input module Hardware resolution: 12 bits -10~+10V, 0~20mA, 4~20mA Conversion time: 2ms/channel
AS06XA-A	4-channel analog input module Hardware resolution: 16 bits 0~10V, 0/1~5V, -5~+5V, -10~+10V, 0/4~20mA, -20~+20mA Conversion time: 2 ms/channel 2-channel analog input module Hardware resolution: 12 bits -10~+10V, 0~20mA, 4~20mA Conversion time: 2ms/channel

Temperature measurement modules:

AS04RTD-A	4-channe, 2-wire/3-wire RTD Sensor type: Pt100 / Ni100 / Pt1000 / Ni1000 / JPt100 / LG-Ni1000 / Cu50 / Cu100 / 0~300Ω / 0~3000Ω input impedance Resolution: 0.1°C/0.1°F (16 bits) Conversion time: 200ms/channel
AS04TC-A	4-channe thermocouple Sensor type: J, K, R, S, T, E, N, B and -100~+100 mV Resolution: 0.1°C/0.1°F (24 bits) Conversion time: 200ms/channel

Network modules:

AS00SCM-A	Serial communication module, 2x communication ports, applicable to communication cards, supporting MODBUS protocols

Load cell modules:

AS02LC-A	2-channel, 4-wire/6-wire load cell sensor Eigenvalue applicable to a load cell: 1, 2, 4, 6, 20, 40, 80 mV/V Highest precision 1/10000 @ 50ms of the conversion time ADC Resolution : 24 bits Conversion time: 2.5 ~ 400ms (9 options to choose from)

Function cards:

AS-F232	Serial communication port, RS232, functioning as a master or slave
AS-F422	Serial communication port, RS422, functioning as a master or slave
AS-F485	Serial communication port, RS485, functioning as a master or slave
AS-FCOPM	CANopen communication port, supporting DS301, AS series remote modules and Delta servo systems
AS-F2AD	2-channel analog input 0~10V (12 bits), 4~20mA (11 bits) Conversion time: 3ms/channel
AS-F2DA	2-channel analog input 0~10V, 4~20mA (12 bits) Conversion time: 2ms/channel

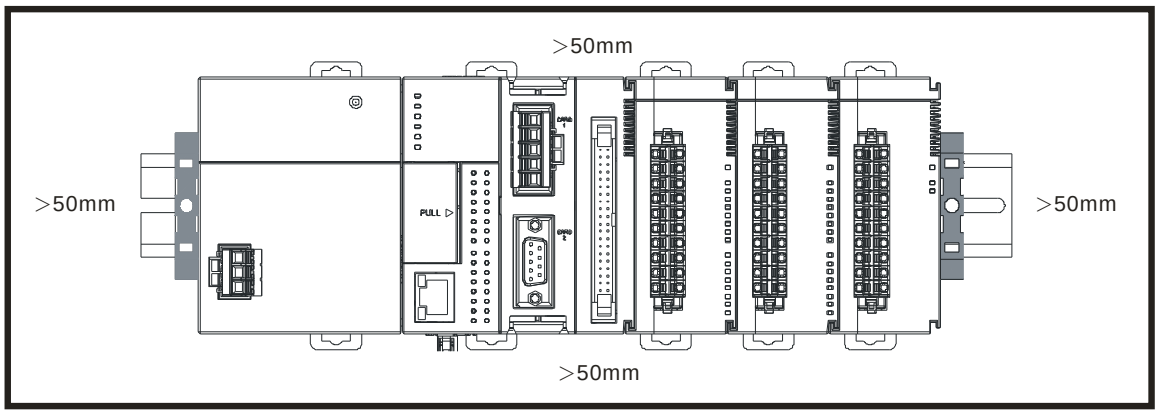
2.2 Warning

- Before a module is installed, please make sure of the size of the module. To prevent the misestimate from resulting in insufficient installation space, the size of the connector of a communication cable and the room which needs to be reserved have to be taken into account.
- Please make sure that the work environment conforms to the specifications for the products. It is necessary to take account of the basic temperature/humidity control and the dust/corrosion prevention.
- The electromagnetic interference will result in the wrong action of the whole system. Therefore, users have to do EMC design carefully. Please refer to chapter seven in this manual for more information related to EMC standards.
- If the specifications for the components such as screws and washers are noted specifically in the manual, please use the components conforming to the specifications.
- If a cable is connected to a communication port, please make sure that the connector of the cable is joined to the port on the module properly.

2.3 Installation

2.3.1 Installation of Modules in a Control Box

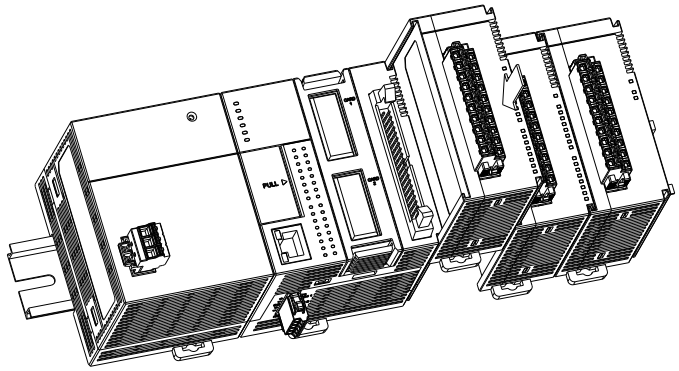
A PLC has to be installed in a closed control box. In order to ensure that the PLC radiates heat normally, the space between the PLC and the control box has to be larger than 50 millimeters.



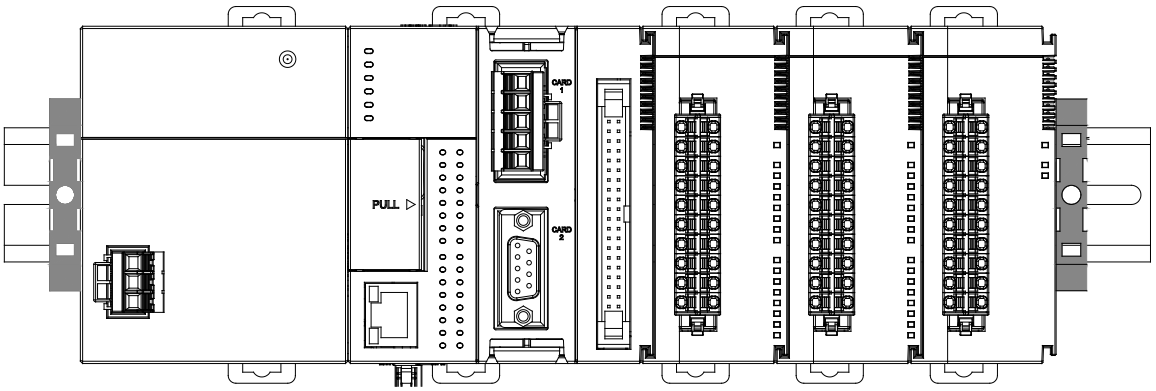
- Please keep the PLC away from high-voltage equipment, high-voltage wires, and high-voltage motors.
- In order to prevent the temperature of a PLC from rising, please do not install the PLC vertically on the bottom/top in the control box.
- Please install a PLC horizontally in the control box, as shown above.
- If users intend to increase the number of modules, they have to leave some space for installing the modules in the control box.

2.3.2 Installing a Module

1. Please install the PLC onto the power supply module, and then insert the module hooks into the DIN rail mounting slot.
2. Link the I/O modules on the right side of the PLC and make sure they are hooked together, push the modules into the DIN rail until hearing a click. That means the module is on the DIN rail and is connected to the PLC as illustrated below.

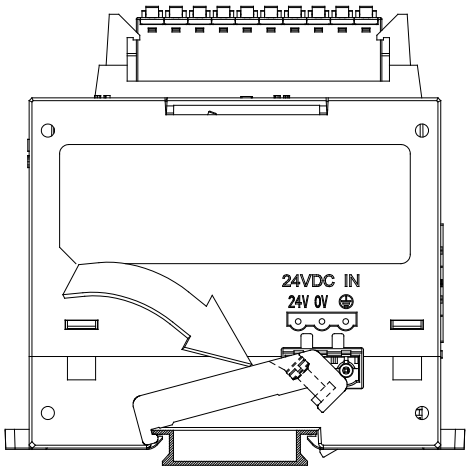


If there is a vibration source in the installation site, it is suggested to installed anti-vibration baffles on the sides of the AS series for better stabilization as the gray baffles illustrated below.

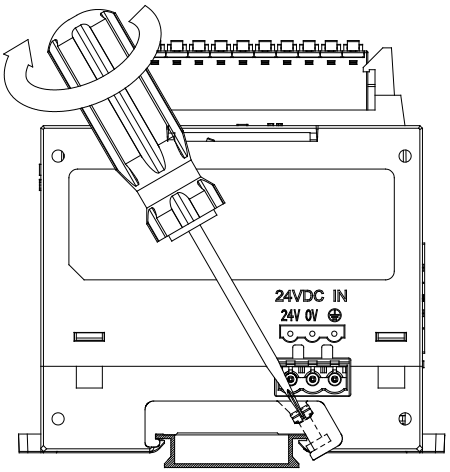


- **Install the baffles:**

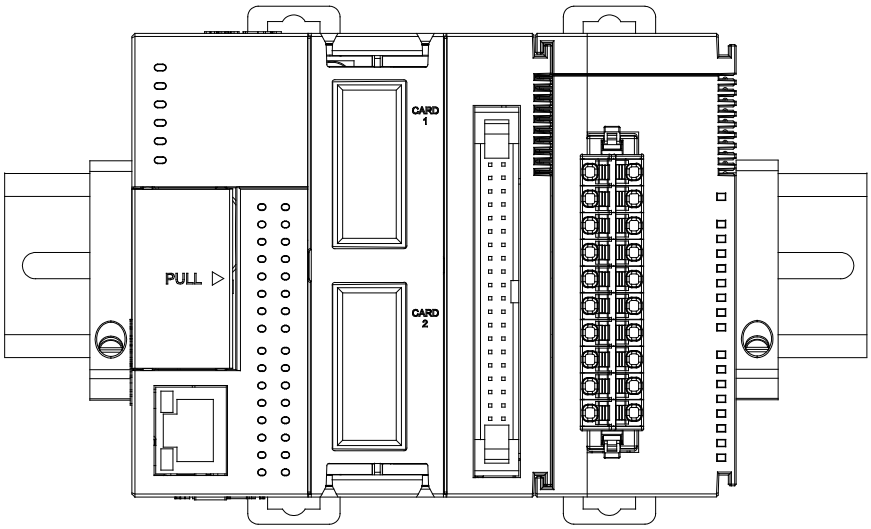
1. Hook the baffles onto the DIN rail and press it down as the directional arrow indicated below.



2. Use screws to secure the baffle.



3. The baffles installation is complete as the image shown below.

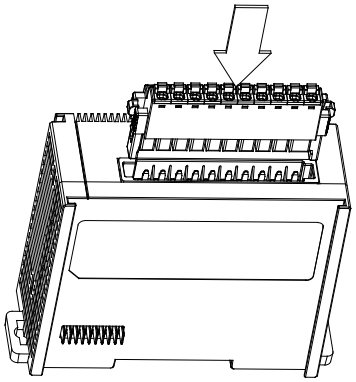


2.3.3 Installing a Removable Terminal Block

Please install the removable terminal block on the module, as illustrated below.

- **Installation**

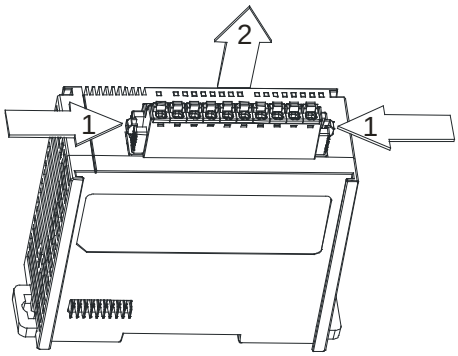
1. Level the terminal block at the printed circuit board, and press it into the module.



- **Removal**

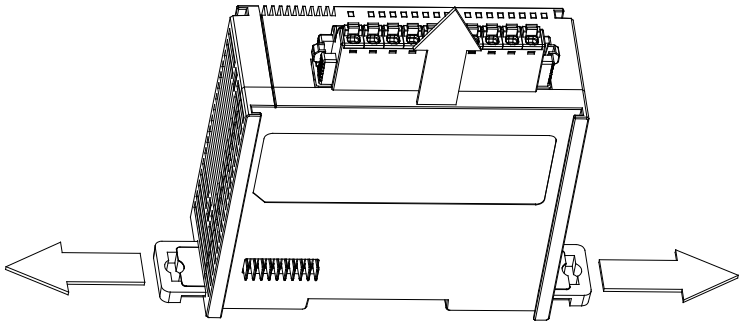
1. Pull down the clip in the direction indicated by the arrow and then pull the terminal block up

   as illustrated below.



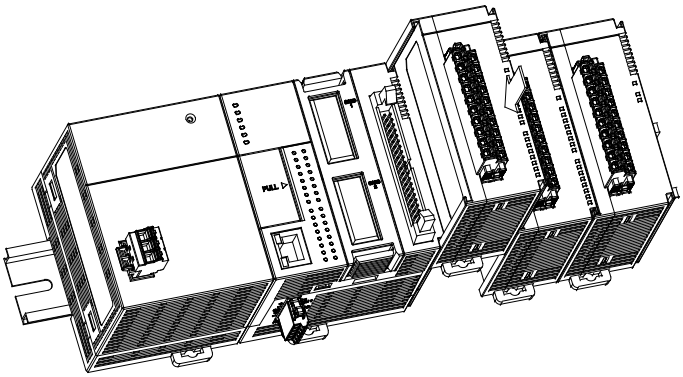
2.3.4 Changing a Module

1. Take the removable terminal block out of the module and pull the clip out from the DIN rail as the image show below.



2. Remove the module to be changed out.

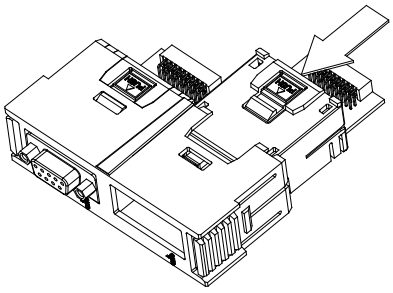
3. Slide the new module in as the image shown below.



2.3.5 Installing and Removing an Extension Card

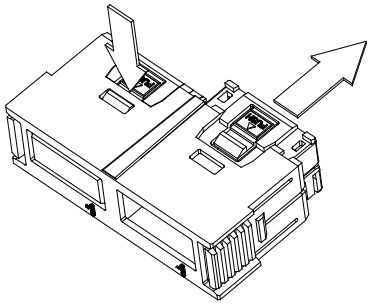
- **Installation**

Put the extension card into the extension card slot until hearing a click.



- **Removal**

Press the PUSH to release the extension card and then take the extension card out.

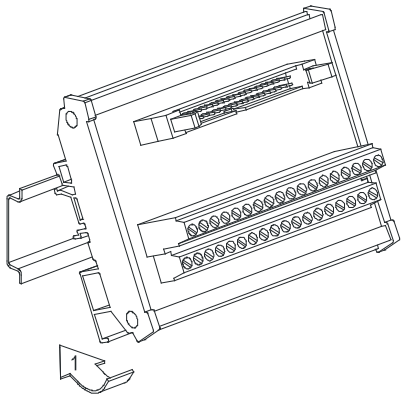


2.3.6 Installing a Wiring Module

Put a communication cable in the port on a CPU module, and make sure that the connector of the cable is joined to the port properly.

- **Installation**

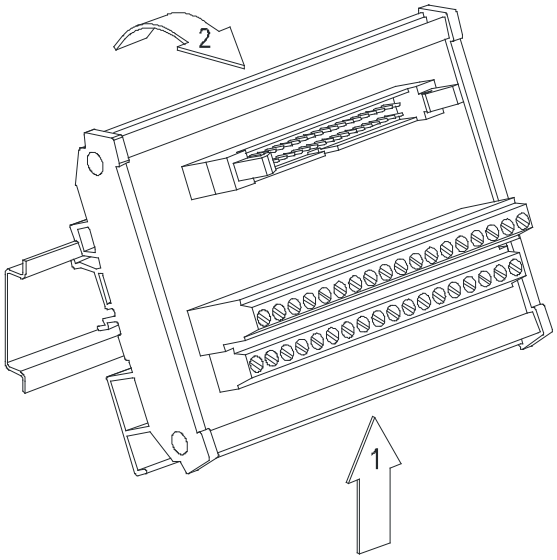
1. One side of a wiring module has to be fixed first.
2. Press the driver board in the direction indicated by arrow 1, and make sure that the groove is combined with the DIN rail.



- **Removal**

1. Push the wiring module in the direction indicated by arrow 1.

2. Pull the wiring module in the direction indicated by arrow 2.



3

Chapter 3 Specifications for Products

Table of Contents

3.1 General Specifications

Item	Specifications
Operating temperature	-20~60°C
Storage temperature	-40~80°C
Operating humidity	5~95% No condensation
Storage humidity	5~95% No condensation
Work environment	No corrosive gas exists.
Installation location	In a control box
Pollution degree	2
EMC (electromagnetic compatibility)	Refer to chapter 7 for more information.
Vibration resistance	Tested with: 5 Hz ≦ f ≦ 8.4 Hz, constant amplitude 3.5 mm; 8.4 Hz ≦ f ≦ 150 Hz, constant acceleration 1g Duration of oscillation: 10 sweep cycles per axis on each direction of the 3 mutually perpendicular axes International Standard IEC 61131-2 & IEC 60068-2-6 (TEST Fc)
Shock resistance	Tested with: Half-sine wave: Strength of shock 15 g peak value, 11 ms duration; Shock direction: The shocks in each in direction per axis, on 3 mutually perpendicular axes (total of 18 shocks) International Standard IEC 61131-2 & IEC 60068-2-27 (TEST Ea)
Safety	Conforms to IEC 61131-2, UL508

3.2 Specifications for CPU Modules

- **Functional specifications**

Item	AS324MT-A/AS332T-A/AS332P-A	Remark
Execution	The program is executed cyclically.	
Input/Output control	Regenerated inputs/outputs Direct inputs/outputs	The inputs and outputs can be controlled through the direct inputs and direct outputs.
Programming language	IEC 61131-3	
	Ladder diagrams, continuous function charts, structured texts, and sequential function charts	
Instruction execution speed	40K steps/ms	
Number of instructions	Approximately 666 instructions	
Constant scan cycle (ms)	1-32000 (The scan cycle can be increased by one millisecond.)	Setting the parameter
Program capacity (step)	128K steps	

Item	AS324MT-A/AS332T-A/AS332P-A	Remark
Installation	DIN rails or screws	
Installation of a module	No backplane installation; only module after module	
Maximum number of modules which can be installed	32 modules	
Number of tasks	283 tasks (32 cyclic tasks; 16 I/O interrupts; 4 timed interrupts, etc.)	Refert to operation manual for more information
Number of inputs/outputs	1024	Number of inputs/outputs accessible to an actual input/output module
Input relays [X]	1024	
Output relays [Y]	1024	
Internal relays [M]	8192 (M0~M8191)	
Timers [T]	512 (T0~T511)	
Counters [C]	512 (C0~C511)	
32-bit counter [HC]	256 (HC0~HC255)	
Data register [D]	3000 (D0~D29999)	
Data register [W]	3000 (W0~W29999)	
Stepping relay [S]	2048 (S0~S2047)	
Index register [E]	10 (E0~E9)	
Special auxiliary relay [SM]	2048 (SM0~SM2047)	
Special data register [SR]	2048 (SR0~SR2047)	
Serial communication port	2x RS-485	
Ethernet port	10/100 M	
USB port	Mini USB	
Storage interface	SD Card (Micro SD); maximum storage: 32G	
Real-time clock	Years, months, days, hours, minutes, seconds, and weeks	*Batteries (CR1620) are not included.
Function card interface	2x function cards, supporting communication card, AD/DA analog function cards	
CANopen DS301 (Master)	Maximum nodeL 64; maximum bytes: 2000	*A function card AS-FCOPM is required.
CANopen DS301 (Slave)	Maximum PDO: 8; maximum bytes: 8	

- **Electrical specifications**

Model / Item	AS332T-A	AS332P-A	AS324MT-A
Supply voltage	24 VDC (20.4 VDC~28.8 VDC) (-15%~+20%)		
Power consumption	3.6W		

- **Electrical specifications for the inputs on digital input/output modules (The signals passing through the inputs are 24 VDC signals.)**

Item \ Model		AS332T-A	AS332P-A	AS324MT-A
Number of inputs		16		12
Connector type		ML connector		
Input type		Digital input		
Input form		Direct current (sinking or sourcing)		X0.0+~X0.3+/X0.0-~X0.3-: differential input X0.4~X0.11: Direct current (sinking or sourcing)
Input voltage/ current		24 VDC 5 mA		X0.0+~X0.3+/X0.0-~X0.3-: 5 VDC, 5 mA X0.4~X0.11: 24 VDC, 5 mA
Action level	**OFF→ON**	>15 VDC		X0.0+~X0.3+/X0.0-~X0.3-: >0.2VDC X0.4~X0.11: >15VDC
	ON→OFF	<5 VDC		X0.0+~X0.3+/X0.0-~X0.3-: <-0.2VDC X0.4~X0.11: <5VDC
Response time	**OFF→ON**	10 ms±10%		X0.0+~X0.3+/X0.0-~X0.3- : < 0.125μs X0.4~X0.11: < 2.5μs
	ON→OFF	15 ms±10%		X0.0+~X0.3+/X0.0-~X0.3- : < 0.125μs X0.4~X0.11: < 2.5μs
Maximum input frequency		50 Hz		X0.0+~X0.3+/X0.0-~X0.3-: < 4MHz X0.4~X0.11: < 200KHz
Input impedance		5.6 kΩ		
Input signal		Voltage input Sinking: The inputs are NPN transistors whose collectors are open collectors. Sourcing: The inputs are PNP transistors whose collectors are open collectors.		
Electrical isolation		Optocoupler		
Input display		When the optocoupler is driven, the input LED indicator is ON.		

- **Electrical specifications for the outputs on a digital input/output module**

Item \ Model	AS332T-A	AS332P-A	AS324MT-A
Number of inputs	16		12
Connector type	ML connector		
Output type	Digital output		
Output form	Transistor-T (sinking)	Transistor-P (sourcing)	Y0.0+~Y0.3+/Y0.0-~Y0.3-: differential input Y0.4~Y0.11 : Transistor-T (sinking)

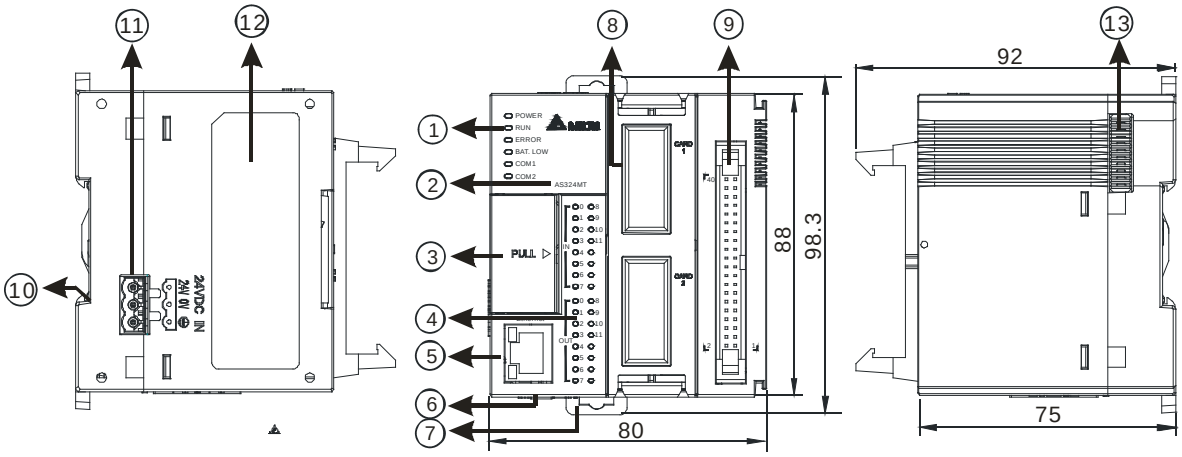
Item \ Model		AS332T-A	AS332P-A	AS324MT-A
Output current		5~30VDC, 0.1A		Y0.0+~Y0.3+/Y0.0-~Y0.3- : 5VDC, 20mA Y0.4~Y0.11 : 5-30VDC, 0.1A
Maximum load	**Resistance**	0.1A		Y0.0+~Y0.3+/Y0.0-~Y0.3- : 20mA Y0.4~Y0.11 : 0.1A
	Inductance	N/A		
	Bulb	N/A		
Maximum output frequency[*1]	**Resistance**	Y0.0~Y0.11 : 200KHz Y0.12~Y0.15 : 100Hz		Y0.0+~Y0.3+/Y0.0-~Y0.3- : 4MHz Y0.4~Y0.11: 200KHz
	Inductance	N/A		
	Bulb	N/A		
Maximum Response time	**OFF→ON**	Y0.0~Y0.11: 2.5μs Y0.12~Y0.15: 0.5ms		Y0.0+~Y0.3+/Y0.0-~Y0.3-: 0.125μs Y0.4~Y0.11: 2.5μs

- **Ethernet Specification**

Item			AS324MT-A/AS332T-A/AS332P-A	Remarks
Communication Protocol			MODBUS TCP, EherNet/IP	Two protocols can be used simultaneously
MODBUS TCP	**Type**		Client, Server	
	Number of Connections for Server		32	
	Number of Connections for Client		32	
	RTU Mapping		4	
Socket	**Number of the TCP Connections**		4	
	Number of the UDP Connections		4	
EtherNet/IP	**Type**		Scanner, Adapter	
	CIP Network I/O Connection	**Number of the CIP Connections**	32 (Clients + Servers)	
		Number of the TCP Connections	16 (Clients + Servers)	
		Requested Packet Interval (RPI)	5ms~1000ms	Default: 20ms
		Max. Transmission Speed	3000 pps	

Item			AS324MT-A/AS332T-A/AS332P-A	Remarks
		Max. Data Length/per transmission	500 bytes	
	CIP Network Explicit Message	Class 3 (Connected Type)	Total 32 (Servers), including the ones from the UCMM type	I/O connections shared
		UCMM (Non-Connected Type)	Total 32 (Clients + Servers) , including the ones from the Class 3	I/O connections shared
		CIP Objects	Identity, Message Router, Assembly, Connection Manager, Port, TCP/IP interface, Ethernet link, Vendor specific	
	CIP Network Produced Tag	Max. Number of the CIP Connections	32 (Clients + Servers)	I/O connections shared
		Max. Data Length	500 bytes (I/O Connections) 400 bytes (Explicit Message)	
		Requested Packet Interval (RPI)	5ms~1000ms	
	CIP Network Consumed Tag	Max. Number of the CIP Connections	32 (Clients + Servers)	I/O connections shared
		Max. Data Length	500 bytes (I/O Connections) 400 bytes (Explicit Message)	
		Requested Packet Interval (RPI)	5ms~1000ms	

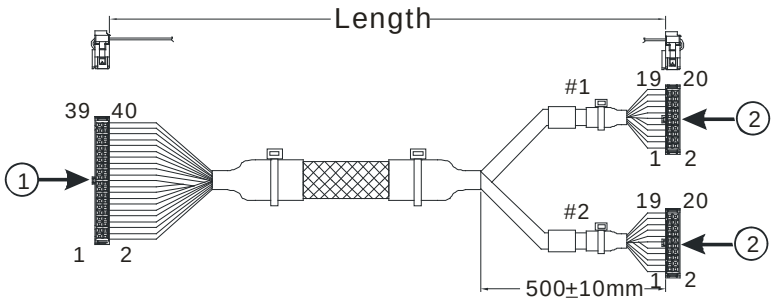
3.2.1 Profiles



Number	Name	Description
1	Power LED indicator	Indicating the power status of the CPU module
	Run LED indicator	Operating status of the module ON: The module is running. OFF: The module stops running.
	Error LED indicator	Error status of the module ON: A serious error occurs in the module. OFF: The module is normal. Blinking: A slight error occurs in the module.
	BAT.LOW LED indicator	Indicating the battery status of the CPU module (Enable/Disable this display by HWCONFIG in ISPSoft)
	COM1 LED COM2 LED	Indicating the communication status of the COM port OFF: no commumnication over the COM port Blinking: a communication is taking place in the COM port
2	Model name	Showing the model name of the CPU module
3	Run/Stop	RUN: execute the programs STOP: stop the programs
	USB port	Mini USB communication port
	SD card slot	Providing an interface for a SD card
	VR0/VR1	VR0: use the flag SM166 to activate the values in SR166 VR1: use the flag SM167 to activate the values in SR167
4	Input/Output LED indicator	If there is an input signal, the input LED indicator is ON. If there is an output signal, the output LED indicator is ON.
5	Ethernet port	Providing an interface for a n Ethernet communication
6	COM1/COM2	Providing an interface for RS-485 communication
7	DIN rail clip	Securing the DIN rail
8	Extension card slot	Providing an interface for an extension card
9	ML connector	Connecting the module and the wiring module
10	Grounding clip	For grounding
11	Power supply	For power supply
12	Label	Nameplate
13	External module port	Connecting the modules

- **ML connector, extension cable, and wiring modules**

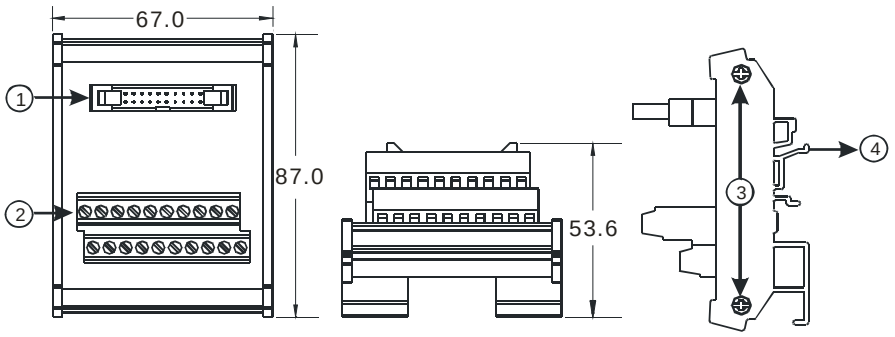
1. Extension Cable UC-ET010-24D / UC-ET020-24D / UC-ET030-24D



Unit: mm

Number	Name	Description
1	IDC 40-pin terminal	Connecting a digital input/output module and an external terminal module.
2	IDC 20-pin terminal	Connecting the external terminal modules UB-10-ID16A/UB-10-OR16A/UB-10-OR16B

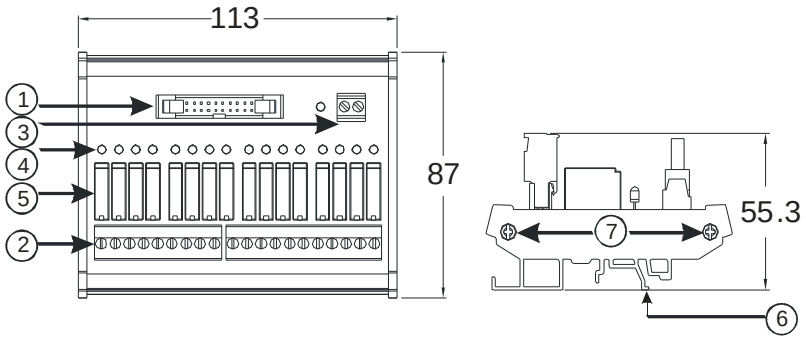
2. AS332T-A/AS332P-A/AS324MT-A and the external terminal module UB-10-ID16A



Unit: mm

Number	Name	Description
1	20-pin ML connector	Connecting the external terminal module and a wiring module
2	Terminals	Input/Output terminals for wiring
3	Clip	Hanging the external terminal module on a DIN rail
4	Set screw	Fixing the base

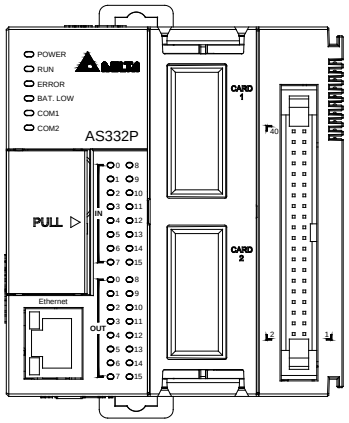
3. AS332T-A and the external terminal module UB-10-OR16A/AS332P-A, and UB-10-OR16B

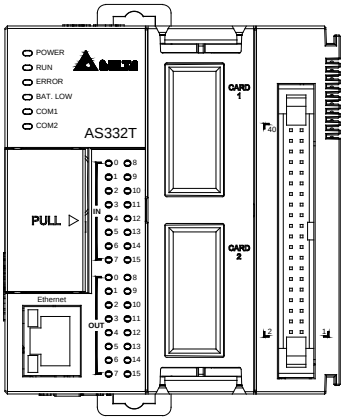


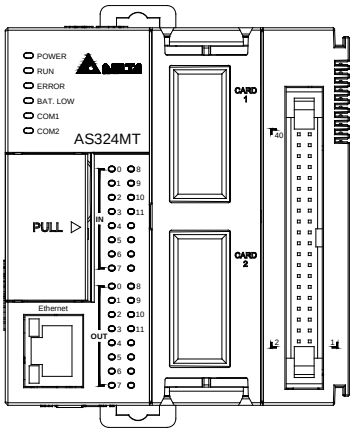
Unit: mm

Number	Name	Description
1	20-pin ML connector	Connecting the external terminal module and a wiring module
2	Terminals	Input/Output terminals for wiring
3	2-pin power input terminal	Power input terminal for wiring
4	Output LED indicator	If there is an output signal, the output LED indicator is ON.
5	Relay output	Relay output
6	Clip	Hanging the external terminal module on a DIN rail
7	Set screw	Fixing the base

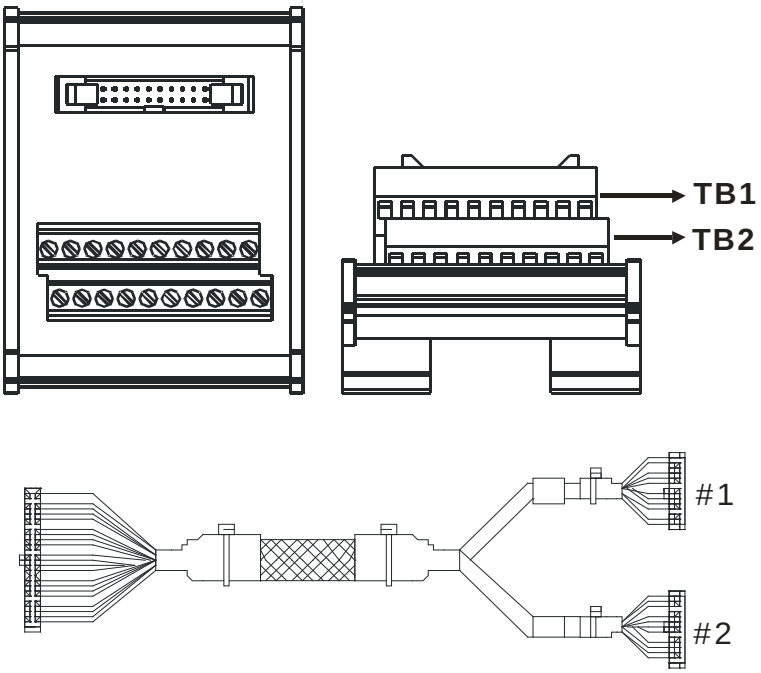
3.2.2 Arrangement of Input/Output Terminals

AS332P-A	
	- | - S/S | S/S X0.15 | X0.14 X0.13 | X0.12 X0.11 | X0.10 X0.9 | X0.8 X0.7 | X0.6 X0.5 | X0.4 X0.3 | X0.2 X0.1 | X0.0 C0 | C0 - | - Y0.15 | Y0.14 Y0.13 | Y0.12 Y0.11 | Y0.10 Y0.9 | Y0.8 Y0.7 | Y0.6 Y0.5 | Y0.4 Y0.3 | Y0.2 Y0.1 | Y0.0

AS332T-A	
	- | - S/S | S/S X0.15 | X0.14 X0.13 | X0.12 X0.11 | X0.10 X0.9 | X0.8 X0.7 | X0.6 X0.5 | X0.4 X0.3 | X0.2 X0.1 | X0.0 - | - C0 | C0 Y0.15 | Y0.14 Y0.13 | Y0.12 Y0.11 | Y0.10 Y0.9 | Y0.8 Y0.7 | Y0.6 Y0.5 | Y0.4 Y0.3 | Y0.2 Y0.1 | Y0.0

AS324MT-A	
	S/S | S/S X0.11 | X0.10 X0.9 | X0.8 X0.7 | X0.6 X0.5 | X0.4 SG0 | SG0 X0.3- | X0.3+ X0.2- | X0.2+ X0.1- | X0.1+ X0.0- | X0.0+ C0 | C0 Y0.11 | Y0.10 Y0.9 | Y0.8 Y0.7 | Y0.6 Y0.5 | Y0.4 SG1 | SG1 Y0.3- | Y0.3+ Y0.2- | Y0.2+ Y0.1- | Y0.1+ Y0.0- | Y0.0+

- **ML connector and the external terminal module UB-10-ID16A**



AS332T-A											
#1	TB1	Y0.0	Y0.2	Y0.4	Y0.6	Y0.8	Y0.10	Y0.12	Y0.14	C0	-
	TB2	Y0.1	Y0.3	Y0.5	Y0.7	Y0.9	Y0.11	Y0.13	Y0.15	C0	-
#2	TB1	X0.0	X0.2	X0.4	X0.6	X0.8	X0.10	X0.12	X0.14	S/S	-
	TB2	X0.1	X0.3	X0.5	X0.7	X0.9	X0.11	X0.13	X0.15	S/S	-

AS332P-A											
#1	TB1	Y0.0	Y0.2	Y0.4	Y0.6	Y0.8	Y0.10	Y0.12	Y0.14	-	C0
	TB2	Y0.1	Y0.3	Y0.5	Y0.7	Y0.9	Y0.11	Y0.13	Y0.15	-	C0
#2	TB1	X0.0	X0.2	X0.4	X0.6	X0.8	X0.10	X0.12	X0.14	S/S	-
	TB2	X0.1	X0.3	X0.5	X0.7	X0.9	X0.11	X0.13	X0.15	S/S	-

AS324MT-A											
#1	TB1	Y0.0+	Y0.1+	Y0.2+	Y0.3+	SG1	Y0.4	Y0.6	Y0.8	Y0.10	C0
	TB2	Y0.0-	Y0.1-	Y0.2-	Y0.3-	SG1	Y0.5	Y0.7	Y0.9	Y0.11	C0
#2	TB1	X0.0+	X0.1+	X0.2+	X0.3+	SG0	X0.4	X0.6	X0.8	X0.10	S/S
	TB2	X0.0-	X0.1-	X0.2-	X0.3-	SG0	X0.5	X0.7	X0.9	X0.11	S/S

3.3 Specifications for Power Supply Modules

3.3.1 General Specifications

- **AS-PS02**

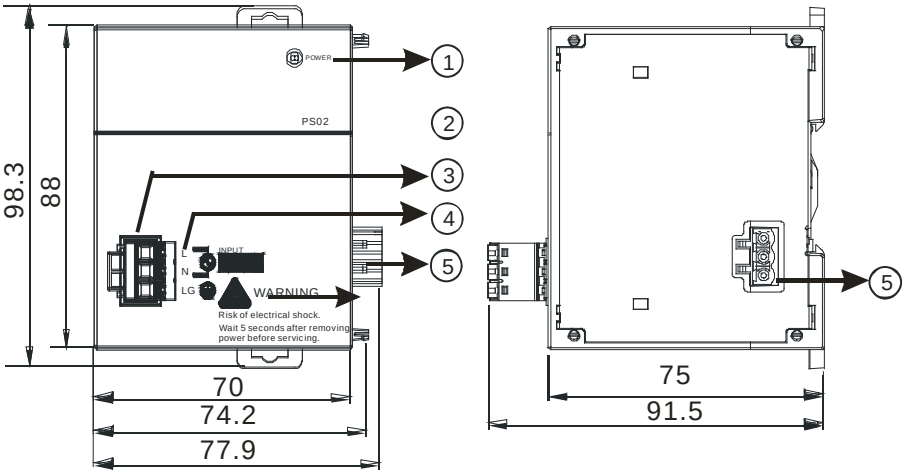
Item	Specifications
Supply voltage	100~240 VAC (-15%~10%) 50/60 Hz±5%
Action specifications	If the input power supply is larger than 85 VAC, the power supply module can function normally.
Allowable instantaneous power failure time	If the instantaneous power failure time is within ten milliseconds, the power supply module keeps running.
Fuse	2.5A/250VAC
Inrush current	＜70A@115VAC
24 VDC output	The maximum current is 2A. It is only for internal use: the CPU and the modules.
Power protection	The 24 VDC output is equipped with the short circuit protection and the overcurrent protection.
Surge voltage withstand level	1,500 VAC (Primary-secondary), 1,500 VAC (Primary-PE), 500 VAC (Secondary-PE)
Insulation voltage	Above 5 MΩ (The voltage between all inputs/outputs and the ground is 500 VDC.)
Ground	The diameter of the ground should not be less than the diameters of the cables connected to the terminals L and N.

- **AS-PS02A**

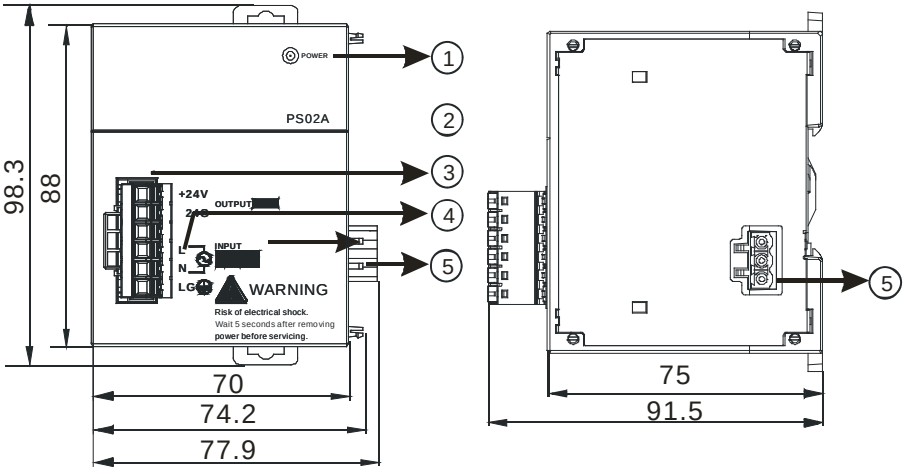
Item	Specifications
Supply voltage	100~240 VAC (-15%~10%) 50/60 Hz±5%
Action specifications	If the input power supply is larger than 85 VAC, the power supply module can function normally.
Allowable instantaneous power failure time	If the instantaneous power failure time is within ten milliseconds, the power supply module keeps running.
Fuse	2.5A/250VAC
Inrush current	＜70A@115VAC
24 VDC output	1.5A for internal use: the CPU and the modules 0.5A for external use
Power protection	The 24 VDC output is equipped with the short circuit protection and the overcurrent protection.
Surge voltage withstand level	1,500 VAC (Primary-secondary), 1,500 VAC (Primary-PE), 500 VAC (Secondary-PE)
Insulation voltage	Above 5 MΩ (The voltage between all inputs/outputs and the ground is 500 VDC.)
Ground	The diameter of the ground should not be less than the diameters of the cables connected to the terminals L and N.

3.3.2 Profiles

- **AS-PS02**



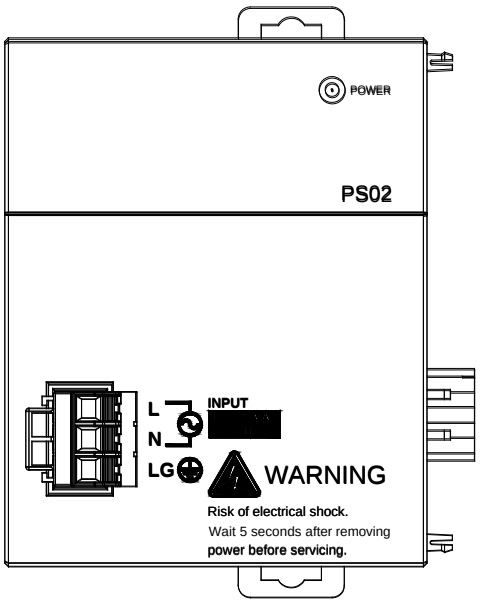
- **AS-PS02A**



Number	Name	Description
1	POWER LED indicator (green)	Indicating the status of the power supply
2	Model name	Model name of the power supply module
3	Terminal	Terminal for wiring
4	Arrangement of the terminals	24G/+24V: DC power input LG: Line ground L/N: AC power input
5	Power output	Connected with AS series

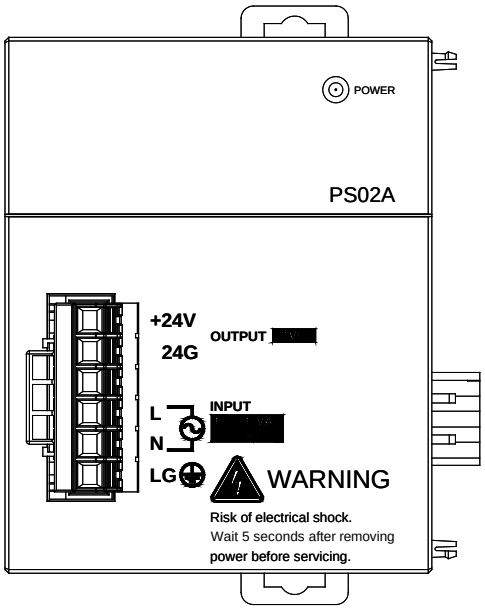
3.3.3 Arrangement of Power Module Terminals

- **AS-PS02**



- L/N: AC power input
- LG: Line ground

- **AS-PS02A**



- 24G/+24V: DC power input
- L/N: AC power input
- LG: Line ground

3.4 Specifications for Digital Input/Output Modules

3.4.1 General Specifications

- **Electrical specifications for the inputs on digital input/output modules**
  (The signals passing through the inputs are 24 VDC signals.)

Module name		08AM10N-A	16AM10N-A	32AM10N-A	64AM10N-A	16AP11RA	16AP11T-A	16AP11P-A
Number of inputs		8	16	32	64	8	8	8
Connector type		Removable terminal block		ML connector		Removable terminal block		
Input type		Digital input						
Input form		Direct current (sinking or sourcing)						
Input voltage/ current		24VDC · 5mA			24VDC 3.2mA	24VDC · 5mA		
Action level	OFF→ON	>15 VDC						
	ON→OFF	<5 VDC						
Response time	OFF→ON	10 ms±10%						
	ON→OFF	15 ms±10%						
Maximum input frequency		50 Hz						
Input impedance		4.7kΩ			7.5kΩ	4.7kΩ		
Input signal		Voltage input Sinking: The inputs are NPN transistors whose collectors are open collectors. Sourcing: The inputs are PNP transistors whose collectors are open collectors.						
Electrical isolation		Optocoupler						
Input display		When the optocoupler is driven, the input LED indicator is ON.						

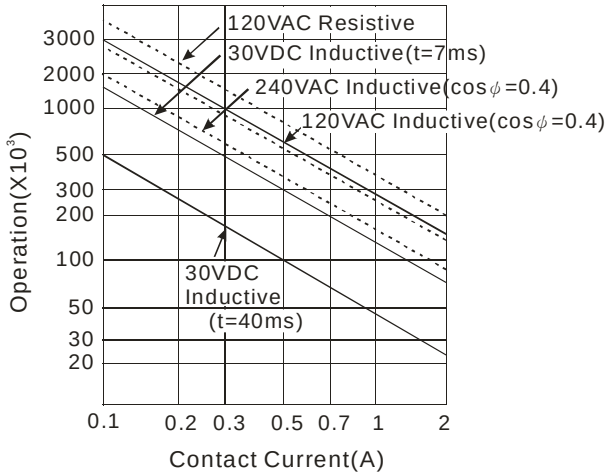
- **Electrical specifications for the outputs on a digital input/output module**

Item \ Model		08AN01R-A	16AN01R-A	16AP11R-A	08AN01T-A	16AN01T-A	16AP11T-A	08AN01P-A	16AN01P-A	16AP11P-A
Number of inputs		8	16	8	8	16	8	8	16	8
Connector type		Removable terminal block								
Output type		Digital output								
Output form		Relay-R			Transistor-T (sinking)			Transistor-P (sourcing)		
Output voltage/ current		240VAC/24VDC			5~30VDC *2			5~30VDC *2		
Maximum load	Resistance	2A/output, 8A/COM			0.5A			0.5A		
	Inductance	Life cycle curve*2			12W（24VDC）			12W（24VDC）		
	Bulb	20W（24VDC） 100W（230VAC）			2W（24VDC）			2W（24VDC）		
Maximum output frequency*1	Resistance	1Hz			100Hz			100Hz		
	Inductance	0.5Hz			0.5Hz			0.5Hz		
	Bulb	1Hz			10Hz			10Hz		
Maximum Response time	OFF→ON	10ms			0.5ms			0.5ms		
	ON→OFF									

Item \ Model		32AN02T-A	64AN02T-A
Number of inputs		32	64
Connector type		ML connector	
Output type		Digital output	
Output form		Transistor-T (sinking)	
Output voltage/ current		5~30VDC	
Maximum load	**Resistance**	0.1A	
	Inductance	N/A	
	Bulb	N/A	
Maximum output frequency[*1]	**Resistance**	100Hz	
	Inductance	N/A	
	Bulb	N/A	
Maximum Response time	**OFF→ON**	0.5ms	
	ON→OFF		

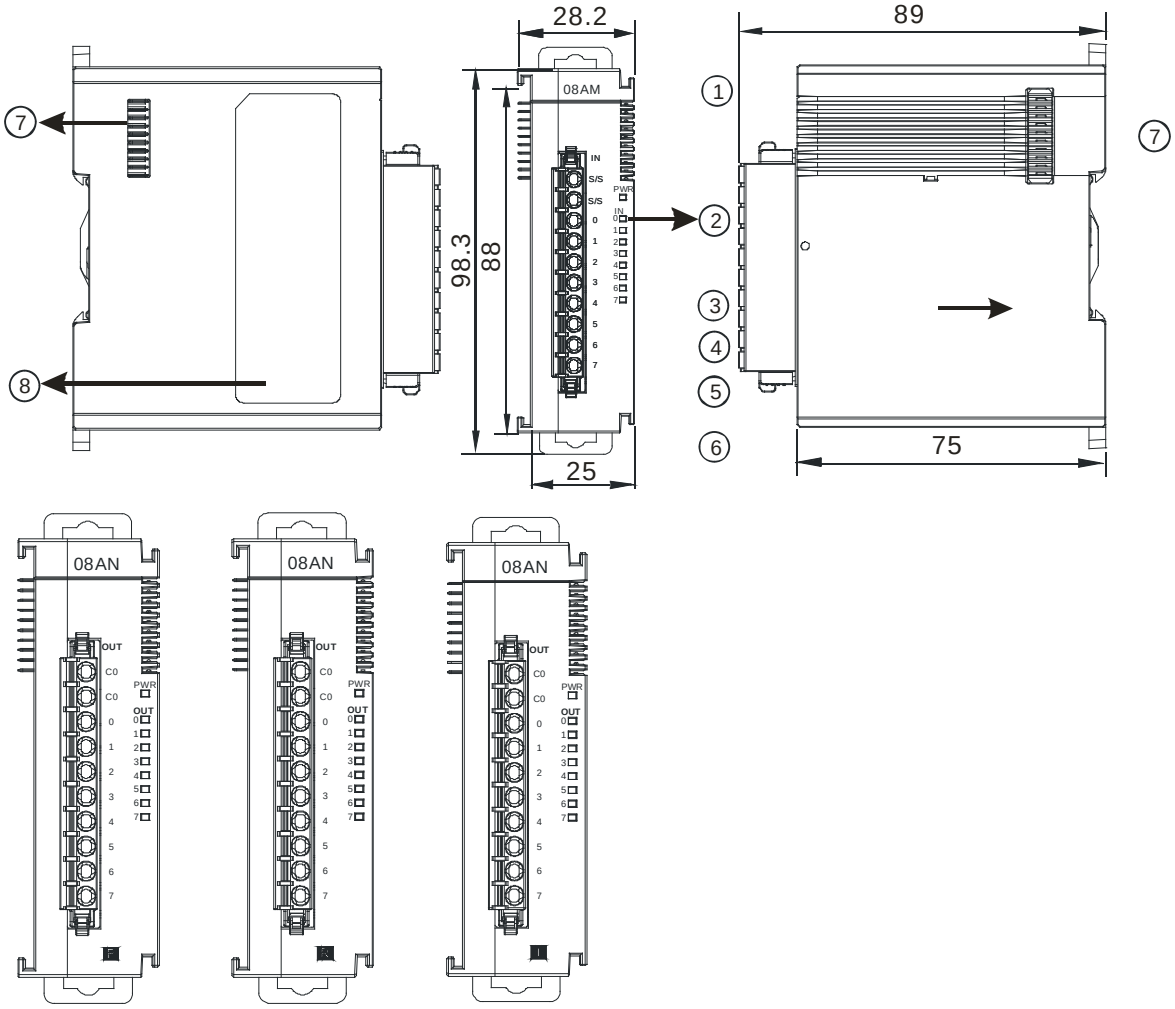
*1: The scan cycle affects the frequency.

*2: The life cycle curve is shown below.



3.4.2 Profiles

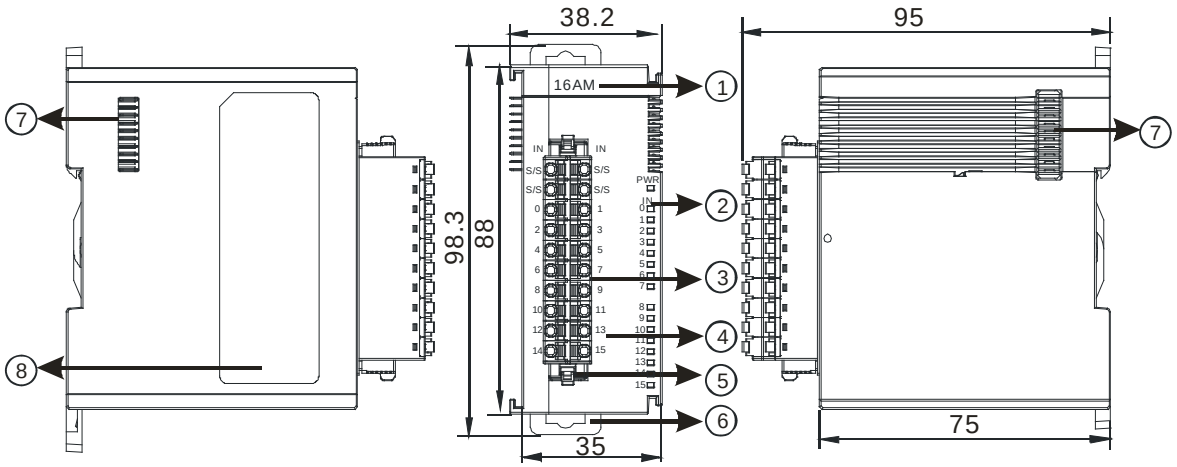
- **AS08AM10N-A/AS08AN01P-A/AS08AN01R-A/AS08AN01T-A**

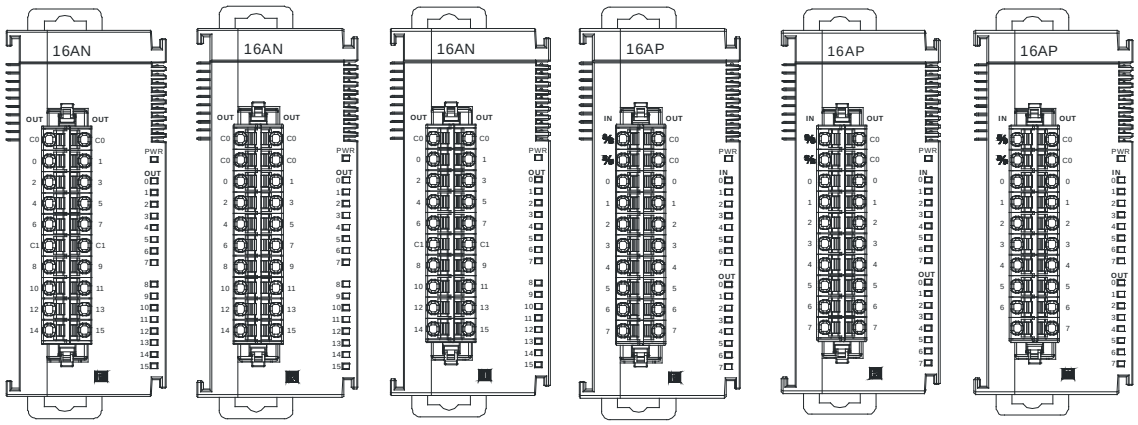


Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	Input/output LED indicator	While inputting, the input LED indicator lights up. While outputting, the output LED indicator lights up.
3	Removable terminal block	The inputs are connected to sensors. The outputs are connected to loads which will be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Terminal block clip	Securing the terminal block
6	DIN rail clip	Securing the DIN rail
7	External module port	Connecting the modules
8	Label	Nameplate

- **AS16AM10N-A/AS16AN01P-A/AS16AN01R-A/AS16AN01T-A/AS16AP11P-A/AS16AP11R-A/ AS16AP11T-A**

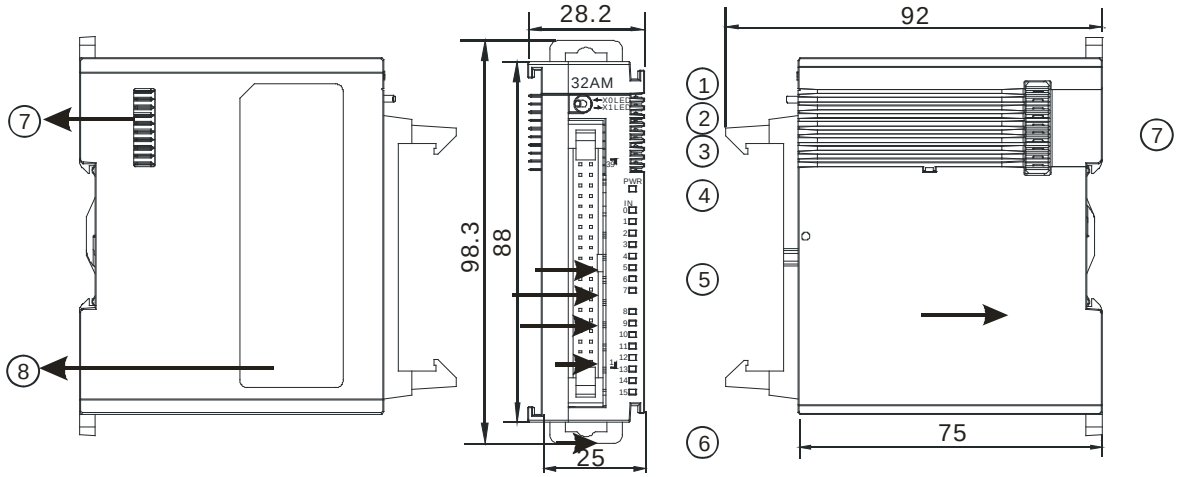




Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	Input/Output LED indicator	If there is an input signal, the input LED indicator is ON. If there is an output signal, the output LED indicator is ON.
3	Removable terminal block	The inputs are connected to sensors. The outputs are connected to loads which will be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Terminal block clip	Securing the terminal block
6	DIN rail clip	Securing the DIN rail
7	External module port	Connecting the modules
8	Label	Nameplate

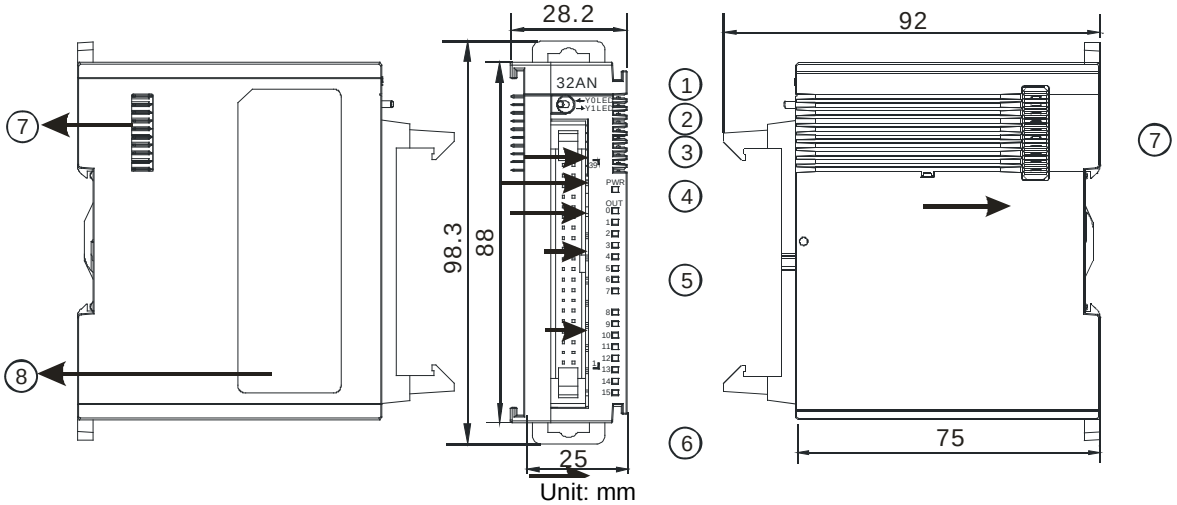
- **AS32AM10N-A**



Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	X0/X1 LED Indicator switch	Switch the LED indicators of their represented inputs.
3	ML connector	For the external I/O connecting cables UC-ET010-24B, UC-ET020-24B, UC-ET030-24B
4	Power LED indicator	Indicating the power status of the module
5	Input LED indicator	If there is an input signal, the input LED indicator is ON.
6	DIN rail clip	Securing the DIN rail
7	External module port	Connecting the modules
8	Label	Nameplate

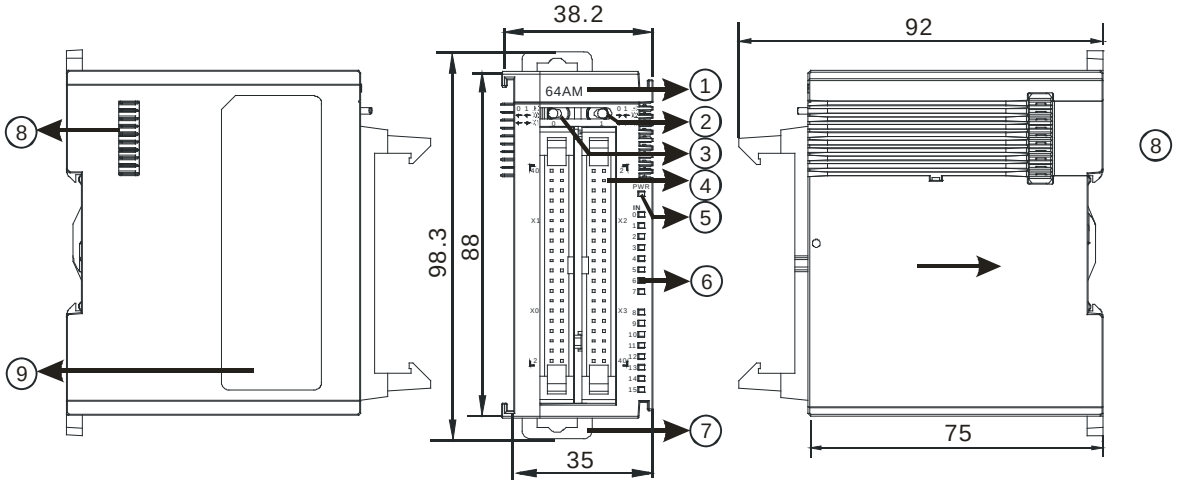
- **AS32AN02T-A**



Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	Y0/Y1 LED indicator switch	Switch the LED indicators of their represented outputs.
3	ML connector	For the external I/O connecting cables UC-ET010-24D, UC-ET020-24D, UC-ET030-24D
4	Power LED indicator	Indicating the power status of the module
5	Output LED indicator	If there is an output signal, the output LED indicator is ON.
6	DIN rail clip	Securing the DIN rail
7	External module port	Connecting the modules
8	Label	Nameplate

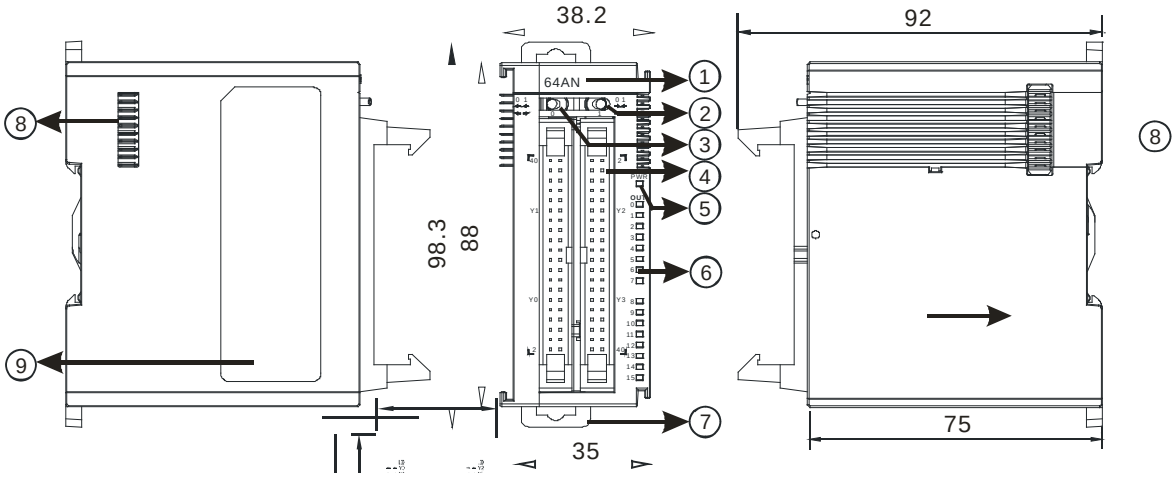
- **AS64AM10N-A**



Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	LED indicator switch 1	Switch the LED indicators of their represented inputs.
3	LED indicator switch 2	Switch the LED indicators of their represented inputs.
4	ML connector	For the external I/O connecting cables UC-ET010-24B, UC-ET020-24B, UC-ET030-24B
5	Power LED indicator	Indicating the power status of the module
6	Input LED indicator	If there is an input signal, the input LED indicator is ON.
7	DIN rail clip	Securing the DIN rail
8	External module port	Connecting the modules
9	Label	Nameplate

- **AS64AN02T-A**

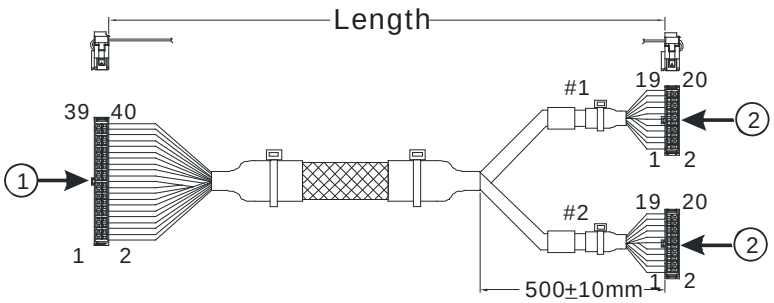


Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	LED indicator switch 1	Switch the LED indicators of their represented outputs.
3	LED indicator switch 2	Switch the LED indicators of their represented outputs.
4	ML connector	For the external I/O connecting cables UC-ET010-24D, UC-ET020-24D, UC-ET030-24D
5	Power LED indicator	Indicating the power status of the module
6	Output LED indicator	If there is an output signal, the output LED indicator is ON.
7	DIN rail clip	Securing the DIN rail
8	External module port	Connecting the modules
9	Label	Nameplate

- **ML connector, extension cable, and wiring modules**

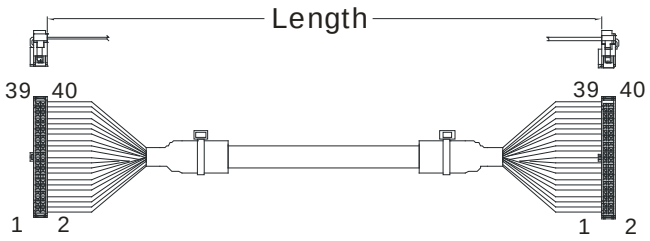
1. Extension Cable UC-ET010-24D (1M) / UC-ET020-24D (2M) / UC-ET030-24D (3M)



Unit: mm

Number	Name	Description
1	IDC 40-pin terminal	Connecting a digital input/output module and an external terminal module.
2	IDC 20-pin terminal	Connecting the external terminal modules UB-10-ID16A/UB-10-OR16A/UB-10-OR16B

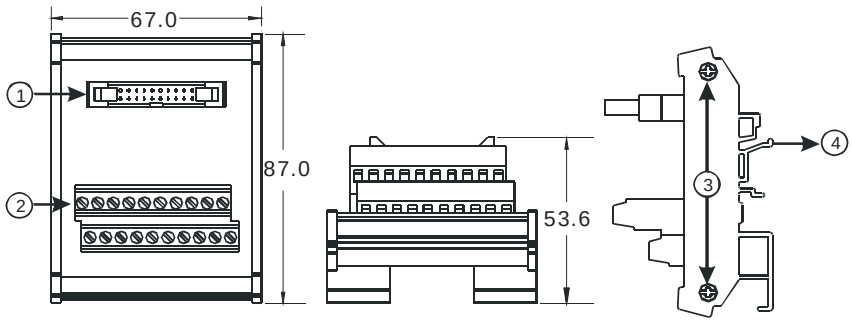
2. I/O connecting cables UC-ET010-24B (1M) / UC-ET020-24B (2M) / UC-ET030-24B (3M)



Number	Name	Description
1	IDC 40-pin terminal	Connecting an external terminal module and an wiring module UB-10-ID32A, and UB-10-OT32A

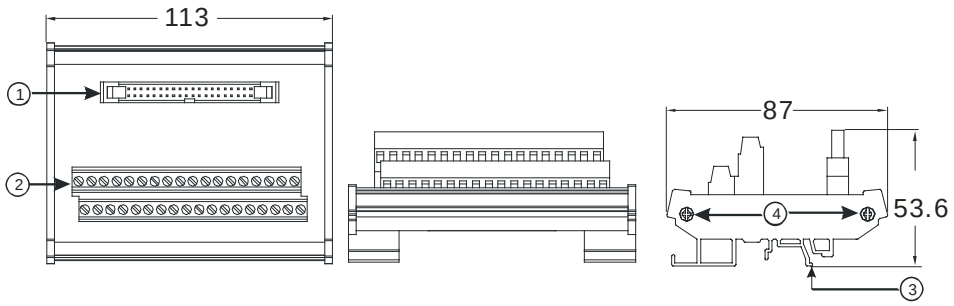
3. AS32AM10N-A/AS64AM10N-A and the external terminal modules UB-10-ID16A, UB-10-ID32A

◆ UB-10-ID16A



Unit: mm

◆ UB-10-ID32A

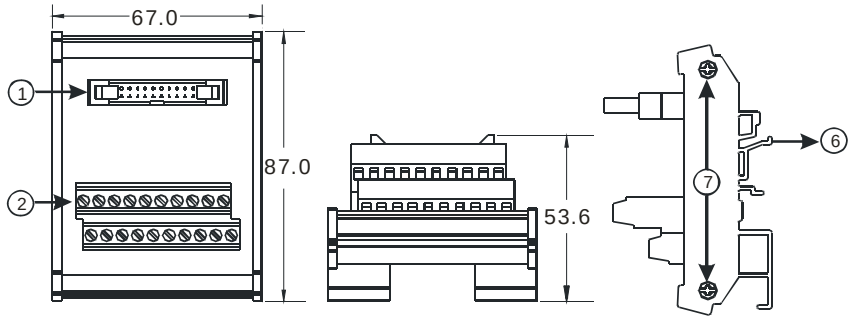


Unit: mm

Number	Name	Description
1	UB-10-ID16A: 20-pin ML connector UB-10-ID32A: 40-pin ML connector	Connecting the external terminal module and a wiring module
2	Terminals	Input/Output terminals for wiring
3	Clip	Hanging the external terminal module on a DIN rail
4	Set screw	Fixing the base

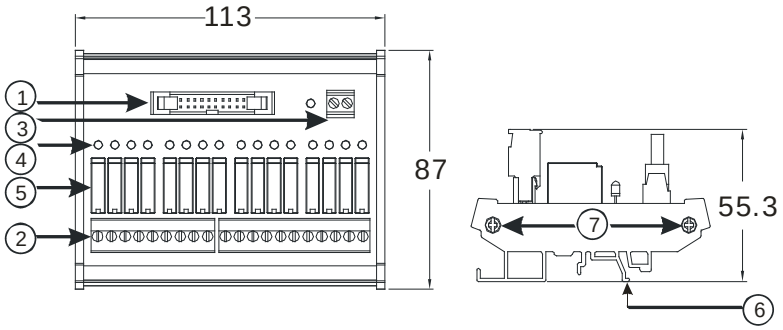
4. AS332T-A/AS64AN02T-A and the external terminal modules UB-10-ID16A, UB-10-OR16A, and UB-10-OT32A.

◆ UB-10-ID16A



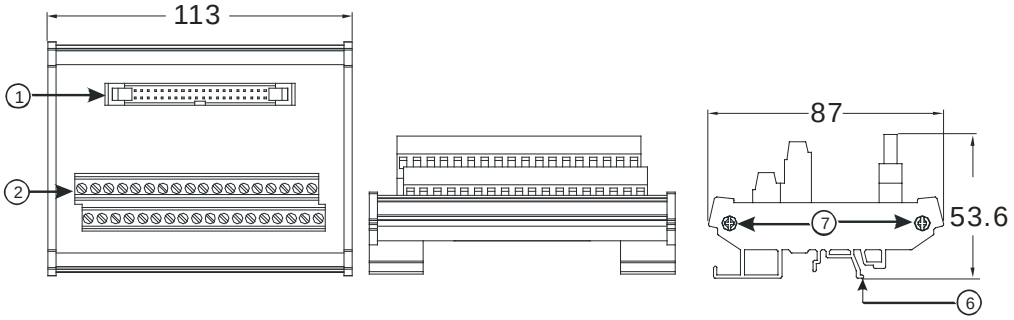
Unit: mm

◆ UB-10-OR16A



Unit: mm

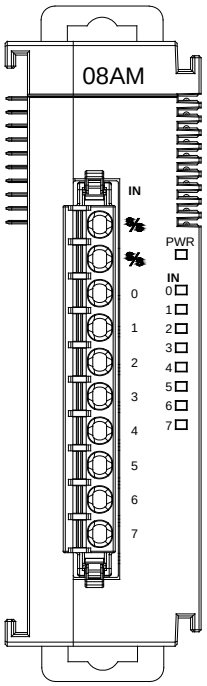
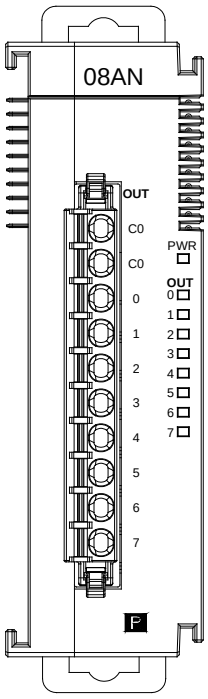
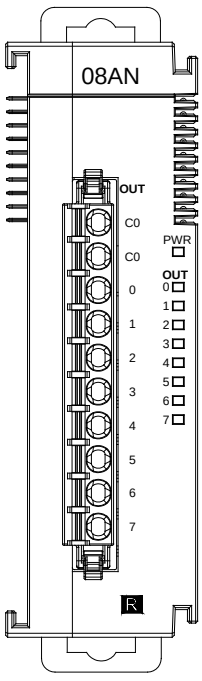
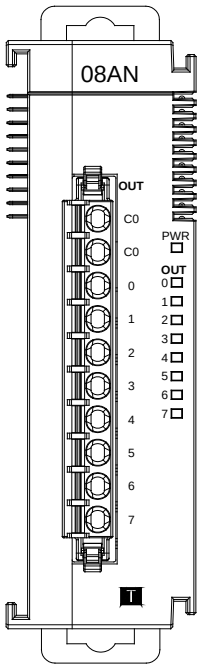
◆ UB-10-OT32A

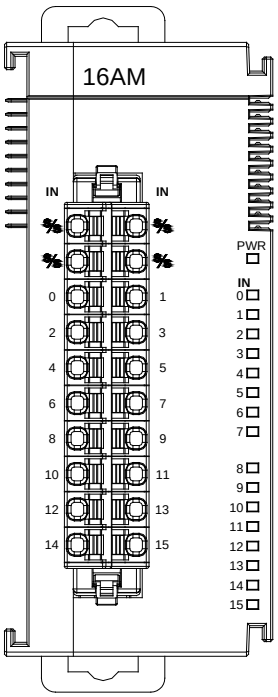
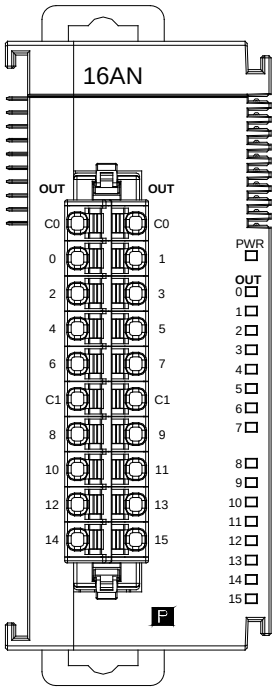


Unit: mm

Number	Name	Description
1	UB-10- ID16A /OR16A: 20-pin ML connector UB-10-OT32A: 40-pin ML connector	Connecting the external terminal module and a wiring module
2	Terminals	Input/Output terminals for wiring
3	2-pin power input terminal	Power input terminal for wiring
4	Output LED indicator	If there is an output signal, the output LED indicator is ON.
5	Relay output	Relay output
6	Clip	Hanging the external terminal module on a DIN rail
7	Set screw	Fixing the base

3.4.3 Arrangement of Input/Output Terminals

AS08AM10N-A	AS08AN01P-A
	
AS08AN01R-A	**AS08AN01T-A**
	

AS16AM10N-A	AS16AN01P-A
	
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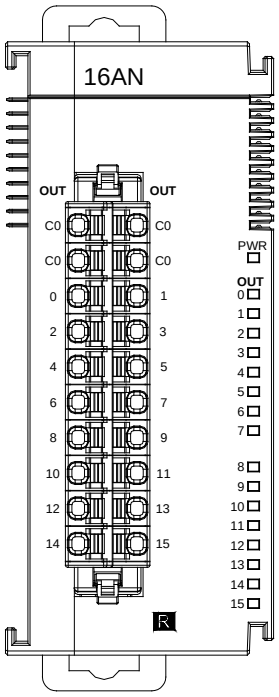	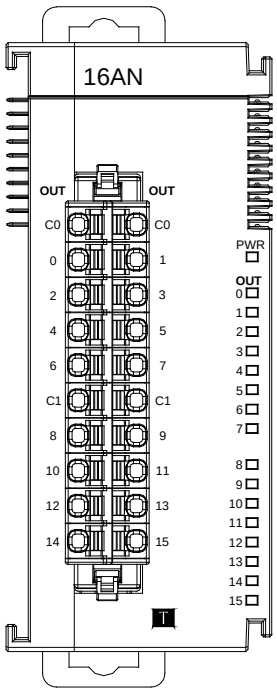

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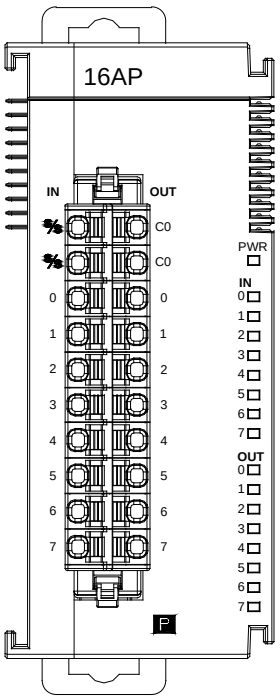	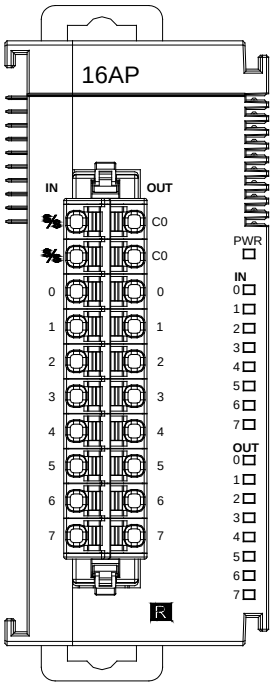
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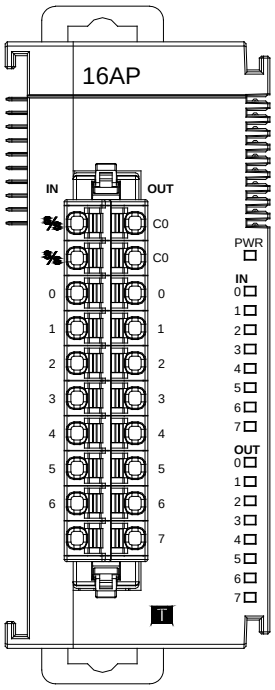
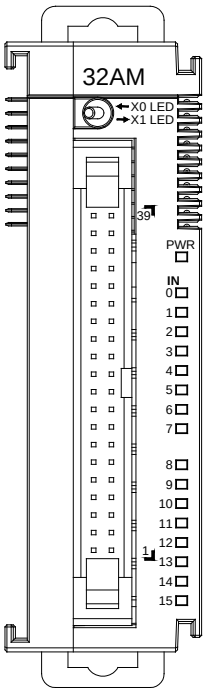
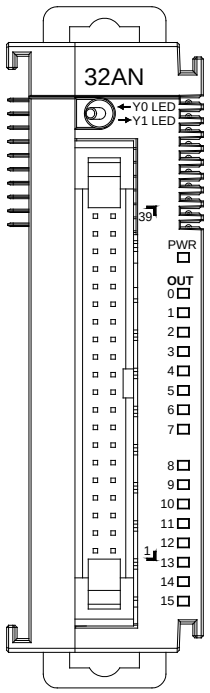
	

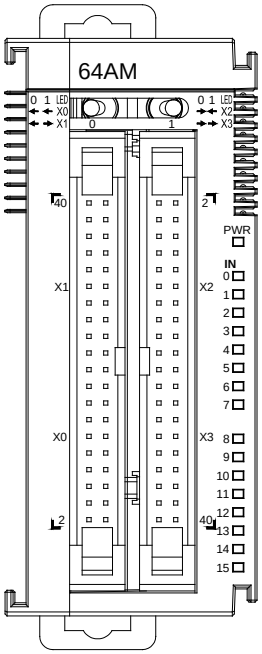
-	-
S/S	S/S
1.15	1.14
1.13	1.12
1.11	1.10
1.9	1.8
1.7	1.6
1.5	1.4
1.3	1.2
1.1	1.0
-	-
S/S	S/S
0.15	0.14
0.13	0.12
0.11	0.10
0.9	0.8
0.7	0.6
0.5	0.4
0.3	0.2
0.1	0.0

AS32AN02T-A



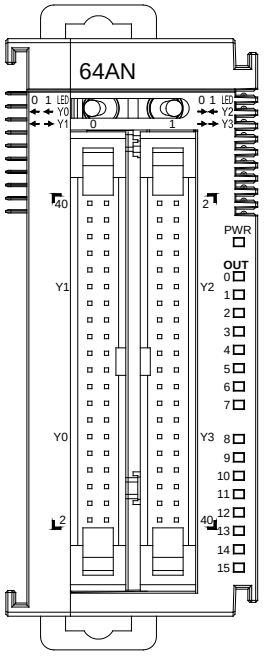
-	-
C0	C0
1.15	1.14
1.13	1.12
1.11	1.10
1.9	1.8
1.7	1.6
1.5	1.4
1.3	1.2
1.1	1.0
-	-
C0	C0
0.15	0.14
0.13	0.12
0.11	0.10
0.9	0.8
0.7	0.6
0.5	0.4
0.3	0.2
0.1	0.0

AS64AM10N-A



-	-	2.0	2.1
S/S	S/S	2.2	2.3
1.15	1.14	2.4	2.5
1.13	1.12	2.6	2.7
1.11	1.10	2.8	2.9
1.9	1.8	2.10	2.11
1.7	1.6	2.12	2.13
1.5	1.4	2.14	2.15
1.3	1.2	S/S	S/S
1.1	1.0	-	-
-	-	3.0	3.1
S/S	S/S	3.2	3.3
0.15	0.14	3.4	3.5
0.13	0.12	3.6	3.7
0.11	0.10	3.8	3.9
0.9	0.8	3.10	3.11
0.7	0.6	3.12	3.13
0.5	0.4	3.14	3.15
0.3	0.2	S/S	S/S
0.1	0.0	-	-

AS64AN02T-A

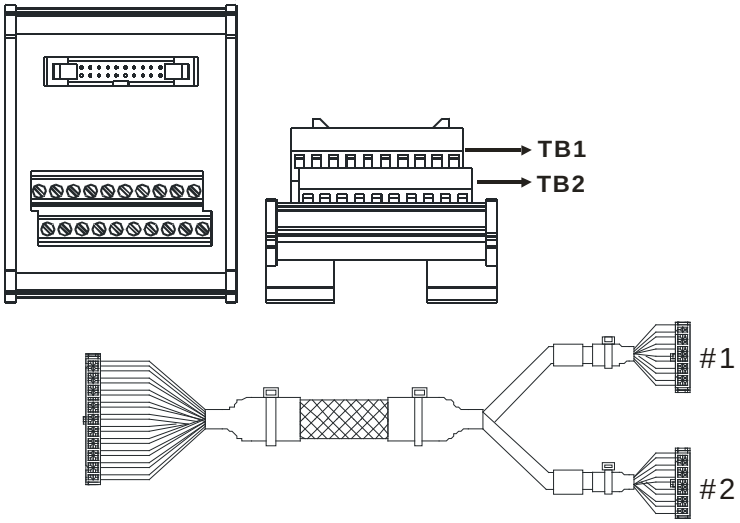


-	-	2.0	2.1
C0	C0	2.2	2.3
1.15	1.14	2.4	2.5
1.13	1.12	2.6	2.7
1.11	1.10	2.8	2.9
1.9	1.8	2.10	2.11
1.7	1.6	2.12	2.13
1.5	1.4	2.14	2.15
1.3	1.2	C1	C1
1.1	1.0	-	-
-	-	3.0	3.1
C0	C0	3.2	3.3
0.15	0.14	3.4	3.5
0.13	0.12	3.6	3.7
0.11	0.10	3.8	3.9
0.9	0.8	3.10	3.11
0.7	0.6	3.12	3.13
0.5	0.4	3.14	3.15
0.3	0.2	C1	C1
0.1	0.0	-	-

- **ML connector and the wiring module**

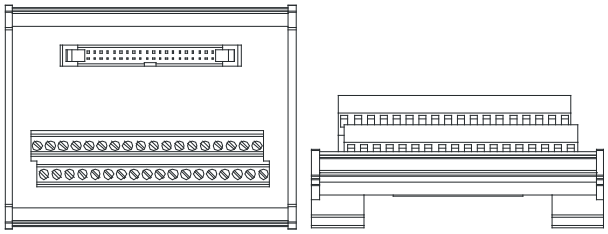
1. AS32AM10N-A/AS64AM10N-A

◆ The wiring module: UB-10-ID16A



AS32AM10N-A/ AS64AM10N-A											
#2	TB1	X0.0	X0.2	X0.4	X0.6	X0.8	X0.10	X0.12	X0.14	S/S	-
	TB2	X0.1	X0.3	X0.5	X0.7	X0.9	X0.11	X0.13	X0.15	S/S	-

◆ The wiring module: UB-10-ID32A



Terminals:

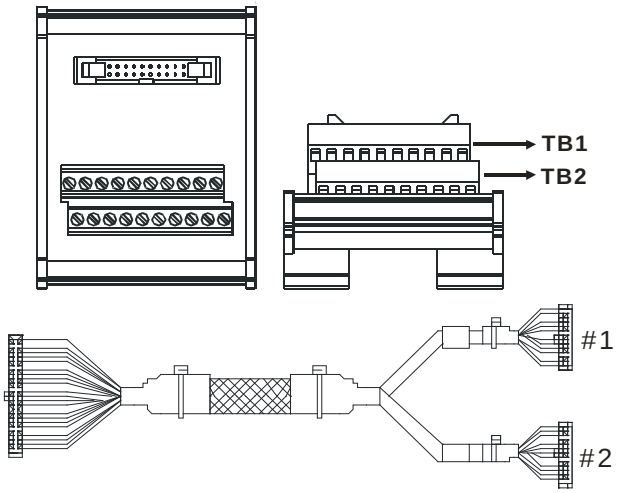
Upper row	S/S	S/S	X0	X2	X4	X6	X10	X12	X14	X16	X20	X22	X24	X26	X30	X32	X34	X36
Lower row	S/S	S/S	X1	X3	X5	X7	X11	X13	X15	X17	X21	X23	X25	X27	X31	X33	X35	X37

AS series terminals:

Upper row	X0.0	X0.2	X0.4	X0.6	X0.8	X0.10	X0.12	X0.14	X1.0	X1.2	X1.4	X1.6	X1.8	X1.10	X1.12	X1.14	S/S	S/S
Lower row	X0.1	X0.3	X0.5	X0.7	X0.9	X0.11	X0.13	X0.15	X1.1	X1.3	X1.5	X1.7	X1.9	X1.11	X1.13	X1.15	S/S	S/S

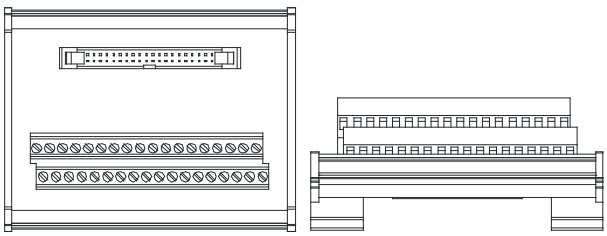
2. AS32AN02T-A/AS64AN02T-A and the wiring modules:

◆ UB-10-ID16A



AS332T-A											
#1	TB1	Y0.0	Y0.2	Y0.4	Y0.6	Y0.8	Y0.10	Y0.12	Y0.14	C0	-
	TB2	Y0.1	Y0.3	Y0.5	Y0.7	Y0.9	Y0.11	Y0.13	Y0.15	C0	-

◆ UB-10-OT32A



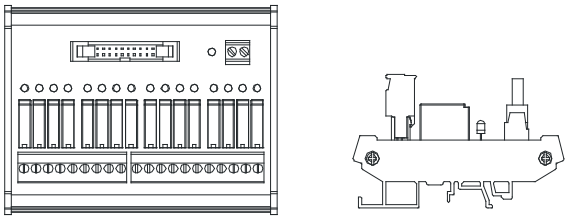
Terminals:

Upper row	Y0	Y2	Y4	Y6	Y10	Y12	Y14	Y16	Y20	Y22	Y24	Y26	Y30	Y32	Y34	Y36	+24V	+24V
Lower row	Y1	Y3	Y5	Y7	Y11	Y13	Y15	Y17	Y21	Y23	Y25	Y27	Y31	Y33	Y35	Y37	GND	GND

AS series terminals:

Upper row	Y0.0	Y0.2	Y0.4	Y0.6	Y0.8	Y0.10	Y0.12	Y0.14	Y1.0	Y1.2	Y1.4	Y1.6	Y1.8	Y1.10	Y1.12	Y1.14	•	•
Lower row	Y0.1	Y0.3	Y0.5	Y0.7	Y0.9	Y0.11	Y0.13	Y0.15	Y1.1	Y1.3	Y1.5	Y1.7	Y1.9	Y1.11	Y1.13	Y1.15	C0	C0

◆ UB-10-OR16A



Terminals:

																		GND	+24 V
C0	Y0	Y1	Y2	Y3	C1	Y4	Y5	Y6	Y7	C2	Y10	Y11	Y12	Y13	C3	Y14	Y15	Y16	Y17

AS series terminals:

																		GND	+24V
C0	Y0.0	Y0.1	Y0.2	Y0.3	C1	Y0.4	Y0.5	Y0.6	Y0.7	C2	Y0.8	Y0.9	Y0.10	Y0.11	C3	Y0.12	Y0.13	Y0.14	Y0.15

3.5 Specifications for Analog Input/Output Modules

3.5.1 General Specifications

- **AS04AD-A**

Electrical specifications

Module name	**AS04AD-A**
Number of inputs	4
Analog-to-digital conversion	Voltage input/Current input
Supply voltage	24 VDC (20.4 VDC~28.8 VDC) (-15%~+20%)
Connector type	Removable terminal block
Conversion time	2ms/channel
Isolation	An analog circuit is isolated from a digital circuit by a digital integrated circuit/an optocoupler, but the analog channels are not isolated from one another. Isolation between a digital circuit and a ground: 500 VDC Isolation between an analog circuit and a ground: 500 VDC Isolation between an analog circuit and a digital circuit: 500 VDC Isolation between the 24 VDC and a ground: 500 VDC

Functional specifications

Analog-to-digital conversion	**Voltage input**				
Rated input range	-10 V~10 V	0 V~10 V	±5 V	0 V~5 V	1 V~5 V
Hardware input range	-10.1 V~10.1 V	-0.1 V~10.1 V	-5.05 V~5.05 V	-0.05 V~5.05 V	0.95 V~5.05 V
Fiducial error (Room temperature) (The umber of input voltages which are averaged is 100.)	±0.2%				
Fiducial error (Full temperature range) (The number of input voltages which are averaged is 100.)	±0. 5%				
Linearity error (Room temperature)	±0.02%				

Analog-to-digital conversion	Voltage input
Linearity error (Full temperature range)	±0.06%
Hardware resolution	16 bits
Input impedance	2MΩ
Absolute input range	±15 V

Analog-to-digital conversion	Current input		
Rated input range	±20 mA	0 mA~20 mA	4 mA~20 mA
Hardware input range	-20.2 mA~20.2 mA	-0.2 mA~20.2 mA	3.8 mA~20.2 mA
Fiducial error (Room temperature) (The number of input currents which are averaged is 100.)	±0.2%		
Fiducial error (Full temperature range) (The number of input currents which are averaged is 100.)	±0.5%		
Linearity error (Room temperature) (Full temperature range)	±0.04%		
Linearity error	±0.10%		
Hardware resolution	16 bits		
Input impedance	250 Ω		
Absolute input range	±32 mA		

- **AS04DA-A**

Electrical specifications

Module name	AS04DA-A
Number of inputs	4
Analog-to-digital conversion	Voltage input/Current input
Supply voltage	24 VDC (20.4 VDC~28.8 VDC) (-15%~+20%)
Connector type	Removable terminal block
Conversion time	2ms/channel

Isolation	An analog circuit is isolated from a digital circuit by a digital integrated circuit/an optocoupler, but the analog channels are not isolated from one another. Isolation between a digital circuit and a ground: 500 VDC Isolation between an analog circuit and a ground: 500 VDC Isolation between an analog circuit and a digital circuit: 500 VDC Isolation between the 24 VDC and a ground: 500 VDC

Functional specifications

Analog-to-digital conversion	**Voltage input**				
Rated input range	±10 V	0 V~10 V	±5 V	0 V~5 V	1 V~5 V
Hardware input range	-10.1V~10.1V	-0.1V~10.1V	-5.05V~5.05V	-0.05V~5.05V	0.95V~5.05V
Fiducial error (Room temperature) (The umber of input voltages which are averaged is 100.)	±0.2%				
Fiducial error (Full temperature range) (The number of input voltages which are averaged is 100.)	±0. 5%				
Linearity error (Room temperature)	±0.05%				
Linearity error (Full temperature range)	±0.05%				
Hardware resolution	12 bits				
Input impedance	1kΩ~2MΩ at ±10V and 0V~10V				
Absolute input range	≧500Ω at 1V~5V				

Analog-to-digital conversion	**Current input**	
Rated input range	0 mA~20 mA	4 mA~20 mA
Hardware input range	-0.2 mA~20.2 mA	3.8 mA~20.2 mA
Fiducial error (Room temperature) (The number of input currents which are averaged is 100.)	±0.2%	

Analog-to-digital conversion	Current input
Fiducial error (Full temperature range) (The number of input currents which are averaged is 100.)	±0.5%
Linearity error (Room temperature) (Full temperature range)	±0.03%
Linearity error	±0.03%
Hardware resolution	12 bits
Input impedance	≦550 Ω

- **AS06XA-A**

Electrical specifications

Module name	AS06XA-A
Number of inputs/outputs	Inputs: 4; Outputs: 2
Analog-to-digital conversion	Voltage input/Current input; Voltage output/Current output;
Supply voltage	24 VDC (20.4 VDC~28.8 VDC) (-15%~+20%)
Connector type	Removable terminal block
Conversion time	2ms/channel
Isolation	An analog circuit is isolated from a digital circuit by a digital integrated circuit/an optocoupler, but the analog channels are not isolated from one another. Isolation between a digital circuit and a ground: 500 VDC Isolation between an analog circuit and a ground: 500 VDC Isolation between an analog circuit and a digital circuit: 500 VDC Isolation between the 24 VDC and a ground: 500 VDC

A/D Functional specifications

Analog-to-digital conversion	Voltage input				
Rated input range	-10V~10V	0V~10V	±5V	0V~5V	1V~5V
Hardware input range	-10.1V~10.1V	-0.1V~10.1V	-5.05V~5.05V	-0.05 V~5.05 V	0.95V~5.05V
Fiducial error (Room temperature) (The umber of input voltages which are averaged is 100.)	±0.2%				

Analog-to-digital conversion	Voltage input
Fiducial error (Full temperature range) (The number of input voltages which are averaged is 100.)	±0. 5%
Linearity error (Room temperature)	±0.02%
Linearity error (Full temperature range)	±0.06%
Hardware resolution	16 bits
Input impedance	2MΩ
Absolute input range	±15 V

Analog-to-digital conversion	Current input		
Rated input range	±20 mA	0 mA~20 mA	4 mA~20 mA
Hardware input range	-20.2 mA~20.2 mA	-0.2 mA~20.2 mA	3.8 mA~20.2 mA
Fiducial error (Room temperature) (The number of input currents which are averaged is 100.)	±0.2%		
Fiducial error (Full temperature range) (The number of input currents which are averaged is 100.)	±0.5%		
Linearity error (Room temperature) (Full temperature range)	±0.04%		
Linearity error	±0.10%		
Hardware resolution	16 bits		
Input impedance	250 Ω		
Absolute input range	±32 mA		

D/A Functional specifications

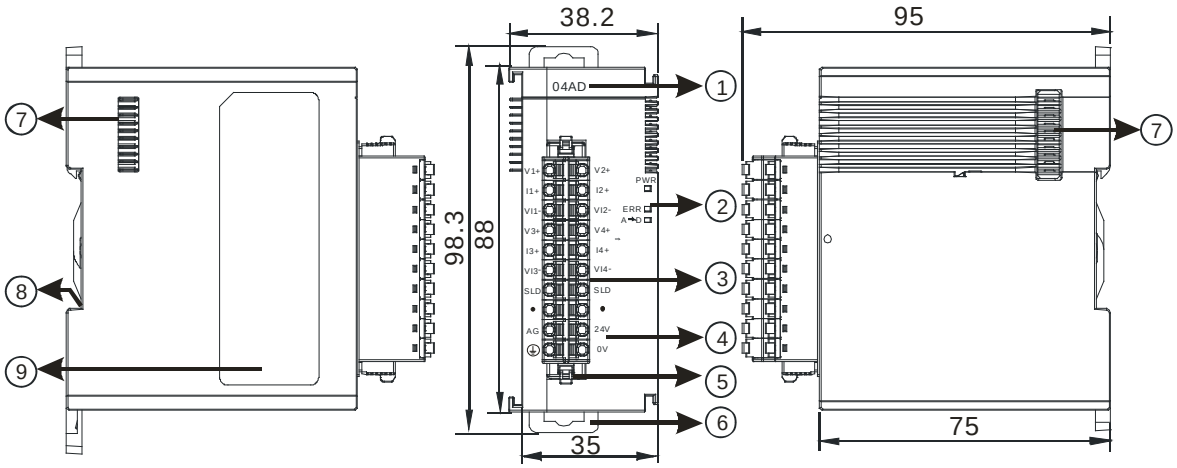
Digital-to-analog conversion	Voltage input				
Rated input range	±10V	0V~10V	±5V	0V~5V	1V~5V
Hardware input range	-10.1V~10.1V	-0.1V~10.1V	-5.05V~5.05V	-0.05 V~5.05 V	0.95V~5.05V
Fiducial error (Room temperature) (The umber of input voltages which are averaged is 100.)	±0.2%				
Fiducial error (Full temperature range) (The number of input voltages which are averaged is 100.)	±0. 5%				
Linearity error (Room temperature)	±0.05%				
Linearity error (Full temperature range)	±0.05%				
Hardware resolution	12 bits				
Input impedance	1kΩ~2MΩ at ±10V and 0V~10V				
Absolute input range	≧500Ω at 1V~5V				

Analog-to-digital conversion	Current input	
Rated input range	0mA~20mA	4mA~20mA
Hardware input range	-0.2mA~20.2mA	3.8mA~20.2mA
Fiducial error (Room temperature) (The number of input currents which are averaged is 100.)	±0.2%	
Fiducial error (Full temperature range) (The number of input currents which are averaged is 100.)	±0.5%	
Linearity error	±0.03%	

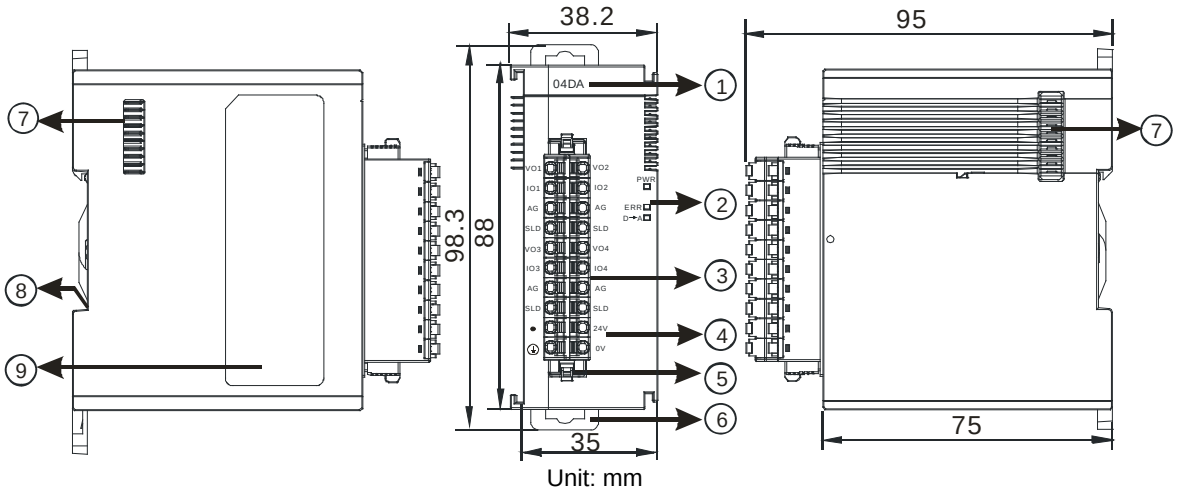
Analog-to-digital conversion	Current input
(Room temperature) (Full temperature range)	
Linearity error	±0.10%
Hardware resolution	12 bits
Input impedance	≦550 Ω

3.5.2 Profiles

- **AS04AD-A**

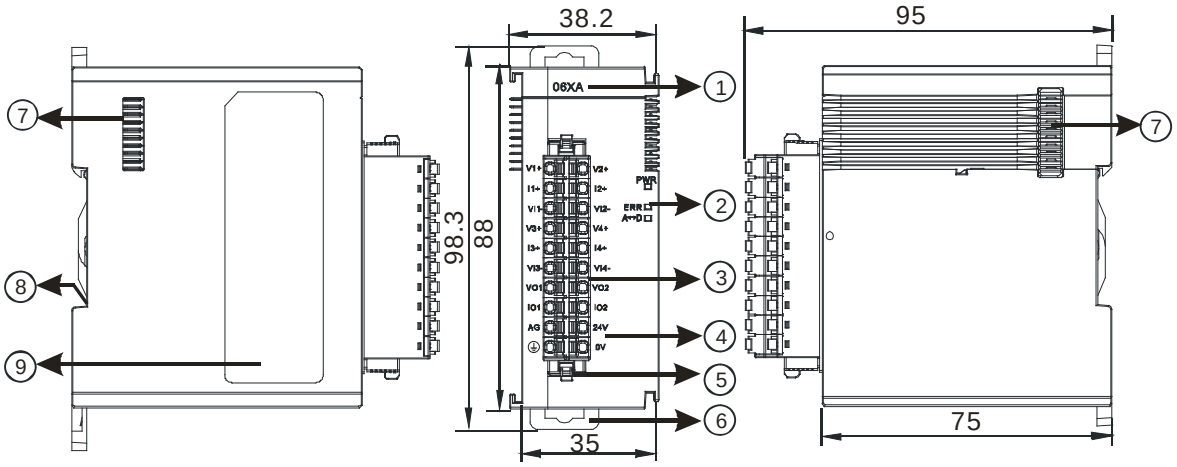


- **AS04DA-A**



Unit: mm

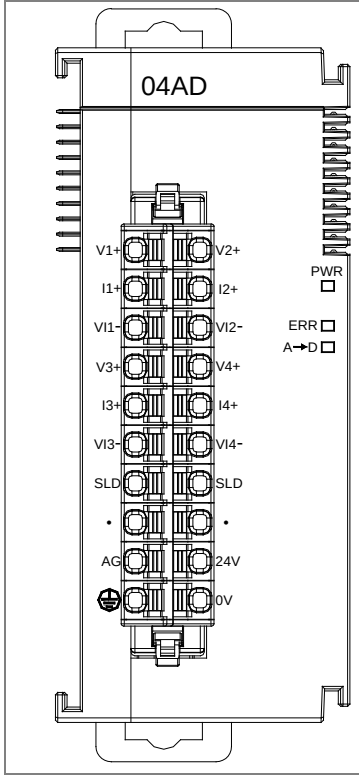
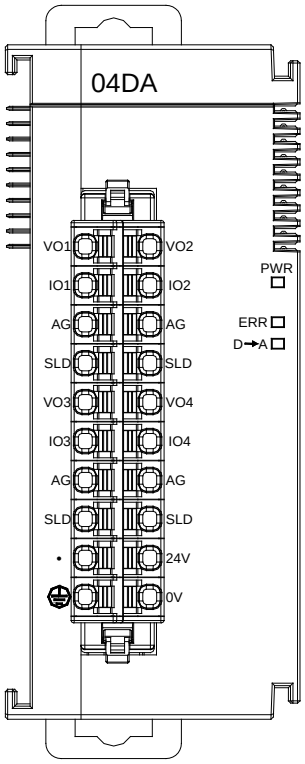
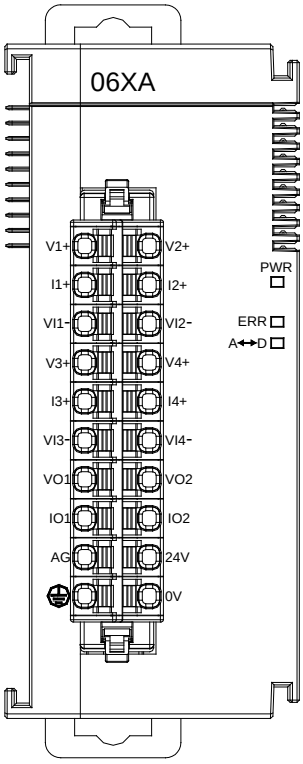
- **AS06XA-A**



Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	POWER LED indicator	Indicating the status of the power supply ON: the power is on OFF: no power
	ERROR LED indicator	Error status of the module ON: A serious error occurs in the module. OFF: The module is normal. Blinking: A slight error occurs in the module.
	Analog to digital conversion indicator	Indicating the analog to digital conversion status Blinking: conversion is taking place OFF: stop conversion
3	Removable terminal block	The inputs are connected to sensors. The outputs are connected to loads which will be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Termainal block clip	Removing the terminal block
6	DIN rail clip	Securing the module onto the DIN rail
7	Module connecting set	Connecting the modules
8	Ground clip	
9	Label	Nameplate

3.5.3 Arrangement of Input/Output Terminals

AS04AD-A	AS04DA-A	AS06XA-A
		

3.6 Specifications for Temperature Measurement Modules

3.6.1 General Specifications

- **AS04RTD-A**

Electrical specifications

Number of analog inputs	4	
Applicable sensor	2-WIRE & 3-WIRE Pt100/Ni100/Pt1000/Ni1000/ JPt100/LG-Ni1000/Cu50/Cu100/0~300Ω/0~3000Ω Pt100：DIN 43760-1980 JIS C1604-1989；100Ω 3850 PPM/°C Pt1000：DIN EN60751；1 kΩ 3850 PPM/°C Ni100/Ni1000：DIN 43760 JPt100：JIS C1604-1989 LG-Ni1000 Cu50/Cu100	
Supply voltage	24 VDC (20.4 VDC~28.8 VDC) (-15%~+20%)	
Connector type	Removable terminal block	
Overall accuracy	Pt100/Ni100/Pt1000/Ni1000/JPt100/LG-Ni1000.	25°C/77°F: The error is ±0.1% of the input within the range. -20~60°C/-4~140°F: The error is ±0.5% of the input within the range.
	Cu50	25°C/77°F: The error is ±4°C of the input within the range.

	Cu100	25°C/77°F: The error is ±2°C of the input within the range.
Conversion time	2-wire/3-wire configuration: 200 ms/channel	
Isolation	An analog circuit is isolated from a digital circuit by a digital integrated circuit/an optocoupler, and the analog channels are isolated from one another by optocouplers. Isolation between a digital circuit and a ground: 500 VDC Isolation between an analog circuit and a ground: 500 VDC Isolation between an analog circuit and a digital circuit: 500 VDC Isolation between the 24 VDC and a ground: 500 VDC	

Functional specifications

Analog-to-digital conversion	Centigrade (°C)	Fahrenheit (°F)	Input impedance
Rated input range	Pt100: -180°C~800°C Ni100: -80°C~170°C Pt1000: -180°C~800°C Ni1000: -80°C~170°C JPt100: -180°C~500°C LG-Ni100: -50°C~180°C Cu50: -50°C~150°C Cu100: -50°C~150°C	Pt100: -292°F~1,472°F Ni100: -112°F~338°F Pt1000: -292°F~1,472°F Ni1000: -112°F~338°F JPt100: -112°F~338°F LG-Ni100: -58°F~356°F Cu50: -58°F~302°F Cu100: -58°F~302°F	0~300Ω 0~3000Ω
Average function	Range: 1~100		
Self-diagnosis	Disconnection detection		

- **AS04TC-A**

Electrical specifications

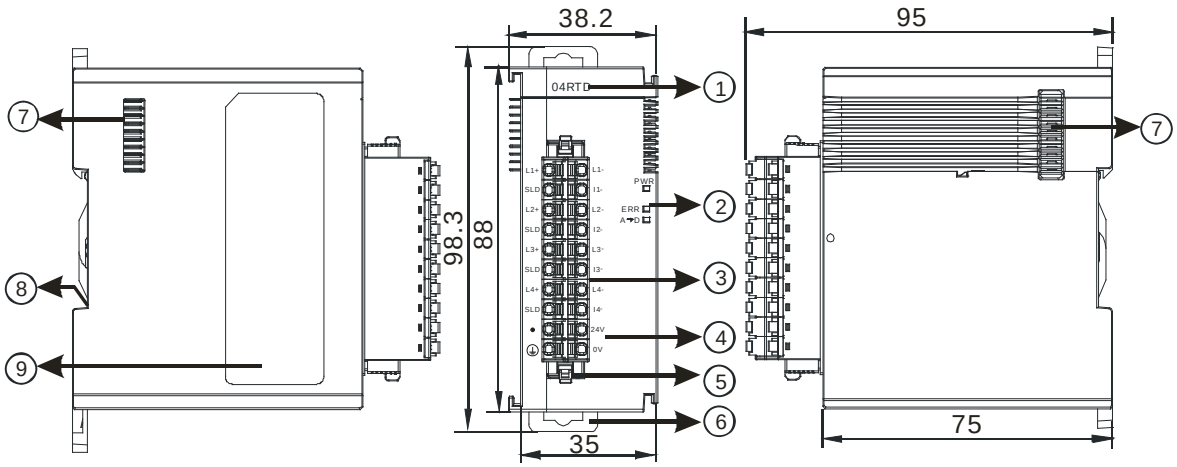
Number of analog inputs	4
Applicable sensor	Type J, K, R, S, T, E, N and B thermocouple; input impedance: ±100mV
Supply voltage	24 VDC (20.4 VDC~28.8 VDC) (-15%~+20%)
Connector type	Removable terminal block
Overall accuracy	25°C/77°F: The error is ±0.5% of the input within the range. -20~60°C/-4~140°F: The error is ±1% of the input within the range.
Conversion time	200 ms/channel
Isolation	An analog circuit is isolated from a digital circuit by a digital integrated circuit, and the analog channels are isolated from one another by optocouplers. Isolation between a digital circuit and a ground: 500 VDC Isolation between an analog circuit and a ground: 500 VDC Isolation between an analog circuit and a digital circuit: 500 VDC Isolation between two group circuits: 500 VDC Isolation between the 24 VDC and a ground: 500 VDC Isolation between the analog channels: 120VAC

Functional specifications

Analog-to-digital conversion	Centigrade (°C)	Fahrenheit (°F)	Input impedance
Rated input range	Type J: -100°C~1200°C Type K: -100°C~1,350°C Type R: 0°C~1,750°C Type S: 0°C~1,750°C Type T: -150°C~400°C Type E: -150°C~980°C Type N: -150°C~1,300°C Type B: 200°C~1,800°C	Type J: -148°F~2,192°F Type K: -148°F~2,462°F Type R: 32°F~3,182°F Type S: 32°F~3,182°F Type T: -238°F~752°F Type E: -238°F~1,796°F Type N: -238°F~2,372°F Type B: 32°F~3,182°F	±100mV
Average function	Range: 1~100		
Self-diagnosis	Disconnection detection		

3.6.2 Profiles

- **AS04RTD-A**

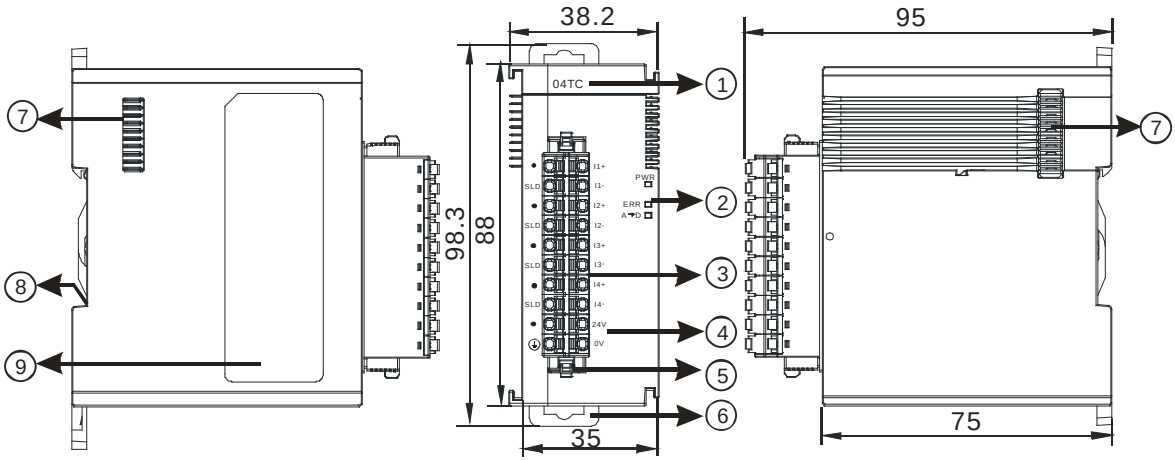


Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	POWER LED indicator	Indicating the status of the power supply ON: the power is on OFF: no power
	ERROR LED indicator	Error status of the module ON: A serious error occurs in the module. OFF: The module is normal. Blinking: A slight error occurs in the module.
	Analog to digital conversion indicator	Indicating the analog to digital conversion status Blinking: conversion is taking place OFF: stop conversion
3	Removable terminal block	The inputs are connected to sensors. The outputs are connected to loads which will be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Termainal block clip	Removing the terminal block
6	DIN rail clip	Securing the module onto the DIN rail

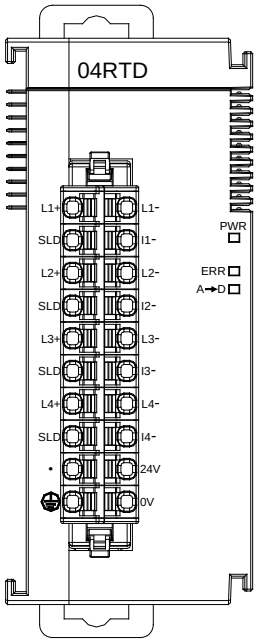
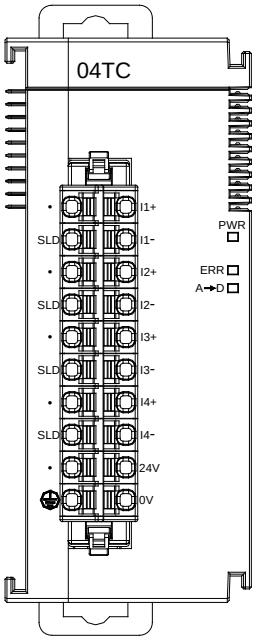
Number	Name	Description
7	Module connecting set	Connecting the modules
8	Ground clip	
9	Label	Nameplate

- **AS04TC-A**



Number	Name	Description
1	Model name	Model name of the module
2	POWER LED indicator	Indicating the status of the power supply ON: the power is on OFF: no power
	ERROR LED indicator	Error status of the module ON: A serious error occurs in the module. OFF: The module is normal. Blinking: A slight error occurs in the module.
	Analog to digital conversion indicator	Indicating the analog to digital conversion status Blinking: conversion is taking place OFF: stop conversion
3	Removable terminal block	The inputs are connected to sensors. The outputs are connected to loads which will be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Termainal block clip	Removing the terminal block
6	DIN rail clip	Securing the module onto the DIN rail
7	Module connecting set	Connecting the modules
8	Ground clip	
9	Label	Nameplate

3.6.3 Dimensions

AS04RTD-A	AS04TC-A
	

Unit: mm

3.7 Specifications for Network Modules

3.7.1 General Specifications

RS-485/RS-422/RS-232 communication interface

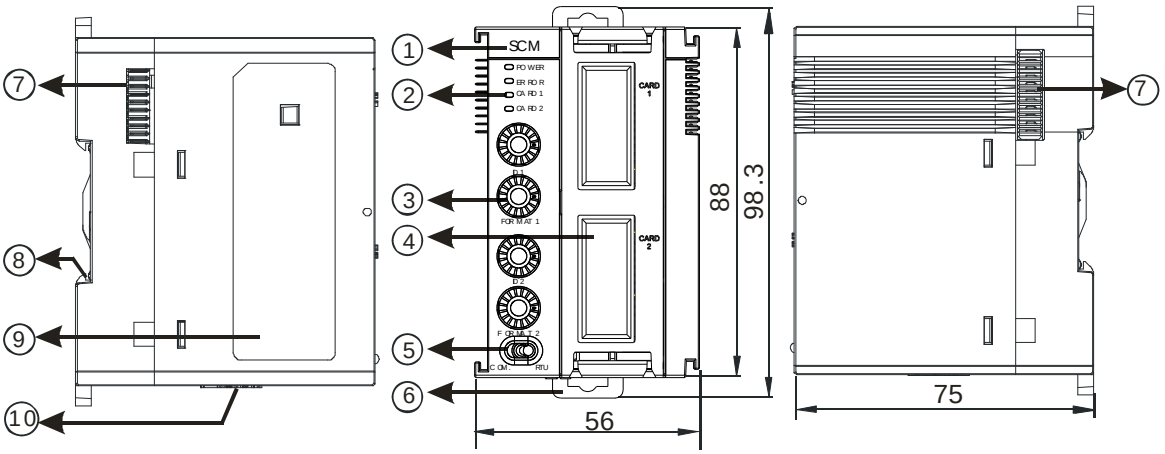
Item	Specifications
Connector type	European-style terminal block, spring-clamp termainal block
Transmission speed	300、600、1,200、2,400、4,800、9,600、19,200、38,400、57,600、76,800、115,200、230,400bps
Communication format	Stop bit: 1 stop bit or 2 stop bits Parity bit: none, an odd parity bit, or an even parity bit Data bit: 7 data bits or 8 data bits
Communication protocol	Modbus ASCII/RTU UD Link

Electrical specifications

Item	Specifications
Supply voltage	24 VDC
Electric energy consumption	0.6 W
Weight	Approximately 169 g

3.7.2 Profiles

- **AS00SCM-A**



Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	POWER LED indicator	Indicating the status of the power supply ON: the power is on OFF: no power or the power is low
	ERROR LED indicator	Error status of the module OFF: The module is normal. Blinking: ● Module setting or communication error (blinks every 1 second) ● Hardware or low power error (blinks every 0.2 second)
	Extension card 1 indicator (orange)	Blinking: communication is taking place in card 1 OFF: No communication in card 1
	Extension card 2 indicator (orange)	Blinking: communication is taking place in card 2 OFF: No communication in card 2
3	Address and function setting knobs	2 sets for setting up the address and function in card 1 and 2
4	Slot for function card 1	Available for AS-F232/AS-F422/AS-F485
	Slot for function card 2	Available for AS-F232/AS-F422/AS-F485/AS-FCOPM
5	Mode switch	COM: communication mode ; RTU: remote control mode
6	DIN rail clip	Securing the module onto the DIN rail
7	Module connecting set	Connecting the modules
8	Ground clip	
9	Label	Nameplate
10	Input for supplying power to remote modules	Power supply for the remote module

3.8 Specifications for Load Cell Modules

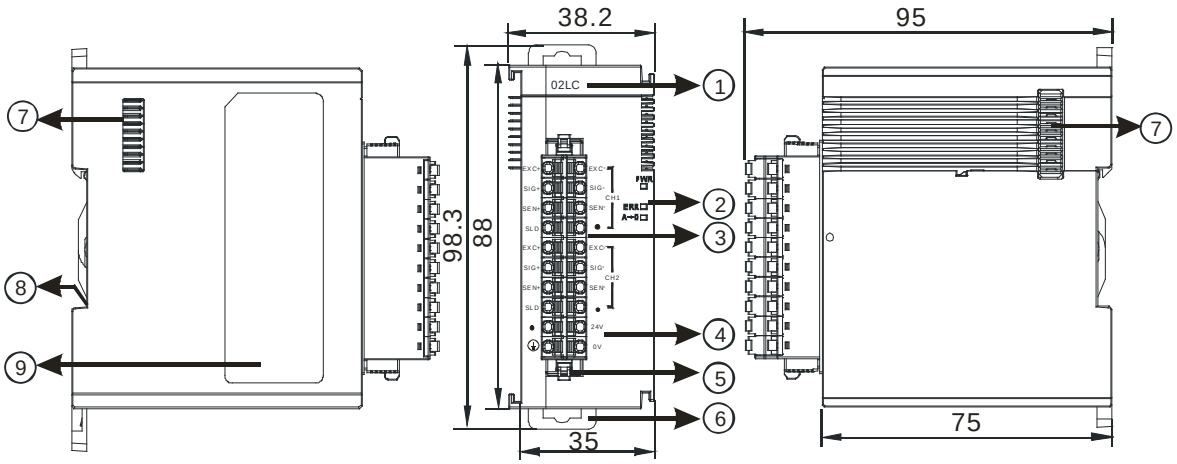
3.8.1 General Specifications

- **AS02LC-A**

Load cell module	Voltage output
Rated supply voltage/Power consumption	24 VDC (-15 to +20%) / 5W
Minimum/maximum voltage	18~31.2VDC
Maximum current consumption	150 mA
Input signal range	±40mVDC
Sensibility	+5 VDC +/-10%
ADC resolution	24 bits
Highest precision	0.04%
Applicable sensor type	4-wire or 6-wire load cell
Expanding a temperature coefficient	≤ ± 50 ppm/K v. E
Reducing a temperature coefficient to zero	≤ ± 0.4 μV/K
Linearity error	≤ 0.02%
Response time	2.5, 10, 16, 20, 50, 60, 100, 200, and 400ms
Eigenvalue applicable to a load cell	0~1, 0~2, 0~4, 0~6, 0~20, 0~40 and 0~80 mV/V
Maximum distance for connecting a load cell	100 meters
Maximum output current	5 VDC * 160 mA
Allowable load	40~4,010 Ω
Averaging weights	100
Common-mode rejection ratio (CMRR @50/60 Hz)	≥100 dB
Dynamic range	K1~K5
Averaging weights	K1~K100
Isolation	Between a digital circuit and the ground: 500 VAC Between an analog circuit and the ground: 500 VAC Between an analog circuit and a digital circuit: 500 VAC

3.8.2 Profiles

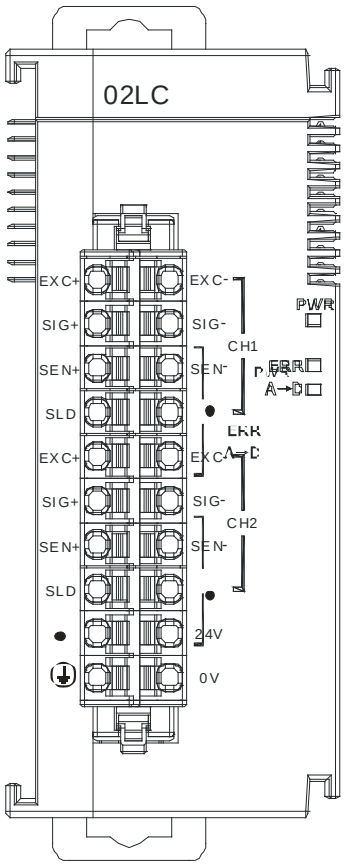
- **AS02LC-A**



Number	Name	Description
1	Model name	Model name of the module
2	POWER LED indicator	Indicating the status of the power supply ON: the power is on OFF: no power
	ERROR LED indicator	Error status of the module ON: A serious error occurs in the module. OFF: The module is normal. Blinking: A slight error occurs in the module.
	Analog to digital conversion indicator	Indicating the analog to digital conversion status Blinking: conversion is taking place OFF: stop conversion
3	Removable terminal block	The inputs are connected to sensors. The outputs are connected to loads which will be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Termainal block clip	Removing the terminal block
6	DIN rail clip	Securing the module onto the DIN rail
7	Module connecting set	Connecting the modules
8	Ground clip	
9	Label	Nameplate

3.8.3 Dimensions

- **AS02LC-A**



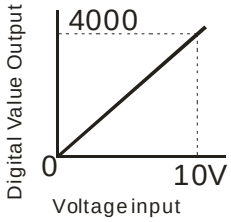
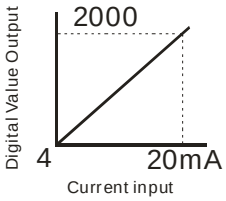
Unit: mm

3.9 Specifications for the Extension Card

3.9.1 General Specifications

- **AS-F2AD**

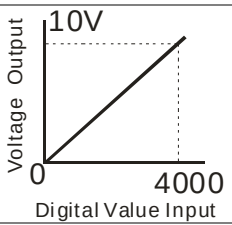
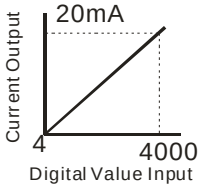
2 analog signal input channels:

Item	Voltage Input		Current input
Analog Signal	DC 0~+10V		DC 4~20mA
Resolution	12-bit		11-bit
Input impedance	2MΩ		250Ω
Conversion time	3ms / CH		
Characteristic curve			
Digital value output	Card1	SR168 (CH1)	SR169 (CH2)
	Card2	SR170 (CH1)	SR171 (CH2)

Users can use the program to read the values in SR to obtain the corresponding A/D conversion value for the channel.

- **AS-F2DA**

2 analog signal output channels:

Item	Voltage output		Current output
Analog Signal	DC 0~+10V		DC 4~20mA
Resolution	12-bit		12-bit
Input impedance	≥1kΩ		≤500Ω
Conversion time	2ms / CH		
Characteristic curve			
Digital value output	Card1	SR172 (CH1)	SR173 (CH2)
	Card2	SR174 (CH1)	SR175 (CH2)

Users can use the instruction MOV to move the value to the SR to obtain the corresponding voltage output value.

- **AS-F232**

AS series PLC is built with COM1 (RS-485), and COM2 (RS-485). Users can use this extension card for communication via different interface such as RS-232, PC and so on. Other than the different communication interface, the communication functions including are the same as the built-in ones; the communication port can be set as a Slave or a Master node. After installing the extension card, go to the HWCONFIG in the ISPSoft for communication setups.

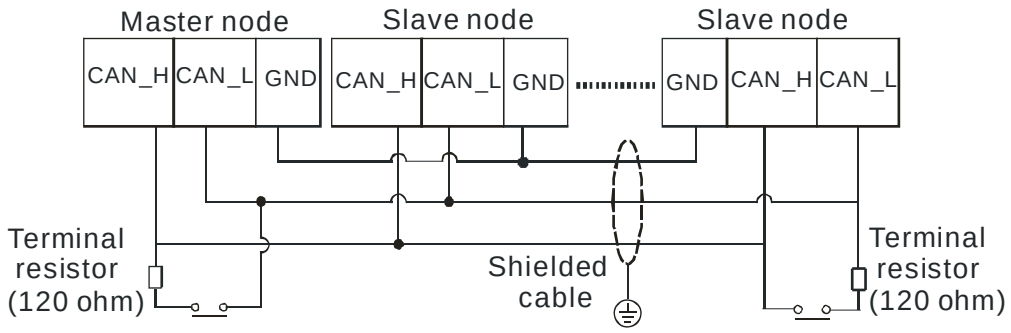
■ Wiring example

DB9 male to DB9 female (standard cable)

- **AS-FCOPM**

With its own standalone communication port, it can work independently and can be set as a Slave or a Master node. After installing the extension card, go to the HWCONFIG in the ISPSoft for communication setups.

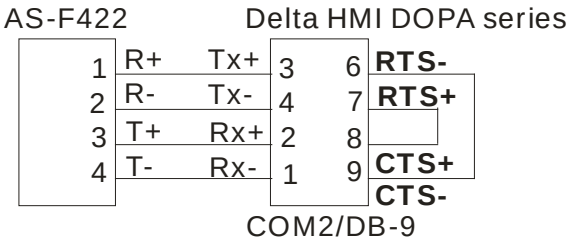
■ Wiring example



- **AS-F422**

Users can use this extension card for communication with Delta HMI series or other devices via RS-422 communication port. Other than the different communication interface, the communication functions including are the same as the built-in ones; the communication port can be set as a Slave or a Master node. After installing the extension card, go to the HWCONFIG in the ISPSoft for communication setups.

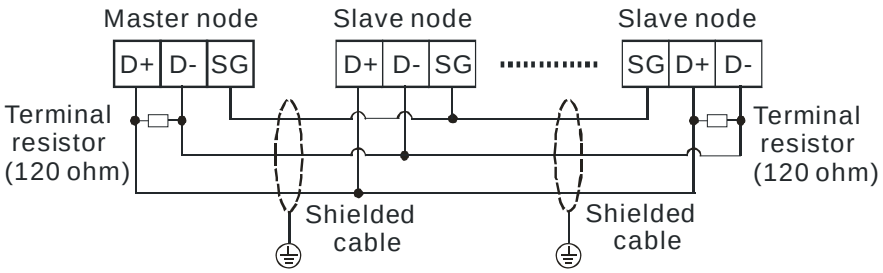
■ Wiring example of the communication with Delta HMI DOPA series via COM2



- **AS-F485**

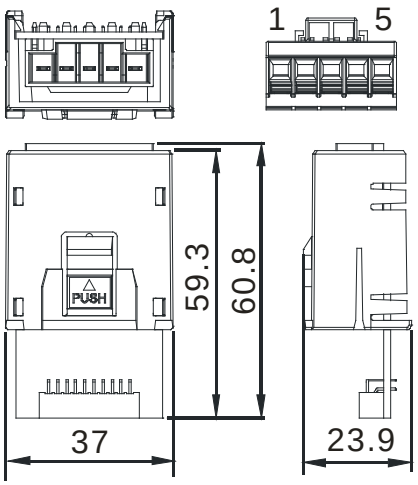
With its own standalone communication port, it can work independently and can be set as a Slave or a Master node. After installing the extension card, go to the HWCONFIG in the ISPSoft for communication setups.

■ Wiring example



3.9.2 Profiles

- **AS-F2AD/AS-F2DA/AS-F422/AS-F485**

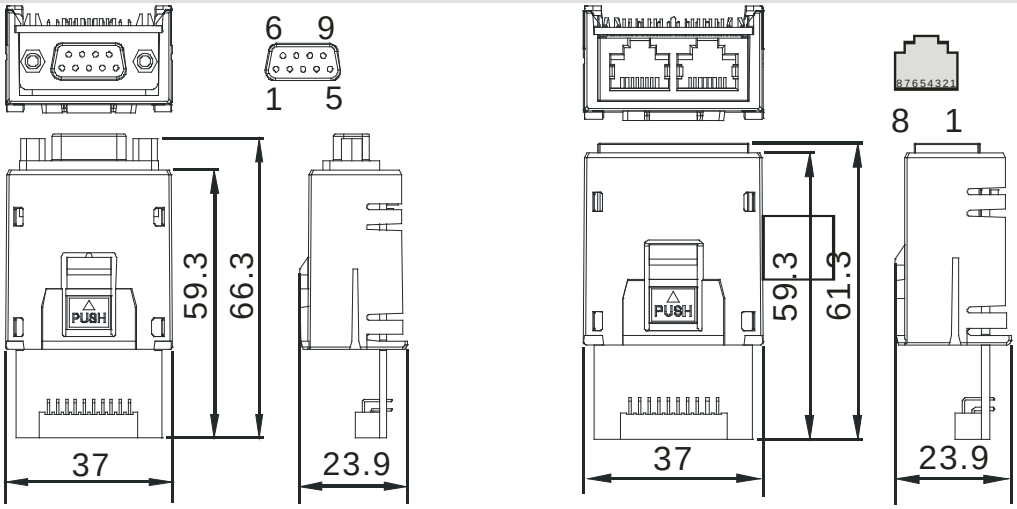


Unit: mm

Pin no.	AS-F2AD	AS-F2DA	AS-F422	AS-F485
1	V1+	VO1	R+	-
2	I1+	IO1	R-	-
3	V2+	VO2	T+	D+
4	I2+	IO2	T-	D-
5	COM	COM	SG	SG

- **AS-F232/AS-FCOPM**

AS-F232	AS-FCOPM



Unit: mm

Pin no.	AS-F232	AS-FCOPM
1	-	CAN_H
2	TX	CAN_L
3	RX	GND
4	-	-
5	GND	-
6-9	-	-

MEMO

4

Chapter 4 Assigning Addresses

Table of Contents

4.1 Assigning I/O Addresses

The assignment of input devices and that of output devices to an AS series input/output module are explained in this chapter.

HWCONFIG in ISPSoft

The following is the **HWCONFIG** window in ISPSoft. Please refer to chapter 8 in AS Series Operation Manual for more information related to the hardware configuration.

- **Software-defined address**

Addresses are automatically assigned to an input/output module through HWCONFIG in ISPSoft. In other words, a start address is automatically assigned to an input/output module through HWCONFIG in ISPSoft.

CPU Group

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Power Module	Power Module	AS-PS02	None		
CPU Module	CPU Module	AS332P	01.00.00	X0.0 ~ X0.15	Y0.0 ~ Y0.15
Function Card1					
Function Card2					
Module Information1	Digital I/O Module	AS32AM10N	01.00.00	X1.0 ~ X2.15	
Module Information2	Digital I/O Module	AS32AN02T	01.00.00		Y1.0 ~ Y2.15
Module Information3	Digital I/O Module	AS64AM10N	01.00.00	X3.0 ~ X6.15	
Module Information4	Digital I/O Module	AS64AN02T	01.00.00		Y3.0 ~ Y6.15
Module Information5	Analog I/O Module	AS04AD-A	00.50.00	D28080 ~ D28099	
Module Information6	Analog I/O Module	AS04DA-A	00.50.00	D28100 ~ D28101	D28102 ~ D28119
Module Information7	Analog I/O Module	AS06XA-A	00.40.00	D28120 ~ D28129	D28130 ~ D28139

- **Remote module address**

Users can assign a start address to a remote module through HWCONFIG in ISPSoft. Double-click the CPU module and select Function Card 1/2. Change the Card 1/2 Detect mode to Manual and then select AS-FCOPM from the Manual Select Card. Users can assign a start address to the first remote module installed on the right side of the I/O module slot. And the following I/O module will be assigned with an address followed by the assigned address automatically.

Remote Module Group 1

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Remote Module	Network Module	AS00SCM-A	00.33.00	D29000 ~ D29009	D29010 ~ D29019
Function Card1					
Function Card2	Function Card	AS-FCOPM	None		
Module Information1	Analog I/O Module	AS04AD-A	00.50.00	D29020 ~ D29039	
Module Information2	Analog I/O Module	AS04DA-A	00.50.00	D29040 ~ D29041	D29042 ~ D29059
Module Information3	Analog I/O Module	AS06XA-A	00.40.00	D29060 ~ D29069	D29070 ~ D29079
Module Information4	Analog I/O Module	AS04RTD-A	00.40.00	D29080 ~ D29099	
Module Information5	Analog I/O Module	AS04TC-A	00.40.00	D29100 ~ D29119	
Module Information6	Analog I/O Module	AS02LC-A	00.40.00	D29120 ~ D29125	D29126 ~ D29139
Module Information7	Digital I/O Module	AS64AM10N	01.00.00	X7.0 ~ X10.15	
Module Information8	Digital I/O Module	AS64AN02T	01.00.00		Y2.0 ~ Y10.15

4.2 Software-defined Addresses

4.2.1 Start Addresses for Digital Input/Output Modules

Input/Output devices are automatically assigned to a digital input/output module through HWCONFIG in ISPSoft according to the number of inputs/outputs which the digital input/output module has (X0.0~X0.15, X1.0~X1.15, X2.0~X2.15... ; Y0.0~Y0.15, Y1.0~Y1.15, Y2.0~Y2.15) . The default start addresses are shown below.

- AS332T/AS332P: There are 16 inputs. The input and output device range occupies 16 bits. (X**n**.0~X**n**.15), (Y**n**.0~Y**n**.15).
- AS324MT: There are 16 outputs. The input and output device range occupies 16 bits. (X**n**.0~X**n**.15), (Y**n**.0~Y**n**.15).
- 08AM: There are 8 inputs. The input device range occupies 16 bits (X**n**.0~X**n**.15).
- 08AN: There are 8 outputs. The output device range occupies 16 bits (Y**n**.0~Y**n**.15).
- 16AM: There are 16 inputs. The input device range occupies 16 bits (X**n**.0~X**n**.15).
- 16AN: There are 16 outputs. The output device range occupies 16 bits (Y**n**.0~Y**n**.15).
- 16AP: There are 8 inputs and 8 outputs. The input and output device range occupies 16 bits. (X**n**.0~X**n**.15), (Y**n**.0~Y**n**.15).
- 32AM: There are 32 inputs. The input device range occupies 32 bits (X**n**.0~X**n+1**.15).
- 32AN: There are 32 outputs. The output device range occupies 32 bits (Y**n**.0~Y**n+1**.15).
- 64AM: There are 64 inputs. The input device range occupies 64 bits (X**n**.0~X**n+3**.15).
- 64AN: There are 64 outputs. The output device range occupies 64 bits (Y**n**.0~Y**n+3**.15).

CPU Group

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Power Module	Power Module	AS-PS02	None		
CPU Module	CPU Module	AS332P	01.00.00	X0.0 ~ X0.15	Y0.0 ~ Y0.15
Function Card1					
Function Card2	Function Card	AS-FCOPM	None		
Module Information1	Digital I/O Module	AS08AM10N	01.00.00	X1.0 ~ X1.15	
Module Information2	Digital I/O Module	AS08AN01P	01.00.00		Y1.0 ~ Y1.15
Module Information3	Digital I/O Module	AS16AM10N	01.00.00	X2.0 ~ X2.15	
Module Information4	Digital I/O Module	AS16AN01T	01.00.00		Y2.0 ~ Y2.15
Module Information5	Digital I/O Module	AS16AP11T	01.00.00	X3.0 ~ X3.15	Y3.0 ~ Y3.15
Module Information6	Digital I/O Module	AS32AM10N	01.00.00	X4.0 ~ X5.15	
Module Information7	Digital I/O Module	AS32AN02T	01.00.00		Y4.0 ~ Y5.15
Module Information8	Digital I/O Module	AS64AM10N	01.00.00	X6.0 ~ X9.15	

4.2.2 Start Addresses for Analog Input/Output Modules

Input/Output data registers are automatically assigned to an analog input/output module through HWCONFIG in ISPSoft according to the number of registers which is defined for the analog input/output module. A channel occupies two words.

- 04AD: There are 4 input channels. The input device range occupies 20 data registers.
- 004DA: There are 4 output channels. The input device range occupies 2 data registers and the output device range occupies 18 data registers.
- 06XA: There are 4 input channels, and 2 output channels. The input device range occupies 10 data registers, and the output device range occupies10 data registers.

CPU Group

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Power Module	Power Module	AS-PS02	None		
CPU Module	CPU Module	AS332T	01.00.00	X0.0 ~ X0.15	Y0.0 ~ Y0.15
Function Card1					
Function Card2					
Module Information1	Analog I/O Module	AS04AD-A	00.50.00	D28000 ~ D28019	
Module Information2	Analog I/O Module	AS04DA-A	00.50.00	D28020 ~ D28021	D28022 ~ D28039
Module Information3	Analog I/O Module	AS06XA-A	00.40.00	D28040 ~ D28049	D28050 ~ D28059

4.2.3 Start Addresses for Temperature Measurement Modules

Input data registers are automatically assigned to a temperature measurement module through HWCONFIG in ISPSoft according to the number of registers which is defined for the temperature measurement module. A channel occupies two words.

- 04RTD: There are 4 input channels. The input device range occupies 20 data registers.
- 04TC: There are 4 input channels. The input device range occupies 20 data registers.

CPU Group

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Power Module	Power Module	AS-PS02	None		
CPU Module	CPU Module	AS332T	01.00.00	X0.0 ~ X0.15	Y0.0 ~ Y0.15
Function Card1					
Function Card2					
Module Information1	Analog I/O Module	AS04RTD-A	00.40.00	D28000 ~ D28019	
Module Information2	Analog I/O Module	AS04TC-A	00.40.00	D28020 ~ D28039	

4.2.4 Start Addresses for Network Modules

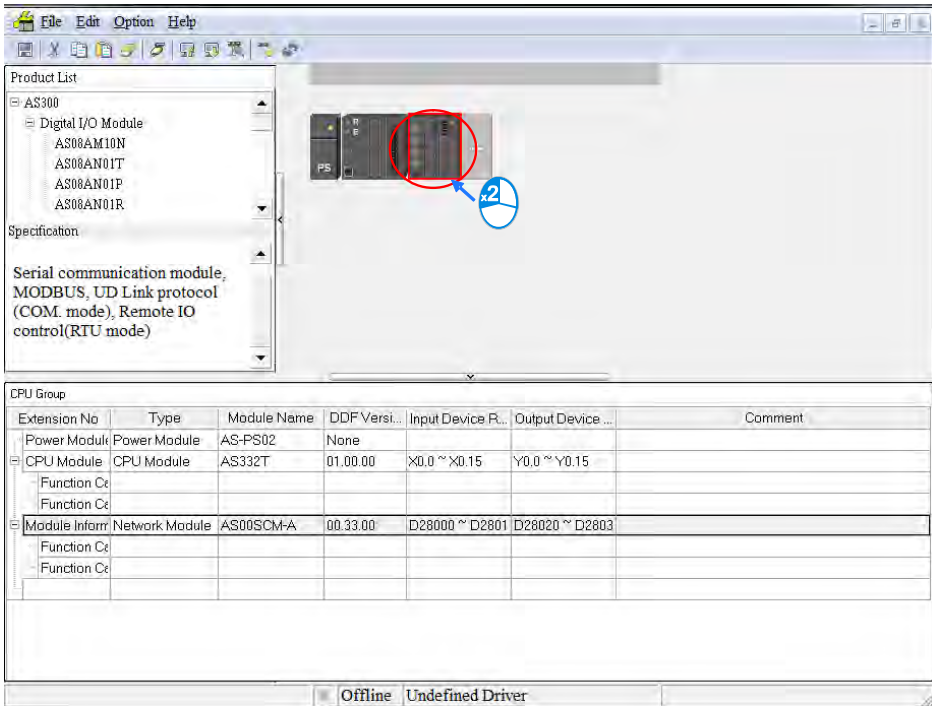
Input/Output data registers are automatically assigned to a network module through HWCONFIG in ISPSoft according to the number of registers which is defined for the network module.

- SCM: communication status and communication method; the input device range occupies 20 data registers, and the output device range occupies 20 data registers.

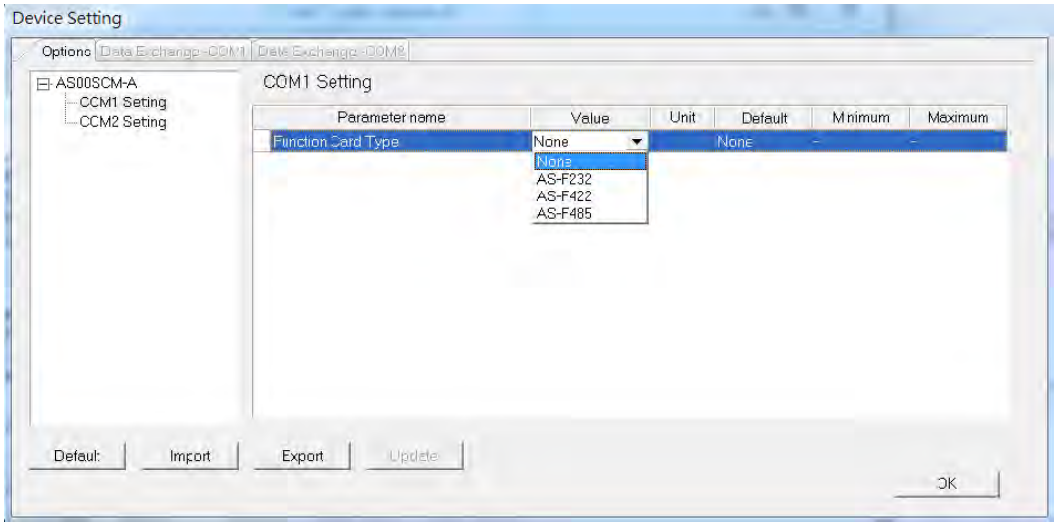
CPU Group

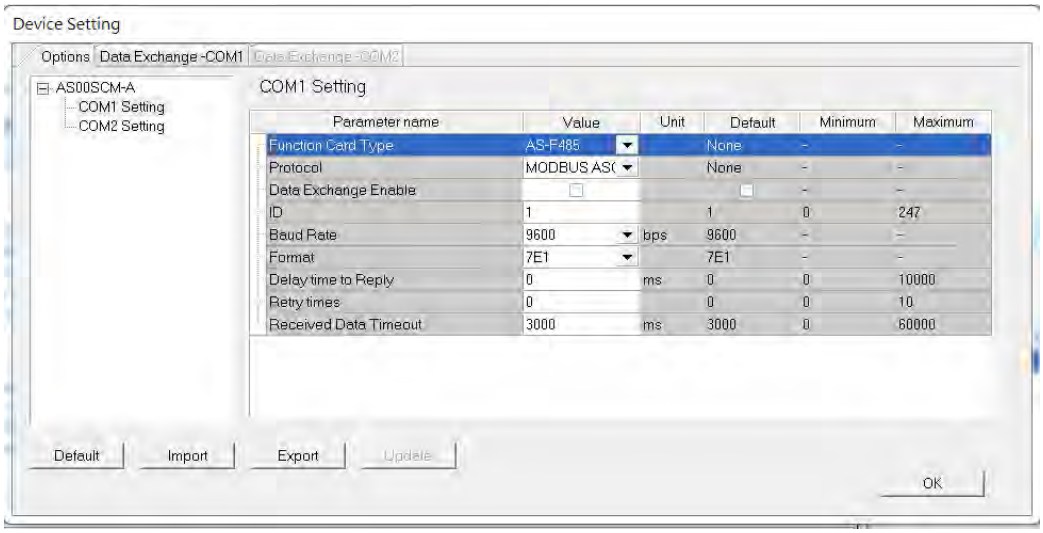
Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Power Module	Power Module	AS-PS02	None		
CPU Module	CPU Module	AS332T	01.00.00	X0.0 ~ X0.15	Y0.0 ~ Y0.15
Function Card1					
Function Card2					
Module Information1	Network Module	AS00SCM-A	00.33.00	D28000 ~ D28019	D28020 ~ D28039
Function Card1					
Function Card2					

Click on the SCM module to see the device setting page.

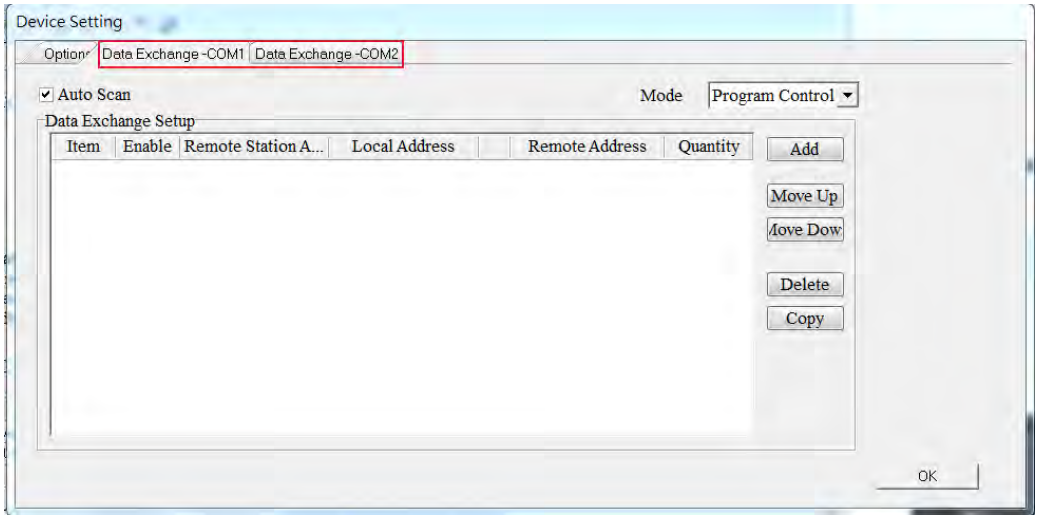


Click COM1/COM2 option to select the function card value from the drop-down list.



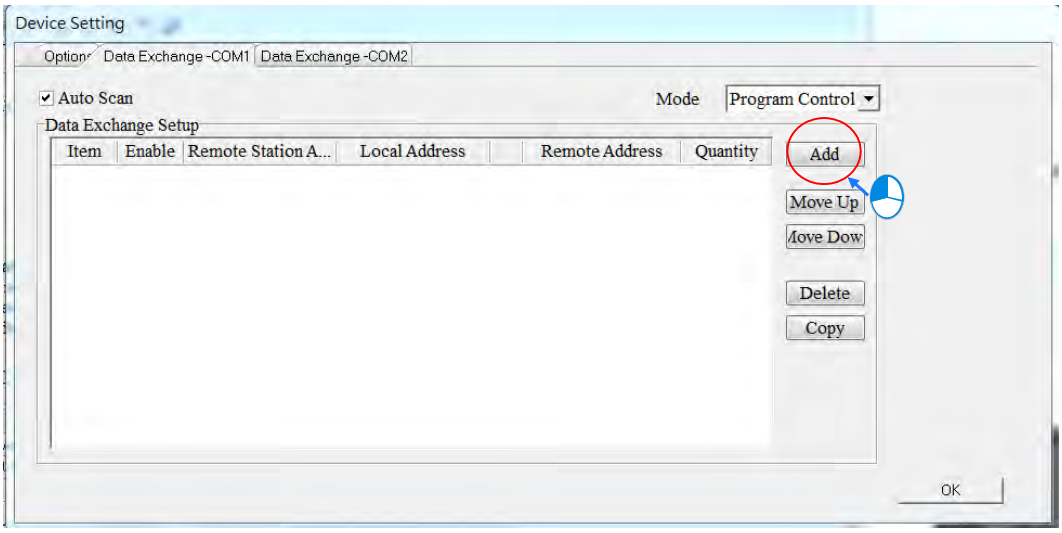


After the settings for COM1/COM2 are done, setups for Data Exchange –COM1, and Data Exchange-COM2 can be done on the setup pages.

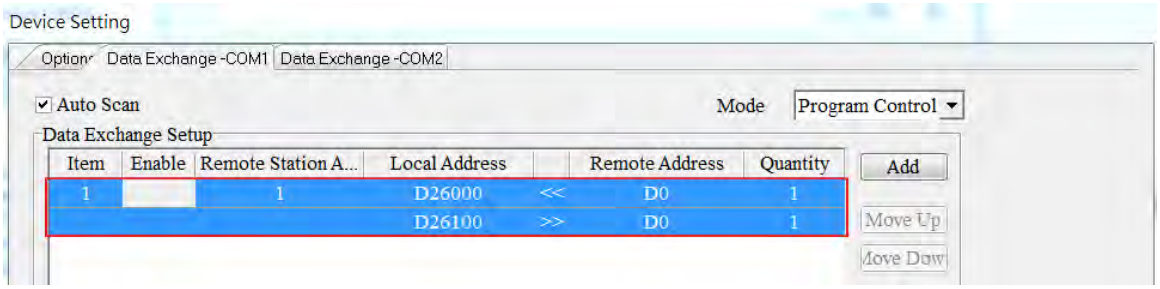


Example of setting up a data exchange to send and receive 100 data registers:

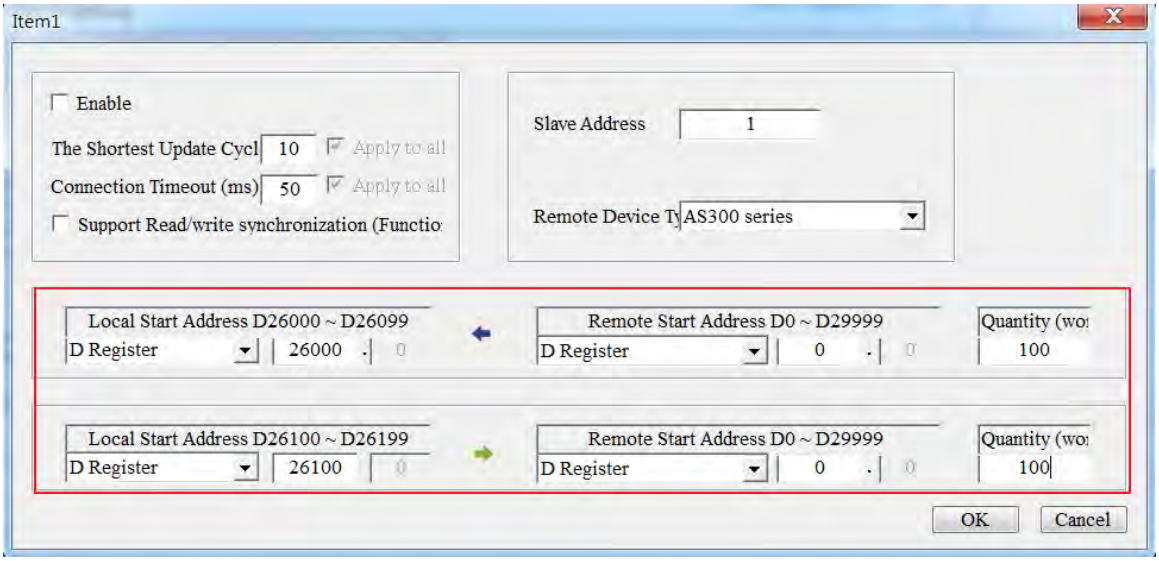
1. Click Add.



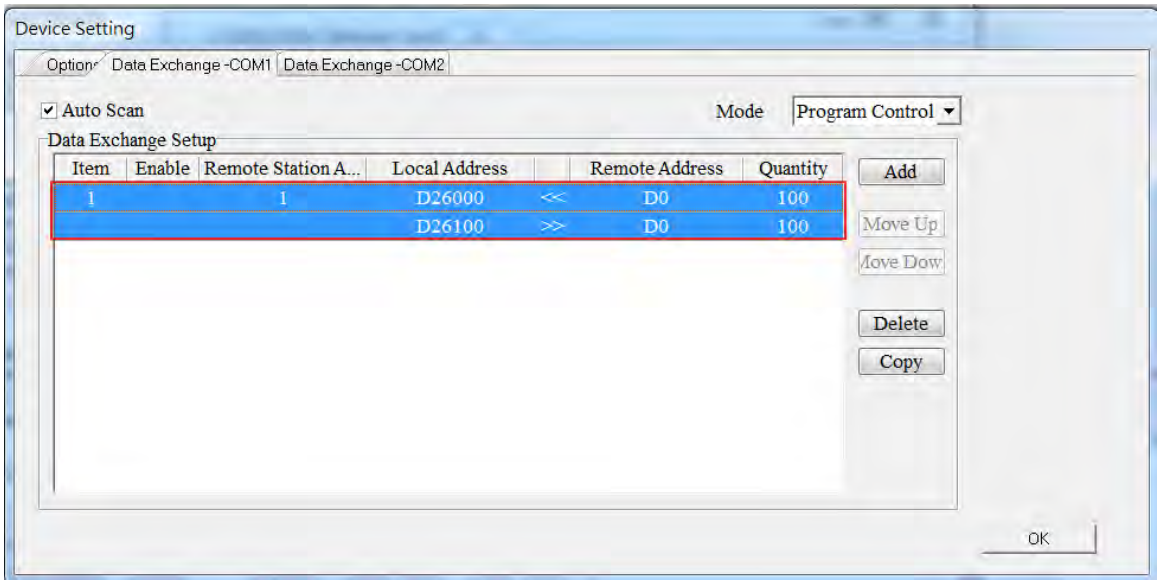
2. Double-click the highlighted area to see the setup page for data exchange.



3. Set up the local start address, remote start address and the quantity.



4. The setups for SCM COM1/COM2 are done.



- Function card 1 using AS-F232: The input device range and output device range occupy 100 data registers respectively.

- Function card 1 using AS-F485: The input device range and output device range occupy 100 data registers respectively.

CPU Group

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Power Module	Power Module	AS-PS02	None		
CPU Module	CPU Module	AS332T	01.00.00	X0.0 ~ X0.15	Y0.0 ~ Y0.15
Function Card1					
Function Card2					
Module Information1	Network Module	AS00SCM-A	00.33.00	D28000 ~ D28019	D28020 ~ D28039
Function Card1	Function Card	AS-F232	None	D26000 ~ D26099	D26100 ~ D26199
Function Card2	Function Card	AS-F485	None	D26200 ~ D26299	D26300 ~ D26399

- Remote module AS00SCM: The input device range and output device range occupy 10 data registers respectively.

Remote Module Group 1

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Remote Module	Network Module	AS00SCM-A	00.33.00	D29000 ~ D29009	D29010 ~ D29019
Function Card1					
Function Card2	Function Card	AS-FCOPM	None		
Module Information1	Digital I/O Module	AS08AM10N	01.00.00	X1.0 ~ X1.15	
Module Information2	Digital I/O Module	AS08AN01T	01.00.00		Y1.0 ~ Y1.15
Module Information3	Digital I/O Module	AS16AM10N	01.00.00	X2.0 ~ X2.15	
Module Information4	Digital I/O Module	AS16AN01T	01.00.00		Y2.0 ~ Y2.15
Module Information5	Digital I/O Module	AS16AP11T	01.00.00	X3.0 ~ X3.15	Y3.0 ~ Y3.15
Module Information6	Digital I/O Module	AS32AM10N	01.00.00	X4.0 ~ X5.15	
Module Information7	Digital I/O Module	AS32AN02T	01.00.00		Y4.0 ~ Y5.15
Module Information8	Digital I/O Module	AS64AM10N	01.00.00	X6.0 ~ X9.15	

4.2.5 Start Addresses for Load Cell Modules

Input data registers are automatically assigned to a load cell module through HWCONFIG in ISPSoft according to the number of registers which is defined for the load cell module.

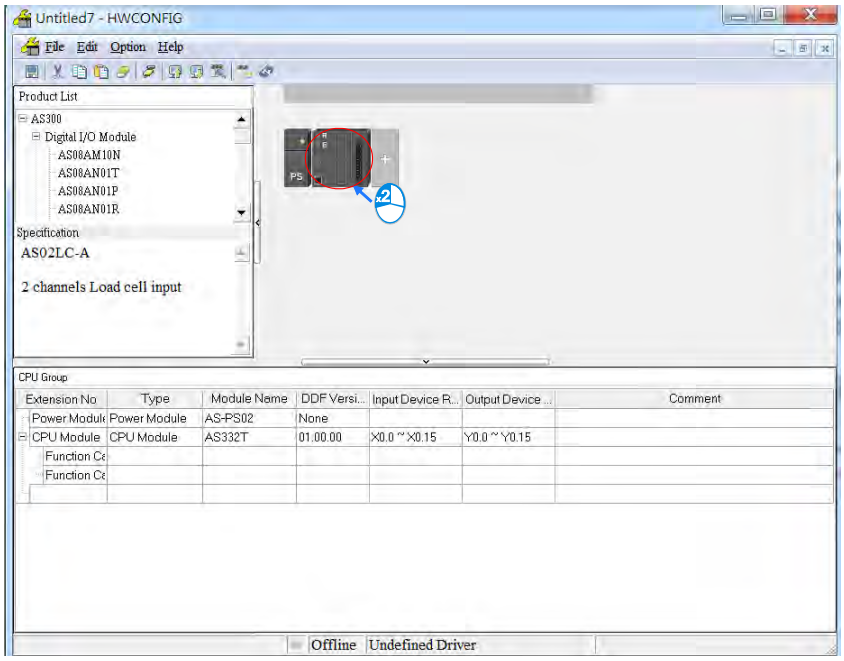
- 02LC: The input device range occupies 6 data registers and the output device range occupies 14 data registers.

CPU Group

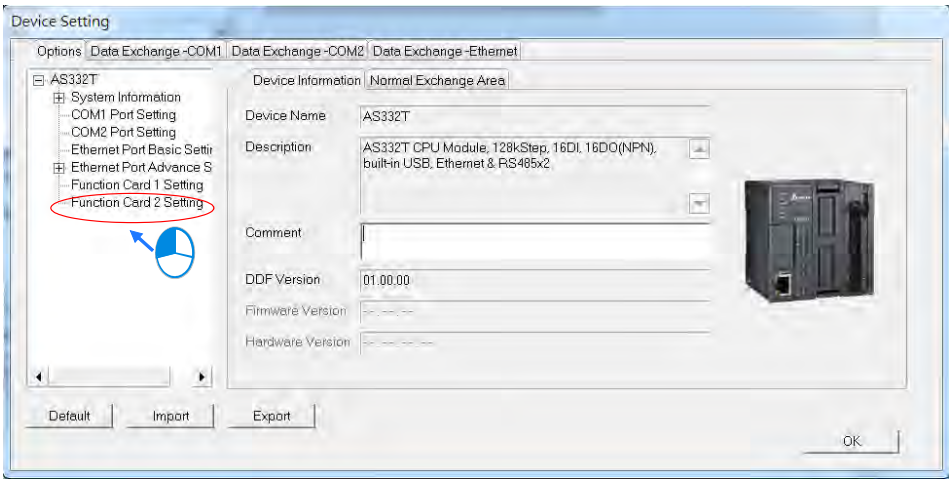
Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Power Module	Power Module	AS-PS02	None		
CPU Module	CPU Module	AS332T	01.00.00	X0.0 ~ X0.15	Y0.0 ~ Y0.15
Function Card1					
Function Card2					
Module Information1	Analog I/O Module	AS02LC-A	00.40.00	D28000 ~ D28005	D28006 ~ D28019

4.3 Assigning Module Addresses

Double-click the CPU module to see the Device Setting page. Users can set up the PLC parameters on the Device Setting page.

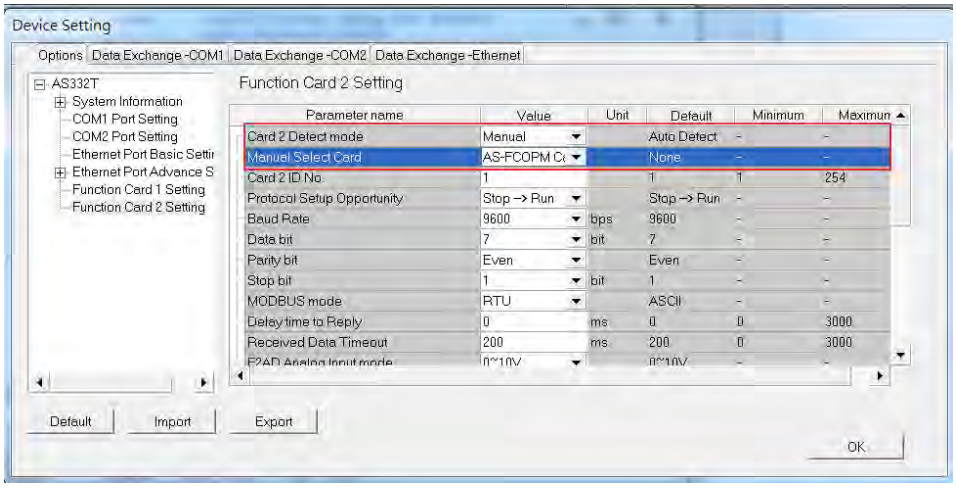


On the Device Setting page, users can see the information concerning the CPU module. Click the Function Card2 option on the left to set up the parameters.

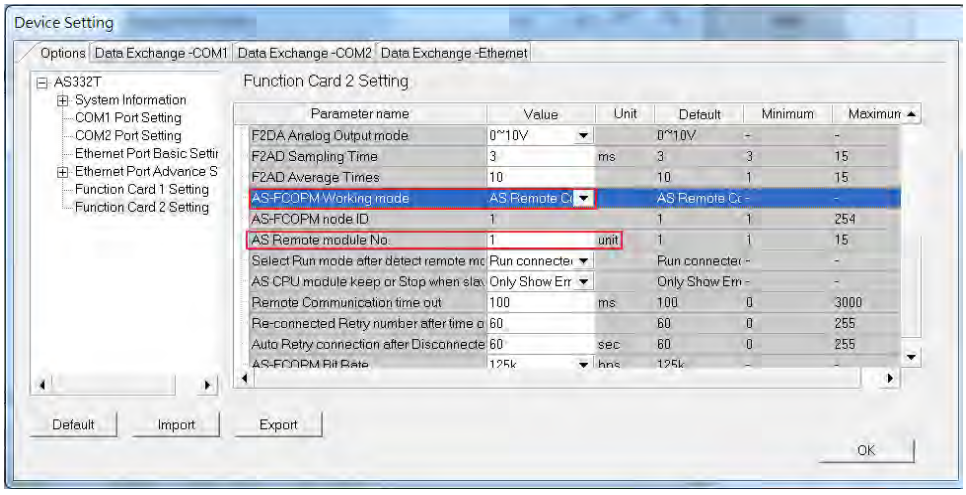


4

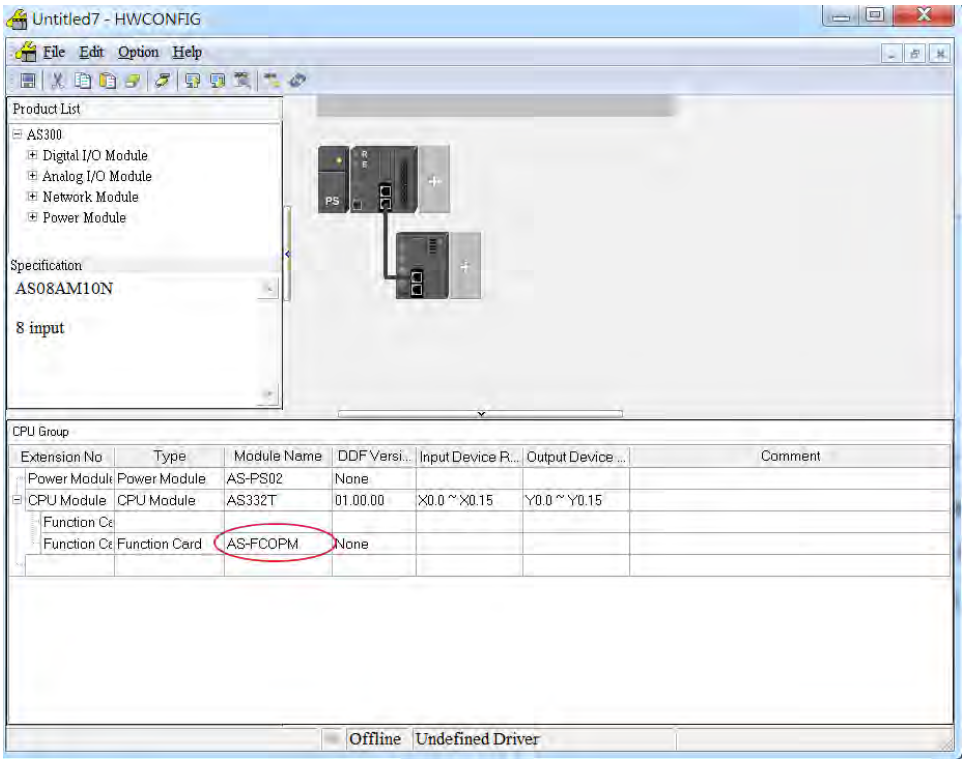
1. Select Manual in the Card 2 Detect mode and select AS-FCOPM Card in the Manual Select Card.



2. Select AS Remote Card in the AS-FCOPM Working mode and input the number of the AS Remote module connected.



Click OK, users can see the newly added remote module on the main page. For remote assignment, only digital and analog modules can be used. Up to 15 modules can be added in the remote group, and the total number of the I/O modules and the connected remote modules cannot exceed 32 pieces. For the assignment of remote input and output devices to an AS series input/output module, refer to section 4.1 and 4.2.



4.3.1 Start Addresses for Digital Input/Output Modules

The remote module AS00SCM-A can add up to 8 modules on its right side. Input/Output devices are automatically assigned to a digital input/output module through HWCONFIG in ISPSoft according to the number of inputs/outputs which the digital input/output module has (X1.0~X1.15, X2.0~X2.15… ; Y0.0~Y0.15, Y1.0~Y1.15, Y2.0~Y2.15). The default start addresses are shown below.

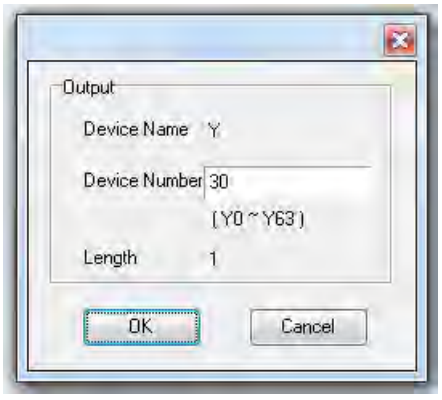
- 08AM: There are 8 inputs. The input device range occupies 16 bits (X**n**.0~X**n**.15).
- 08AN: There are 8 outputs. The output device range occupies 16 bits (Y**n**.0~Y**n**.15).
- 16AM: There are 16 inputs. The input device range occupies 16 bits (X**n**.0~X**n**.15).
- 16AN: There are 16 outputs. The output device range occupies 16 bits (Y**n**.0~Y**n**.15).
- 16AP: There are 8 inputs and 8 outputs. The input and output device range occupies 16 bits. (X**n**.0~X**n**.15), (Y**n**.0~Y**n**.15).
- 32AM: There are 32 inputs. The input device range occupies 32 bits (X**n**.0~X**n+1**.15).

- 32AN: There are 32 outputs. The output device range occupies 32 bits (Y**n**.0~Y**n+1**.15).
- 64AM: There are 64 inputs. The input device range occupies 64 bits (X**n**.0~X**n+3**.15).
- 64AN: There are 64 outputs. The output device range occupies 64 bits (Y**n**.0~Y**n+3**.15).

Remote Module Group 1

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Function Card1					
Function Card2	Function Card	AS-FCOPM	None		
Module Information1	Digital I/O Module	AS08AM10N	01.00.00	X1.0 ~ X1.15	
Module Information2	Digital I/O Module	AS08AN01T	01.00.00		Y1.0 ~ Y1.15
Module Information3	Digital I/O Module	AS16AM10N	01.00.00	X2.0 ~ X2.15	
Module Information4	Digital I/O Module	AS16AN01T	01.00.00		Y2.0 ~ Y2.15
Module Information5	Digital I/O Module	AS32AM10N	01.00.00	X3.0 ~ X4.15	
Module Information6	Digital I/O Module	AS32AN02T	01.00.00		Y3.0 ~ Y4.15
Module Information7	Digital I/O Module	AS64AM10N	01.00.00	X5.0 ~ X8.15	
Module Information8	Digital I/O Module	AS64AN02T	01.00.00		Y5.0 ~ Y8.15

Users can assign a start address to the first remote module installed on the right side of the I/O module slot. And the following I/O module will be assigned with an address followed by the assigned address automatically.



Remote Module Group 1

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Remote Module	Network Module	AS00SCM-A	00.33.00	D29000 ~ D29009	D29010 ~ D29019
Function Card1					
Function Card2	Function Card	AS-FCOPM	None		
Module Information1	Digital I/O Module	AS08AM10N	01.00.00	X20.0 ~ X20.15	
Module Information2	Digital I/O Module	AS08AN01T	01.00.00		Y30.0 ~ Y30.15
Module Information3	Digital I/O Module	AS16AM10N	01.00.00	X21.0 ~ X21.15	
Module Information4	Digital I/O Module	AS16AN01T	01.00.00		Y31.0 ~ Y31.15
Module Information5	Digital I/O Module	AS32AM10N	01.00.00	X22.0 ~ X23.15	
Module Information6	Digital I/O Module	AS32AN02T	01.00.00		Y32.0 ~ Y33.15
Module Information7	Digital I/O Module	AS64AM10N	01.00.00	X24.0 ~ X27.15	
Module Information8	Digital I/O Module	AS64AN02T	01.00.00		Y34.0 ~ Y37.15

4.3.2 Start Addresses for Analog Input/Output Modules

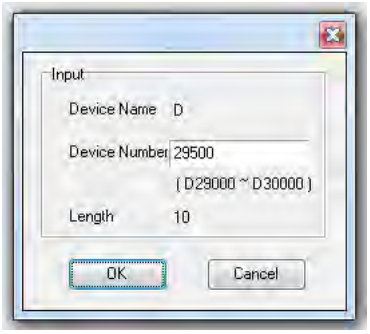
Input/Output data registers are automatically assigned to an analog input/output module through HWCONFIG in ISPSoft according to the number of registers which is defined for the analog input/output module. The default start address is D29000.

- 04AD: There are 4 input channels. The input device range occupies 20 data registers.
- 004DA: There are 4 output channels. The input device range occupies 2 data registers and the output device range occupies 18 data registers.
- 06XA: There are 4 input channels, and 2 output channels. The input device range occupies 10 data registers, and the output device range occupies10 data registers.

Remote Module Group 1

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Remote Module	Network Module	AS00SCM-A	00.33.00	D29000 ~ D29009	D29010 ~ D29019
Function Card1					
Function Card2	Function Card	AS-FCOPM	None		
Module Information1	Analog I/O Module	AS04AD-A	00.50.00	D29020 ~ D29039	
Module Information2	Analog I/O Module	AS04DA-A	00.50.00	D29040 ~ D29041	D29042 ~ D29059
Module Information3	Analog I/O Module	AS06XA-A	00.40.00	D29060 ~ D29069	D29070 ~ D29079

Users can assign a start address to the first remote module installed on the right side of the I/O module slot. And the following I/O module will be assigned with an address followed by the assigned address automatically.



Remote Module Group 1

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Remote Module	Network Module	AS00SCM-A	00.33.00	D29500 ~ D29509	D29510 ~ D29519
Function Card1					
Function Card2	Function Card	AS-FCOPM	None		
Module Information1	Analog I/O Module	AS04AD-A	00.50.00	D29520 ~ D29539	
Module Information2	Analog I/O Module	AS04DA-A	00.50.00	D29540 ~ D29541	D29542 ~ D29559
Module Information3	Analog I/O Module	AS06XA-A	00.40.00	D29560 ~ D29569	D29570 ~ D29579

4.3.3 Start Addresses for Temperature Measurement Modules

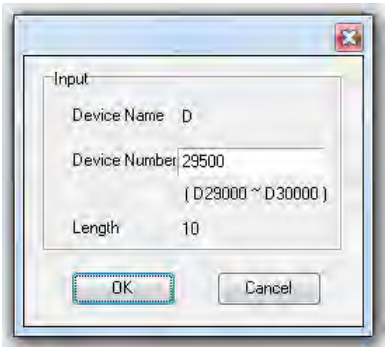
Users can assign input registers to a temperature measurement module through HWCONFIG in ISPSoft. The default start address is D29000.

- 04RTD: There are 4 input channels. The input device range occupies 20 data registers.
- 04TC: There are 4 input channels. The input device range occupies 20 data registers.

Remote Module Group 1

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Remote Module	Network Module	AS00SCM-A	00.33.00	D29000 ~ D29009	D29010 ~ D29019
Function Card1					
Function Card2	Function Card	AS-FCOPM	None		
Module Information1	Analog I/O Module	AS04RTD-A	00.40.00	D29020 ~ D29039	
Module Information2	Analog I/O Module	AS04TC-A	00.40.00	D29040 ~ D29059	

Users can assign a start address to the first remote module installed on the right side of the I/O module slot. And the following I/O module will be assigned with an address followed by the assigned address automatically.



Remote Module Group 1

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Remote Module	Network Module	AS00SCM-A	00.33.00	D29500 ~ D29509	D29510 ~ D29519
Function Card1					
Function Card2	Function Card	AS-FCOPM	None		
Module Information1	Analog I/O Module	AS04RTD-A	00.40.00	D29520 ~ D29539	
Module Information2	Analog I/O Module	AS04TC-A	00.40.00	D29540 ~ D29559	

4.3.4 Start Addresses for Load Cell Modules

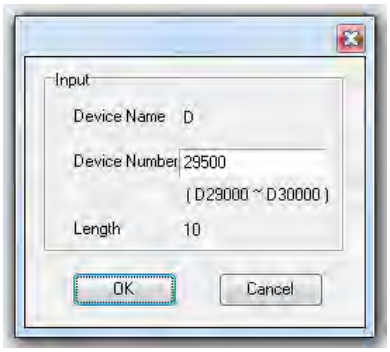
Input data registers are automatically assigned to a load cell module through HWCONFIG in ISPSoft according to the number of registers which is defined for the load cell module. The default start address is D29000.

- 02LC: The input device range occupies 6 data registers and the output device range occupies 14 data registers.

Remote Module Group 1

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Remote Module	Network Module	AS00SCM-A	00.33.00	D29000 ~ D29009	D29010 ~ D29019
Function Card1					
Function Card2	Function Card	AS-FCOPM	None		
Module Information1	Analog I/O Module	AS02LC-A	00.40.00	D29020 ~ D29025	D29026 ~ D29039

Users can assign a start address to the first remote module installed on the right side of the I/O module slot. And the following I/O module will be assigned with an address followed by the assigned address automatically.



Remote Module Group 1

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Remote Module	Network Module	AS00SCM-A	00.33.00	D29500 ~ D29509	D29510 ~ D29519
Function Card1					
Function Card2	Function Card	AS-FCOPM	None		
Module Information1	Analog I/O Module	AS02LC-A	00.40.00	D29520 ~ D29525	D29526 ~ D29539

MEMO

5

Chapter 5 Wiring

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5.1 Wiring

- **Points for attention**

DANGER	● Before installing or wiring a module, users need to make sure that the external power supply is turned off. If the power supply is not turned off, users may get an electric shock, or the product may be damaged. ● If the installation of the module or the wiring of the module is complete, users need to make sure that a terminal block cover is installed on the module before they turn on the power supply or operate the module. If the terminal block cover is not installed properly, users may get an electric shock, or the module may not operate normally.
WARNING	● Be sure to connect the terminals FG and LG with protective grounding conductors. Otherwise, users may get an electric shock, or the module may not operate normally. ● To ensure that a PLC is wired correctly, users need to check the rated voltage of the product, and the arrangement of the terminals. If the PLC is connected to the power supply which does not conform to the rated voltage, or the product is not wired correctly, a fire accident will occur, or the product will be damaged. ● The external connections should be crimped or press-welded by specific tools, or soldered correctly. The improper connections will result in a short circuit, a fire accident, or erroneous operation. ● Tighten the terminal screws with the specified torque. If the terminal screws are loose, a short circuit, a fire accident, or erroneous operation will occur. Tightening the terminal screws too far, may cause damage to the terminal screws and the module, resulting in a short circuit or a malfunction. ● Make sure that there are no foreign substances such as iron filings or wiring debris inside the module. Theses foreign substances may result in a fire accident, damage, or erroneous operation.

- **Wiring an I/O module**

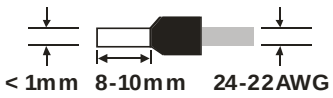
(1) Definitions of the terminals

- 2-/3-wire (passive sensor): the sensor and the system share the same power circuit.
- 4-wire (active sensor): the sensor uses independent power supply and suggested not to share the same power circuit with the system.

(2) Terminals with insulation sleeves cannot be arranged as a terminal block. It is recommended that the terminals be covered with insulation tubes.

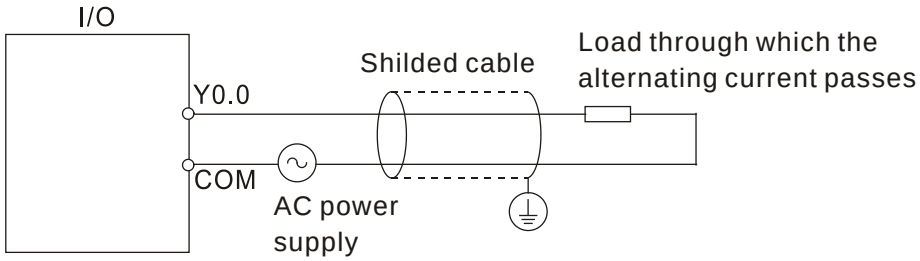
(3) Please use single-core cables or twin-core cables in a diameter of 24 AWG~22 AWG and with less

than 1mm pin-typed terminals. Only use copper conducting wires with a temperature of 60/75°C.



(4) Please keep the input cables, the output cables, and the power cable separate form one another.

(5) If the main circuit and the power cable cannot be separated from each other, please use a shielded cable, and ground it at the side of the I/O module. In some cases, the shielded cable is grounded at the opposite side.



(6) If users wire a module by means of piping, they need to ground the piping correctly.

(7) Please keep 24 VDC input cables separate from 110 VAC input cables and 220 VDC input cables.

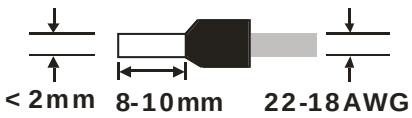
(8) If the wiring length is more than 200 meters (686.67 inches), the leakage current will result from parasitic capacitance, and the system will break down.

- **Grounding a cable**

Please ground a cable according to the steps below.

(1) Please ground a cable correctly.

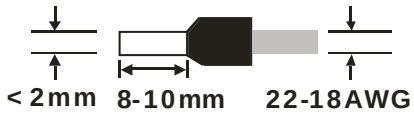
(2) Please use single-core cables or twin-core cables in a diameter of 22 AWG~18 AWG and with less than 2mm pin-typed terminals.



(3) The ground point should be near the PLC. Ground the cable properly.

Note

(1) Use 110 V/220 V power cable and the 24 VDC power cable with a diameter of 22-18AWG and with less than 2mm pin-typed terminals. Be sure to twist the power cables at terminal screws. To prevent the short circuit which results from loose screws, users need to use solderless terminals with insulation sleeves.



(2) If cables are connected to the terminals LG and FG, the cables need to be grounded. Do not connect LG and FG to any devices. If LG and FG are not grounded, the PLC will be susceptible to noise. Since LG have potential, users will get an electric shock if they touch metal parts.

5.2 Connecting Power Cables

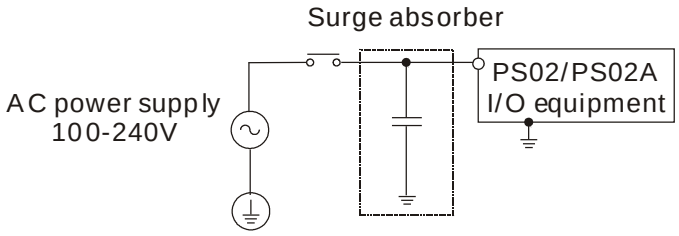
5.2.1 Precautions

- **Connecting AC power cables**

(1) The 110 VAC cable, the 220 VAC cable, and the 24 VDC cable should be twisted, and connected to a module within a short distance.

(2) Do not bundle 110 VAC cable, the 220 VAC cable, the 24 VDC cable, the (high-voltage high-current) main circuit, and the I/O signal cable together. Besides, it is recommended that the distance between adjacent cables should be more than 100 millimeters.

(3) To prevent the surge resulting from lightning, please install a surge absorber in the way shown below.

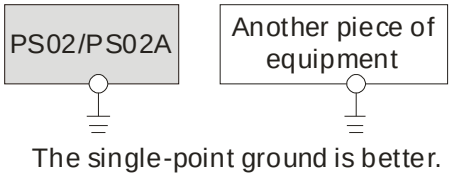


Points for attention:

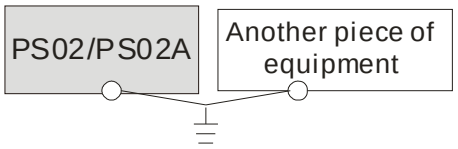
1. The surge absorber and the PLC system should be grounded separately.
2. Please select the surge absorber whose working voltage is not less than the maximum allowable input voltage.

5.2.2 Ground

- The diameter of the ground should not be less than the diameters of the cables connected to the terminals L and N.
- If much equipment is used, please use single-point ground.

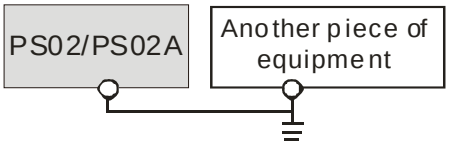


- If single-point ground cannot be used, please use common-point ground.



The common-point ground is permitted.

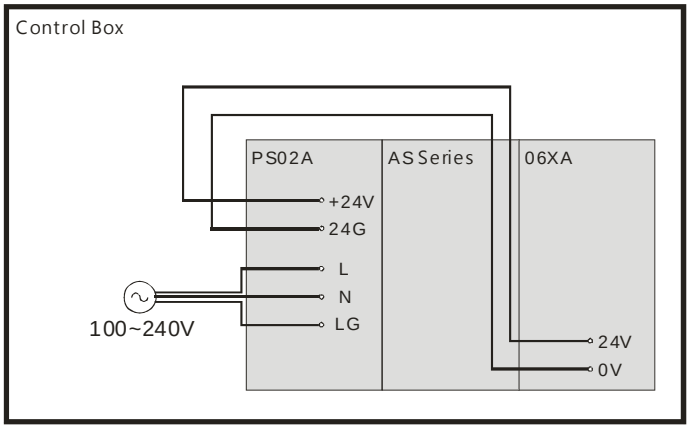
- Users cannot ground equipment in the way shown on the right.



The equipment can not be grounded in this way.

5.2.3 Wiring Power Supply Modules

- **Connecting an AC power cable**



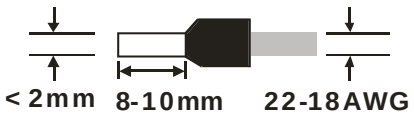
*1. The live wire and the neutral wire in the AC power cable are connected to L and N on the power supply module respectively. To prevent the system from becoming abnormal, the ground in the AC power cable has to be connected to LG on the power supply module.

The power input of AS-PS02/AS-PS02A is the AC input. Users have to pay attention to the following points when they use AS-PS02/AS-PS02A.

- The alternating-current input voltage is in the range of 100 VAC to 240 VAC. Please connect the power supply to the terminals L and N. If the 110 VAC or the 220 VAC power supply is connected to the input terminals +24V and 24G, the PLC will be damaged.

- If the power cut lasts for less than 10 milliseconds, the PLC keeps running without being affected. If the power cut lasts for long, or if the voltage of the power supply decreases, the PLC stops running, and there is no output. When the power supply returns to normal, the PLC resumes. (Users have to notice that there are latched auxiliary relays and registers in the PLC when they write the program.)

- Please use single-core cables or twin-core cables in a diameter of 22 AWG~18 AWG and with less than 2mm pin-typed terminals. Only use copper conducting wires with a temperature of 60/75°C.

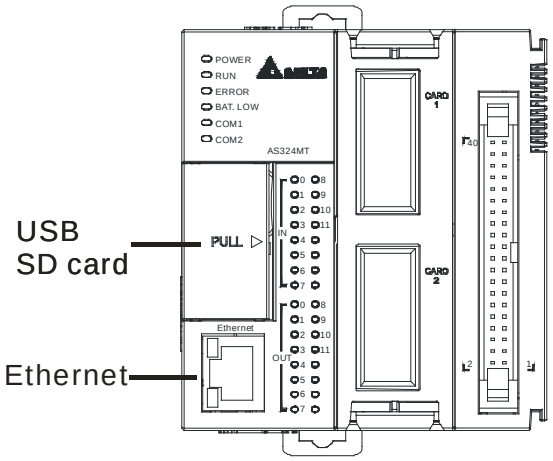


5.2.4 Power Consumption

Classification	Model name	Internal power consumption (mA)	Internal power consumption (W)	External power consumption (W)
CPU module	AS332P-A	150	3.6	N/A
	AS332T-A	150	3.6	N/A
	AS324MT-A	150	3.6	N/A
Digital I/O module	AS08AM10N-A	30	0.72	N/A
	AS08AN01T-A	30	0.72	N/A
	AS08AN01P-A	60	1.4	N/A
	AS08AN01R-A	70	1.7	N/A
	AS16AM10N-A	20	0.5	N/A
	AS16AP11T-A	30	0.7	N/A
	AS16AP11P-A	30	0.7	N/A
	AS16AP11R-A	80	1.9	N/A
	AS16AN01T-A	60	1.4	N/A
	AS16AN01P-A	60	1.4	N/A
	AS16AN01R-A	140	3.4	N/A
	AS32AM10N-A	20	0.48	N/A
	AS32AN02T-A	30	0.72	N/A
	AS64AM10N-A	30	0.72	N/A
	AS64AN02T-A	60	1.44	N/A
Analog I/O module	AS04AD-A	50	1.2	2.16
	AS04DA-A	50	1.2	2.64
	AS06XA-A	50	1.2	2.16
Temperature measurement module	AS04RTD-A	30	0.75	0.75
	AS04TC-A	30	0.75	0.75
Load cell module	AS02LC-A	30	0.75	3
Network module	AS00SCM-A	25	0.6	N/A
Function cards	AS-F232	20	0.48	N/A
	AS-F422	30	0.72	N/A
	AS-F485	20	0.48	N/A
	AS-FCOPM	20	0.48	N/A
	AS-F2AD	15	0.36	N/A
	AS-F2DA	50	1.2	N/A

5.3 Wiring CPU Modules

- **AS324MT-A/AS332T-A/AS332P-A**

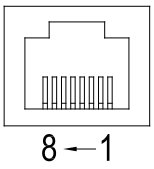


- **USB port**

Pin	Function
1	VBUS (4.4–5.25 V)
2	D−
3	D+
4	Ground
5	Ground

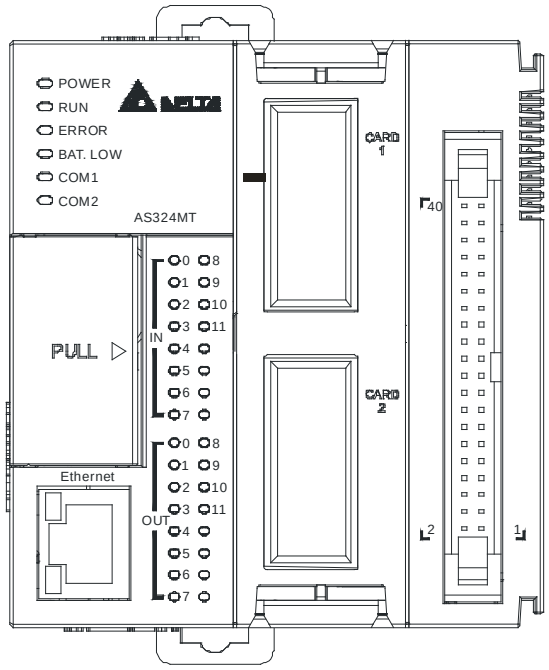
- **Ethernet port**

Pin	Signal	Description
1	TX+	Transmitting data (positive pole)
2	TX-	Transmitting data (negative pole)
3	RX+	Receiving data (positive pole)
4	--	N/C
5	--	N/C
6	RX-	Receiving data (negative pole)
7	--	N/C
8	--	N/C

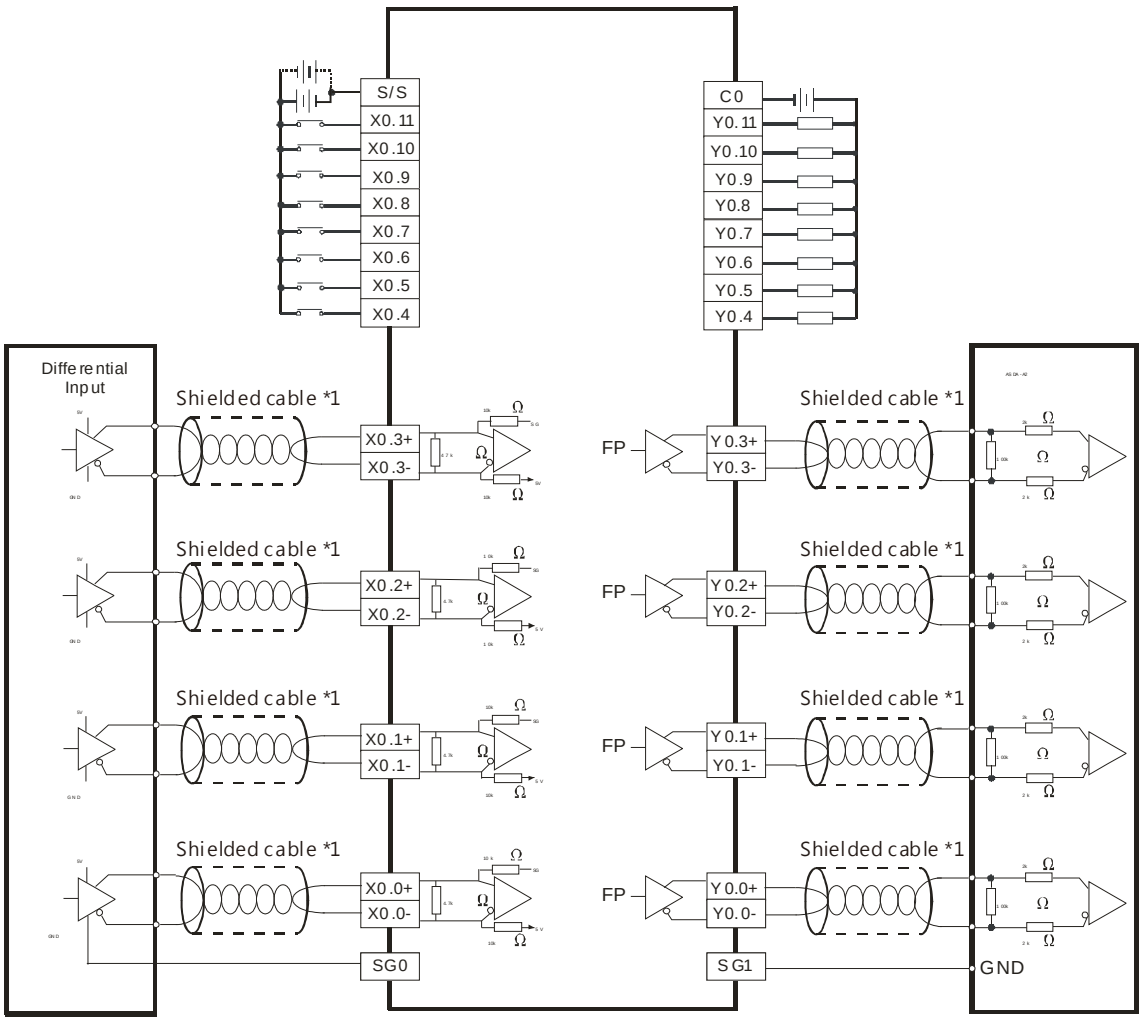


5.3.1 Wiring AS324MT-A

Input form	X0.0+~X0.3+/X0.0-~X0.3- : Differential input X0.4~X0.11: Direct current (sinking or sourcing)
Input current/voltage	X0.0+~X0.3+/X0.0-~X0.3- : 5VDC, 5mA X0.4~X0.11 : 24VDC, 5mA
Output form	Y0.0+~Y0.3+/Y0.0-~Y0.3- : Differential input Y0.4~Y0.11: Transistor-T (sinking)
Output current/voltage	Y0.0+~Y0.3+/Y0.0-~Y0.3-: 5VDC, 20mA Y0.4~Y0.11: 5~30VDC, 0.1A

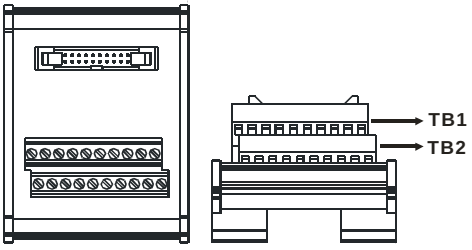


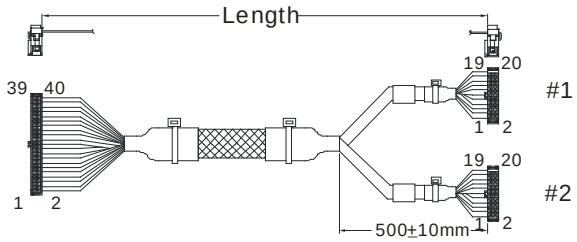
40		39	S/S	S/S
38		37	X0.11	X0.10
36		35	X0.9	X0.8
34		33	X0.7	X0.6
32		31	X0.5	X0.4
30		29	SG0	SG0
28		27	X0.3-	X0.3+
26		25	X0.2-	X0.2+
24		23	X0.1-	X0.1+
22		21	X0.0-	X0.0+
20		19	C0	C0
18		17	Y0.11	Y0.10
16		15	Y0.9	Y0.8
14		13	Y0.7	Y0.6
12		11	Y0.5	Y0.4
10		9	SG1	SG1
8		7	Y0.3-	Y0.3+
6		5	Y0.2-	Y0.2+
4		3	Y0.1-	Y0.1+
2		1	Y0.0-	Y0.0+


S/S
X0.11
X0.10
X0.9
X0.8
X0.7
X0.6
X0.5
X0.4
C0
Y0.11
Y0.10
Y0.9
Y0.8
Y0.7
Y0.6
Y0.5
Y0.4
Differential Input
Shielded cable *1
X0.3+
X0.3-
X0.2+
X0.2-
X0.1+
X0.1-
X0.0+
X0.0-
SG0
FP
Y0.3+
Y0.3-
Y0.2+
Y0.2-
Y0.1+
Y0.1-
Y0.0+
Y0.0-
SG1
GND

Wiring the External Terminal Module UB-10-ID16A

Input form	X0.0+~X0.3+/X0.0-~X0.3-: Differential input X0.4~X0.11: Direct current (sinking or sourcing)
Input current/voltage	X0.0+~X0.3+/X0.0-~X0.3- : 5VDC, 5mA X0.4~X0.11: 24VDC, 5mA
Output form	Y0.0+~Y0.3+/Y0.0-~Y0.3- : Differential input Y0.4~Y0.11: Transistor-T (sinking)
Output current/voltage	Y0.0+~Y0.3+/Y0.0-~Y0.3-: 5VDC, 20mA Y0.4~Y0.11 : 5~30VDC, 0.1A





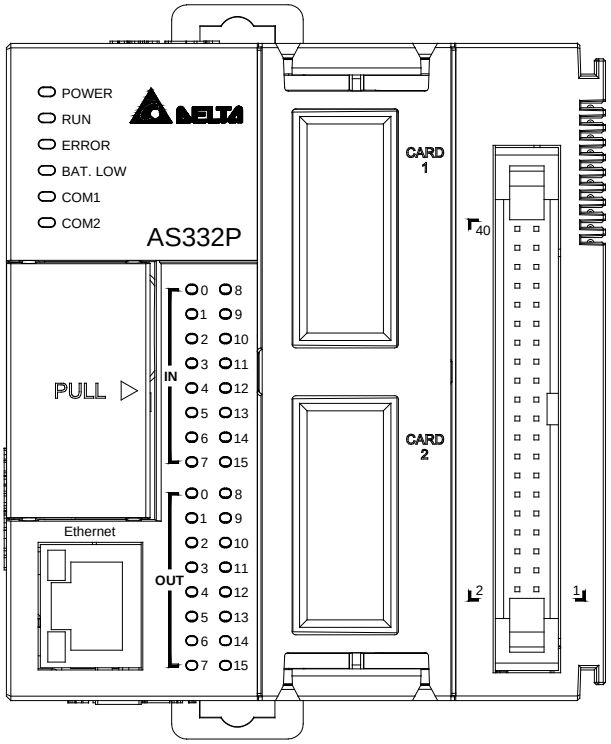
Length:

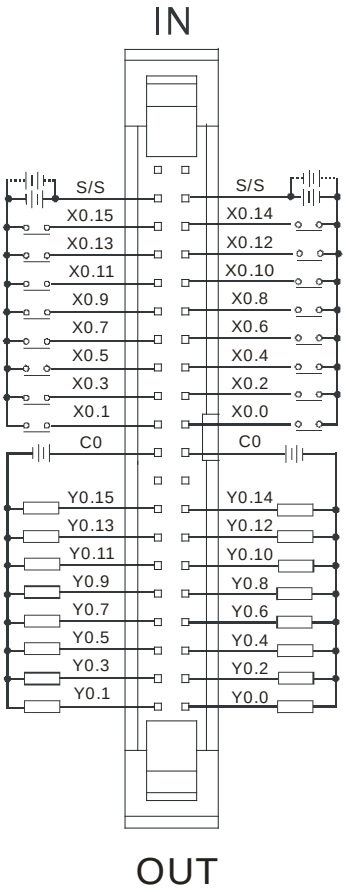
UC-ET010-24D(1M)(28AWG)
UC-ET020-24D(2M)(28AWG)
UC-ET030-24D(3M)(28AWG)

#1	TB1	Y0.0+	Y0.1+	Y0.2+	Y0.3+	SG1	Y0.4	Y0.6	Y0.8	Y0.10	C0
	TB2	Y0.0-	Y0.1-	Y0.2-	Y0.3-	SG1	Y0.5	Y0.7	Y0.9	Y0.11	C0
#2	TB1	X0.0+	X0.1+	X0.2+	X0.3+	SG0	X0.4	X0.6	X0.8	X0.10	S/S
	TB2	X0.0-	X0.1-	X0.2-	X0.3-	SG0	X0.5	X0.7	X0.9	X0.11	S/S

5.3.2 Wiring AS332P-A

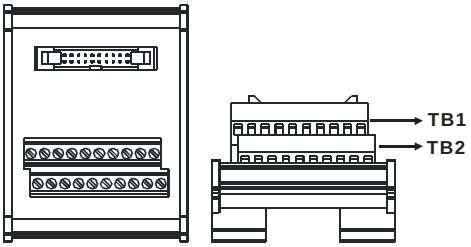
Input form	Direct current (sinking or sourcing)
Input current/voltage	24VDC, 5mA
Output form	Transistor-P (souring)
Output current/voltage	5~30VDC, 0.1A

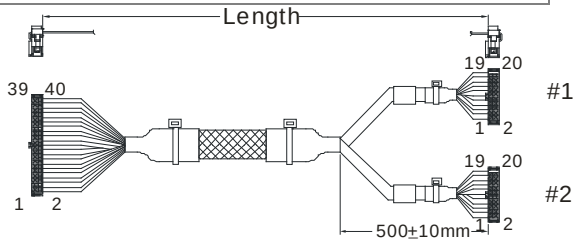




Wiring the External Terminal Module UB-10-ID16A

Input form	Direct current (sinking or sourcing)
Input current/voltage	24VDC. 5mA
Output form	Transistor-P (souring)
Output current/voltage	5~30VDC. 0.1A





Length:

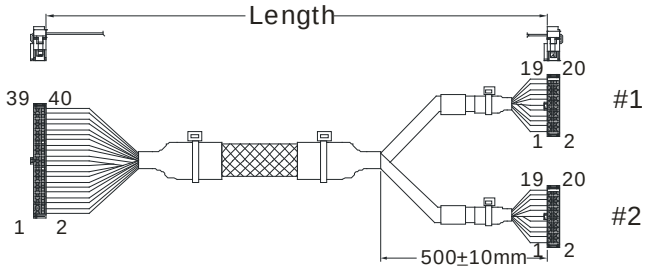
UC-ET010-24D(1M)(28AWG)
UC-ET020-24D(2M)(28AWG)
UC-ET030-24D(3M)(28AWG)

#1	TB1	Y0.0	Y0.2	Y0.4	Y0.6	Y0.8	Y0.10	Y0.12	Y0.14	-	C0
	TB2	Y0.1	Y0.3	Y0.5	Y0.7	Y0.9	Y0.11	Y0.13	Y0.15	-	C0
#2	TB1	X0.0	X0.2	X0.4	X0.6	X0.8	X0.10	X0.12	X0.14	S/S	-
	TB2	X0.1	X0.3	X0.5	X0.7	X0.9	X0.11	X0.13	X0.15	S/S	-

Wiring the External Terminal Module UB-10-OR16B

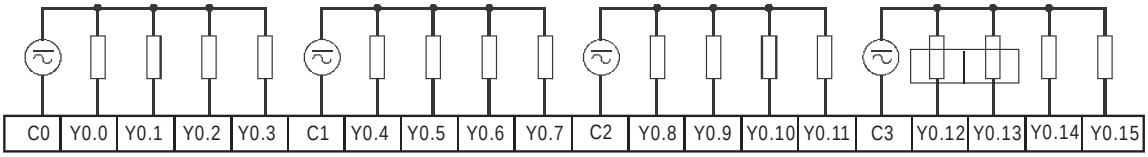
(For cables that can only be connected to the cables of group #1, see below)

Output form	Relay
Output voltage	Less than 250VAC, 30VDC



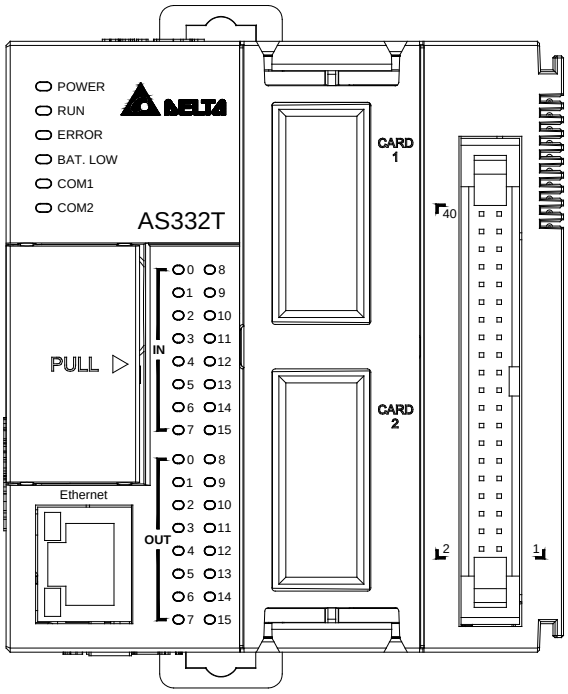
Length:

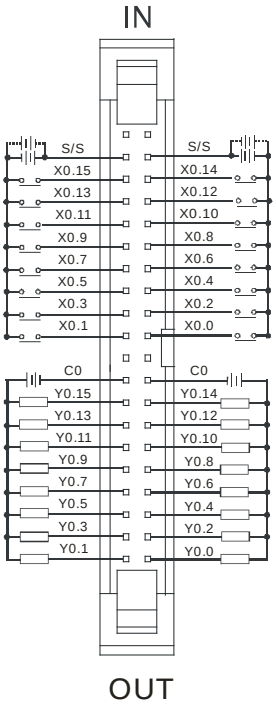
UC-ET010-24D(1M)(28AWG)
UC-ET020-24D(2M)(28AWG)
UC-ET030-24D(3M)(28AWG)



5.3.3 Wiring AS332T-A

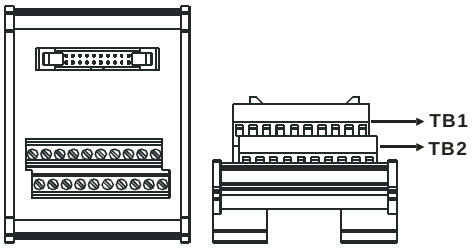
Input form	Direct current (sinking or sourcing)
Input current/voltage	24VDC, 5mA
Output form	Transistor-T (sinking)
Output current/voltage	5~30VDC, 0.1A

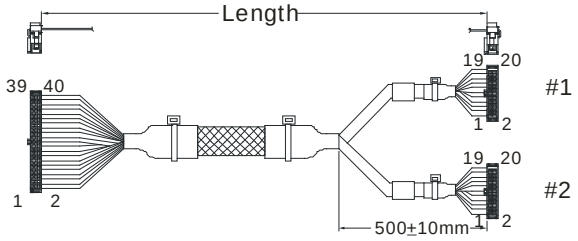




Wiring the External Terminal Module UB-10-ID16A

Input form	Direct current (sinking or sourcing)
Input current/voltage	24VDC, 5mA
Output form	Transistor-T (sinking)
Output current/voltage	5~30VDC, 0.1A





Length:

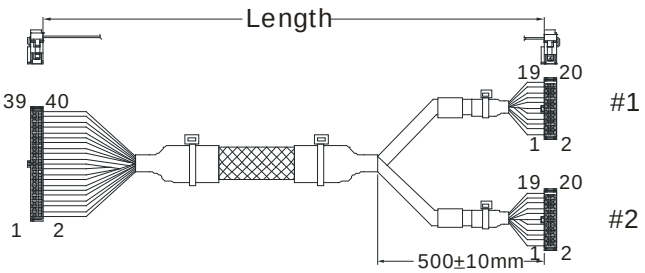
UC-ET010-24D(1M)(28AWG)
UC-ET020-24D(2M)(28AWG)
UC-ET030-24D(3M)(28AWG)

#1	TB1	Y0.0	Y0.2	Y0.4	Y0.6	Y0.8	Y0.10	Y0.12	Y0.14	C0	-
	TB2	Y0.1	Y0.3	Y0.5	Y0.7	Y0.9	Y0.11	Y0.13	Y0.15	C0	-
#2	TB1	X0.0	X0.2	X0.4	X0.6	X0.8	X0.10	X0.12	X0.14	S/S	-
	TB2	X0.1	X0.3	X0.5	X0.7	X0.9	X0.11	X0.13	X0.15	S/S	-

Wiring the External Terminal Module UB-10-OR16A

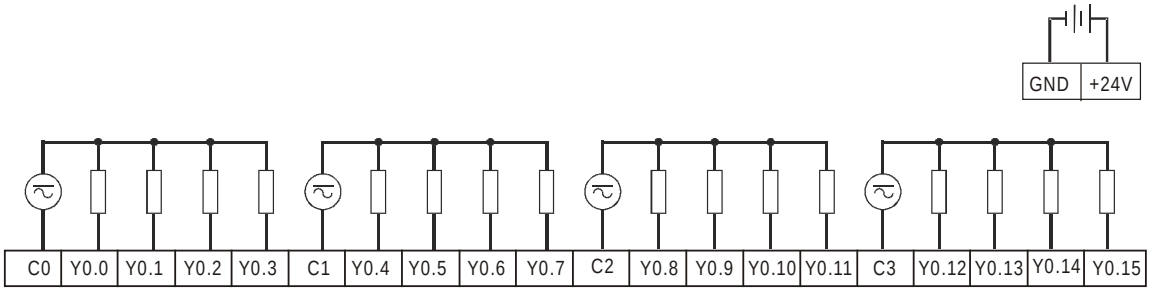
(For cables that can only be connected to the cables of group #1, see below)

Output form	Relay
Output voltage	Less than 250VAC, 30VDC



Length:

UC-ET010-24D(1M)(28AWG)
UC-ET020-24D(2M)(28AWG)
UC-ET030-24D(3M)(28AWG)

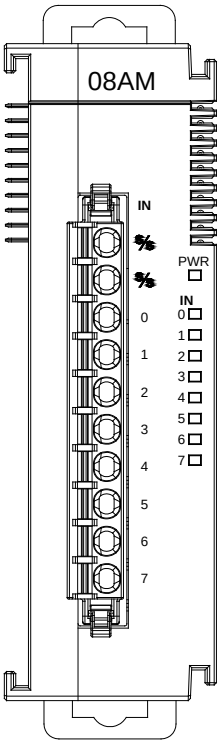


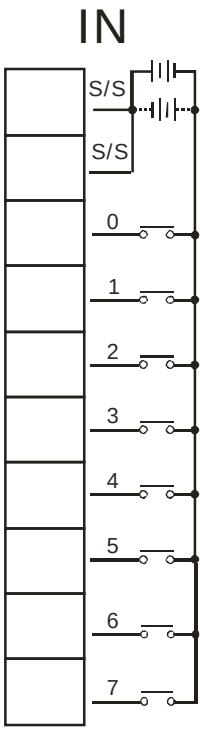
5.4 Wiring Digital Input/Output Modules

The wiring of digital input/output modules is illustrated simply in this section. The simplistic wiring diagrams below also illustrate how the power supplies are connected to S/S, and COM. If users want to get more information about the wiring of digital input/output terminals, they can refer to section 5.5 in this manual.

5.4.1 Wiring AS08AM10N-A

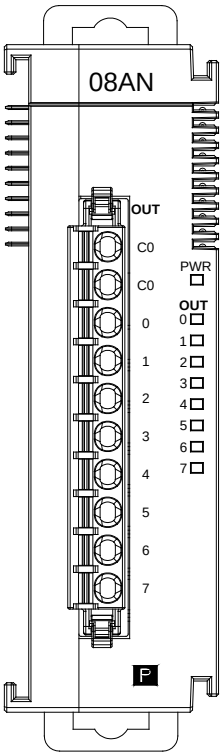
Input form	Direct current (sinking or sourcing)
Voltage specifications	24 VDC, 5 mA

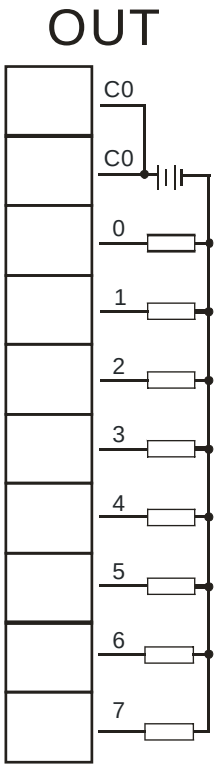




5.4.2 Wiring AS08AN01P-A

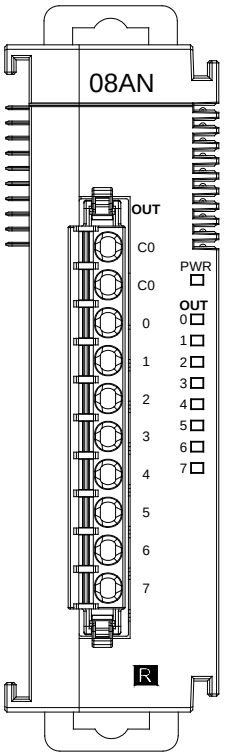
Output form	Transistor-P (souring)
Voltage specifications	5~30VDC, 0.5A

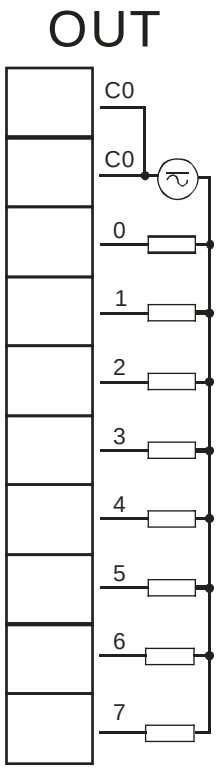




5.4.3 Wiring AS08AN01R-A

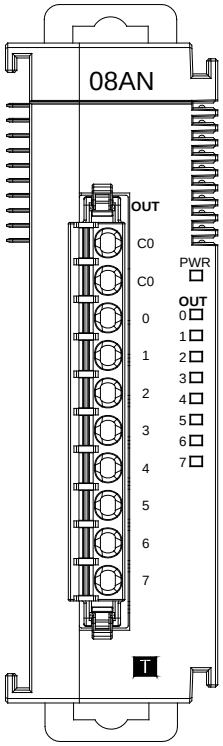
Output form	Relay
Voltage specifications	240VAC/24VDC, 2A/inputs, 8A/I/O

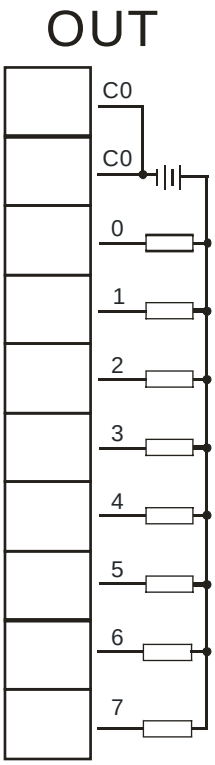




5.4.4 Wiring AS08AN01T-A

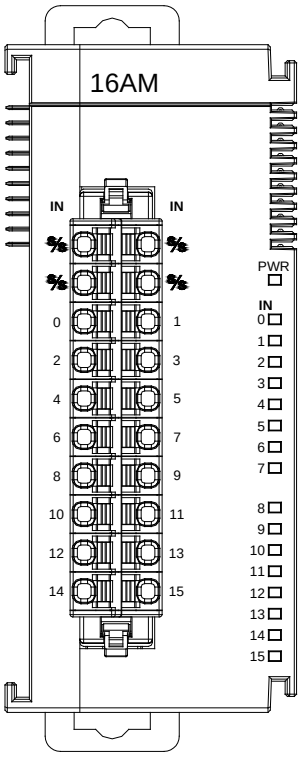
Output type	Transistor-T (sinking)
Voltage specifications	5~30VDC, 0.5A

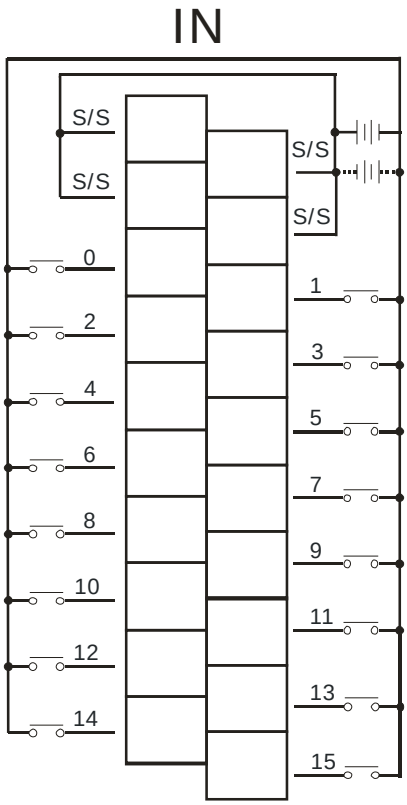




5.4.5 Wiring AS16AM10N-A

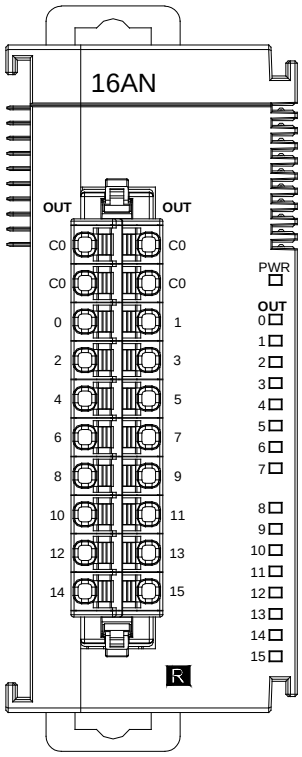
Input type	Direct current (sinking or sourcing)
Voltage specifications	24VDC, 5mA

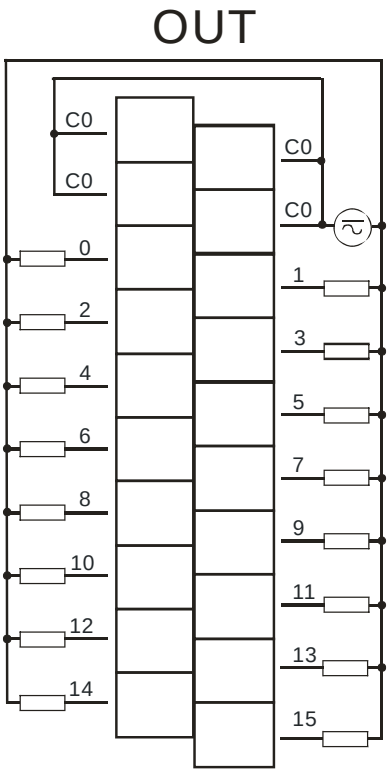




5.4.6 Wiring AS16AN01R-A

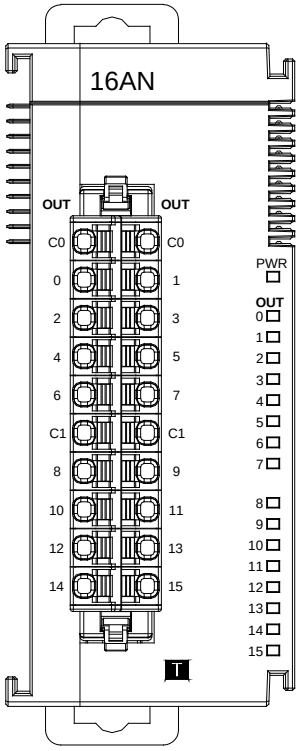
Output type	Relay
Voltage specifications	240VAC/24VDC, 2A/inputs, 8A/I/O

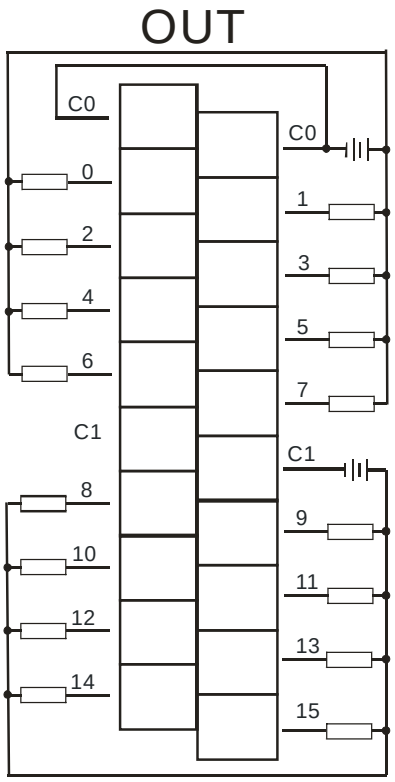




5.4.7 Wiring AS16AN01T-A

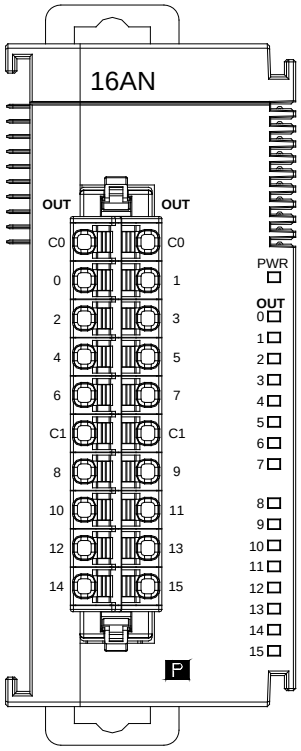
Output type	Transistor-T (sinking)
Voltage specifications	5~30VDC, 0.5A

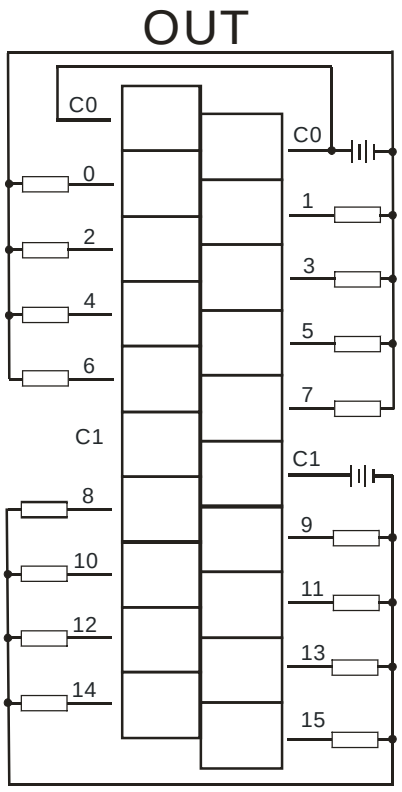




5.4.8 Wiring AS16AN01P-A

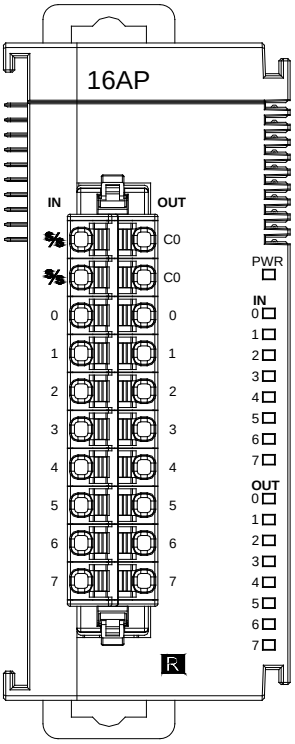
Output type	Transistor-P (souring)
Voltage specifications	5~30VDC, 0.5A

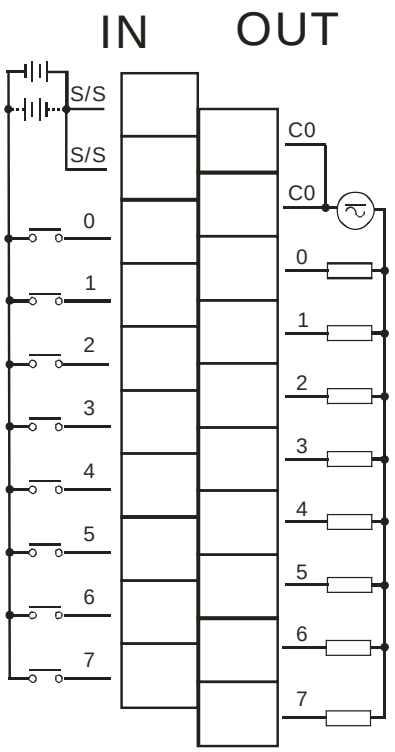




5.4.9 Wiring AS16AP11R-A

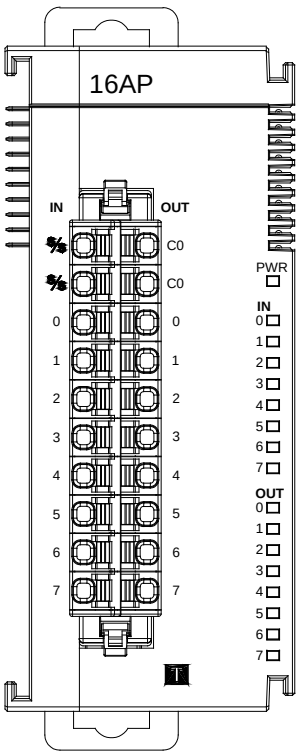
Input form	Direct current (sinking or sourcing)
Voltage specifications	24 VDC, 5 mA
Output type	Relay
Voltage specifications	240VAC/24VDC, 2A/inputs, 8A/I/O

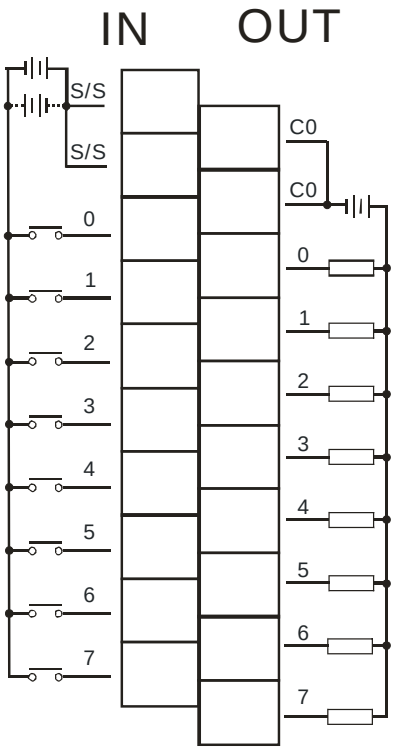




5.4.10 Wiring AS16AP11T-A

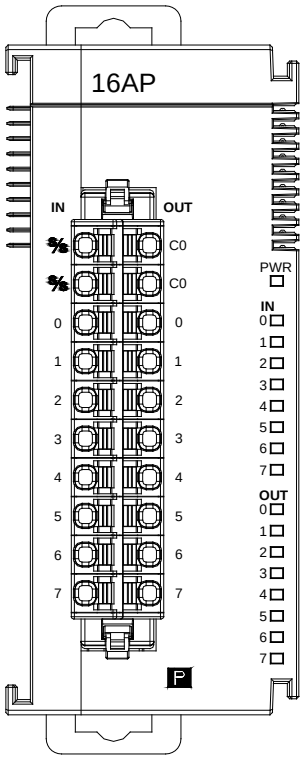
Input form	Direct current (sinking or sourcing)
Voltage specifications	24 VDC, 5 mA
Output type	Transistor-T (sinking)
Voltage specifications	5~30VDC, 0.5A

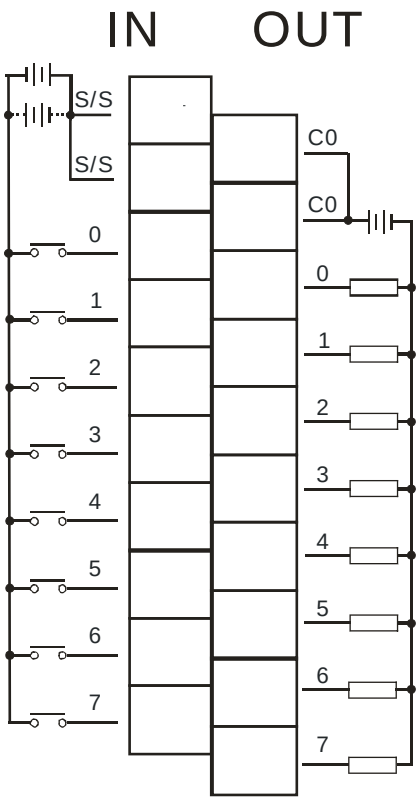




5.4.11 Wiring AS16AP11P-A

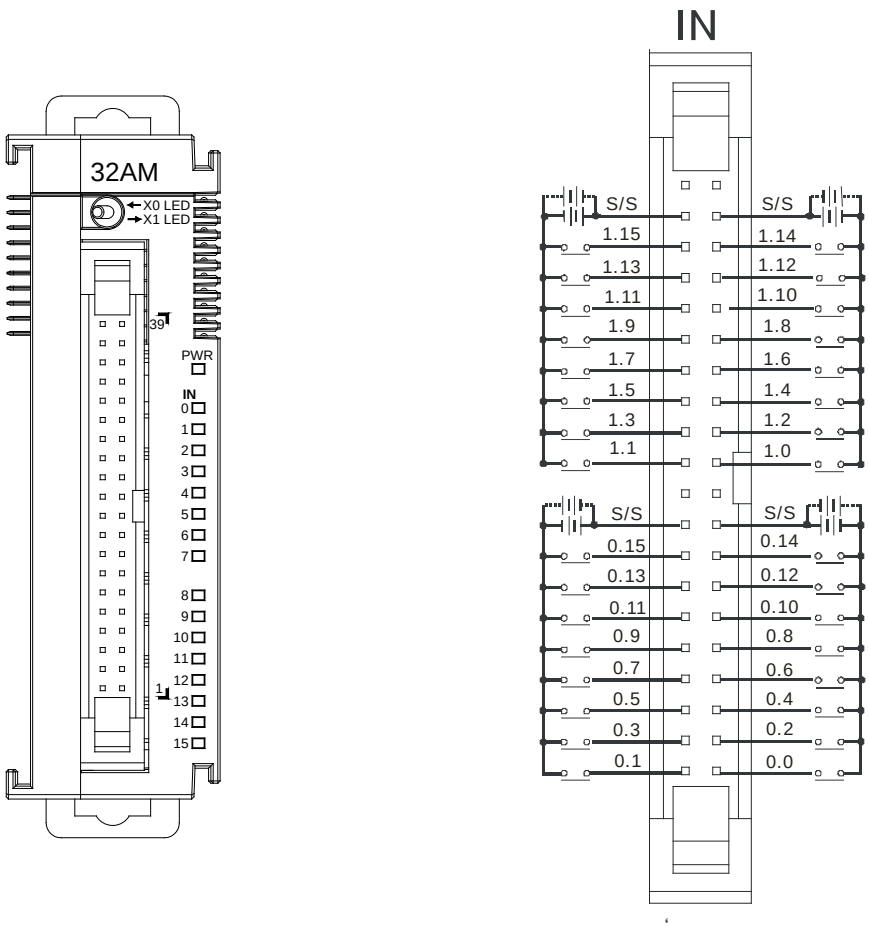
Input form	Direct current (sinking or sourcing)
Voltage specifications	24 VDC, 5 mA
Output type	Transistor-P (sourcing)
Voltage specifications	5~30VDC, 0.5A





5.4.12 Wiring AS32AM10N-A

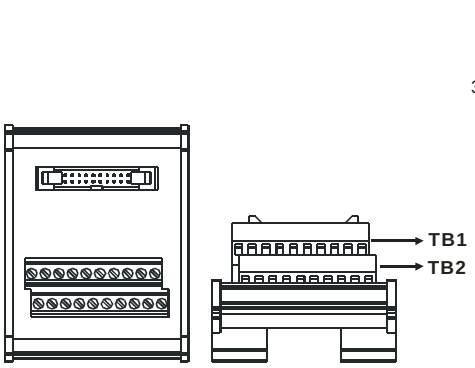
Input form	Direct current (sinking or sourcing)
Input current	24 VDC, 5 mA

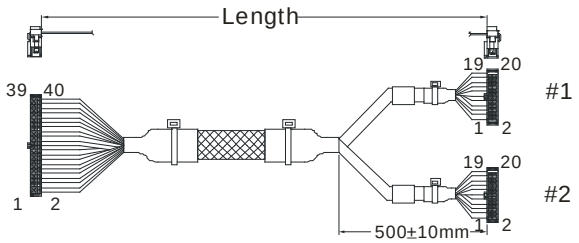


Wiring the External Terminal Module UB-10-ID16A

(For cables that can only be connected to the cables of group #2, see below)

Input form	Direct current (sinking or sourcing)
Voltage specifications	24VDC, 5mA





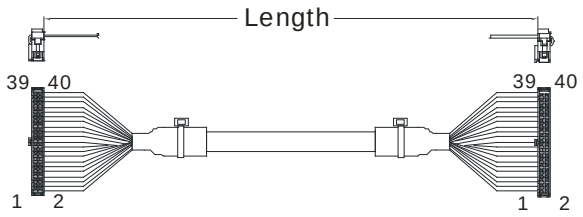
Length:

UC-ET010-24D(1M)(28AWG)
UC-ET020-24D(2M)(28AWG)
UC-ET030-24D(3M)(28AWG)

#2	TB1	X0.0	X0.2	X0.4	X0.6	X0.8	X0.10	X0.12	X0.14	S/S	-
	TB2	X0.1	X0.3	X0.5	X0.7	X0.9	X0.11	X0.13	X0.15	S/S	-

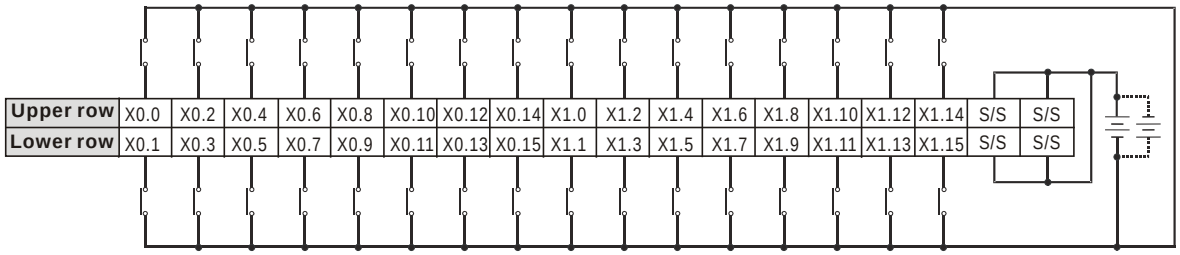
Wiring the External Terminal Module UB-10-ID32A

Input form	Direct current (sinking or sourcing)
Input current/voltage	24VDC, 5mA



Length:

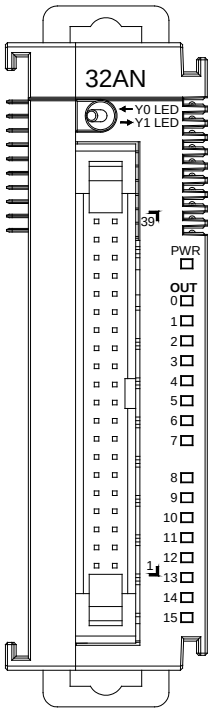
UC-ET010-24B(1M)
UC-ET020-24B(2M)
UC-ET030-24B(3M)

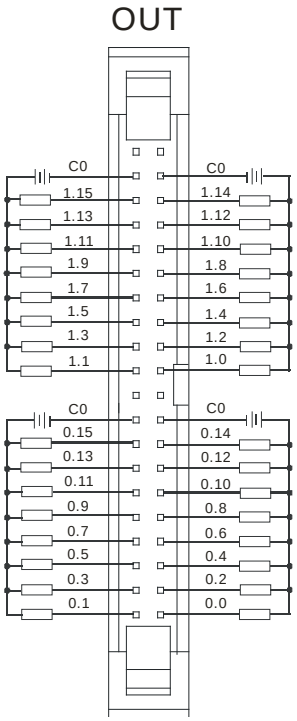


24 V DC, 5 mA

5.4.13 Wiring AS32AN02T-A

Output form	Transistor-T (sinking)
Voltage specifications	5~30VDC, 0.1A

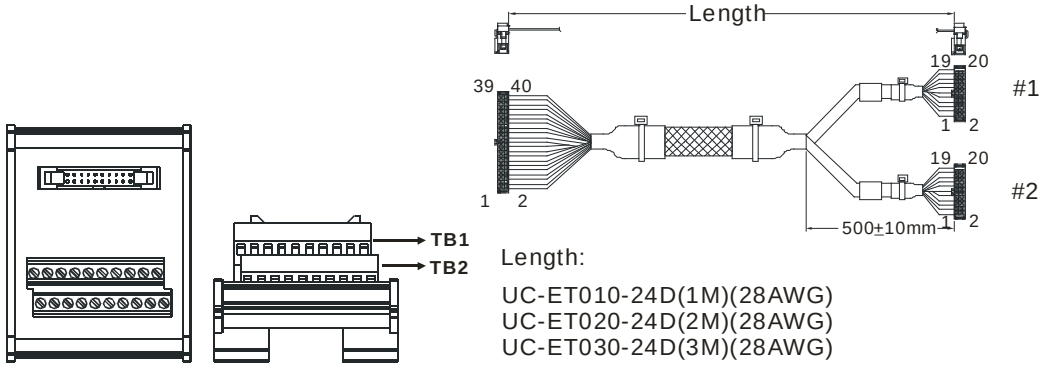




Wiring the External Terminal Module UB-10-ID16A

(For cables that can only be connected to the cables of group #1, see below)

Output form	Transistor-T (sinking)
Voltage specifications	5~30VDC, 0.1A



Length:

UC-ET010-24D(1M)(28AWG)
UC-ET020-24D(2M)(28AWG)
UC-ET030-24D(3M)(28AWG)

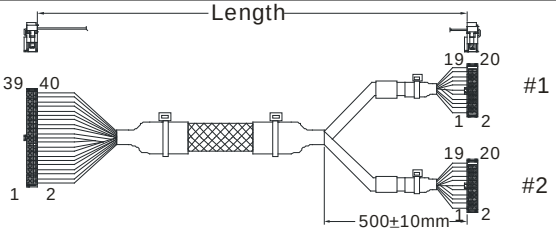
#1	TB1	Y0.0	Y0.2	Y0.4	Y0.6	Y0.8	Y0.10	Y0.12	Y0.14	C0	-
	TB2	Y0.1	Y0.3	Y0.5	Y0.7	Y0.9	Y0.11	Y0.13	Y0.15	C0	-

5

Wiring the External Terminal Module UB-10-OR16A

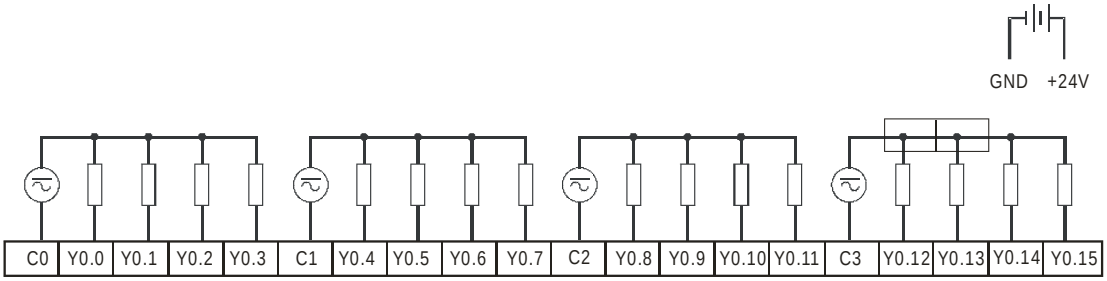
(For cables that can only be connected to the cables of group #1, see below)

Output form	Relay
Voltage specifications	Less than 250VAC, 30VDC, 2A



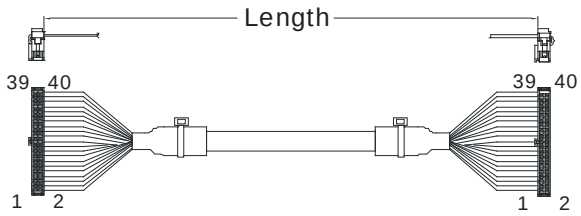
Length:

UC-ET010-24D(1M)(28AWG)
UC-ET020-24D(2M)(28AWG)
UC-ET030-24D(3M)(28AWG)



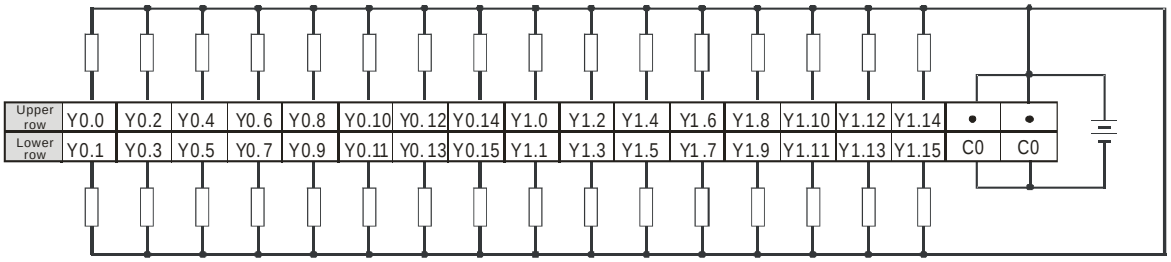
Wiring the External Terminal Module UB-10-OT32A

Output form	Transistor-T (sinking)
Voltage specifications	5~30VDC, 0.1A



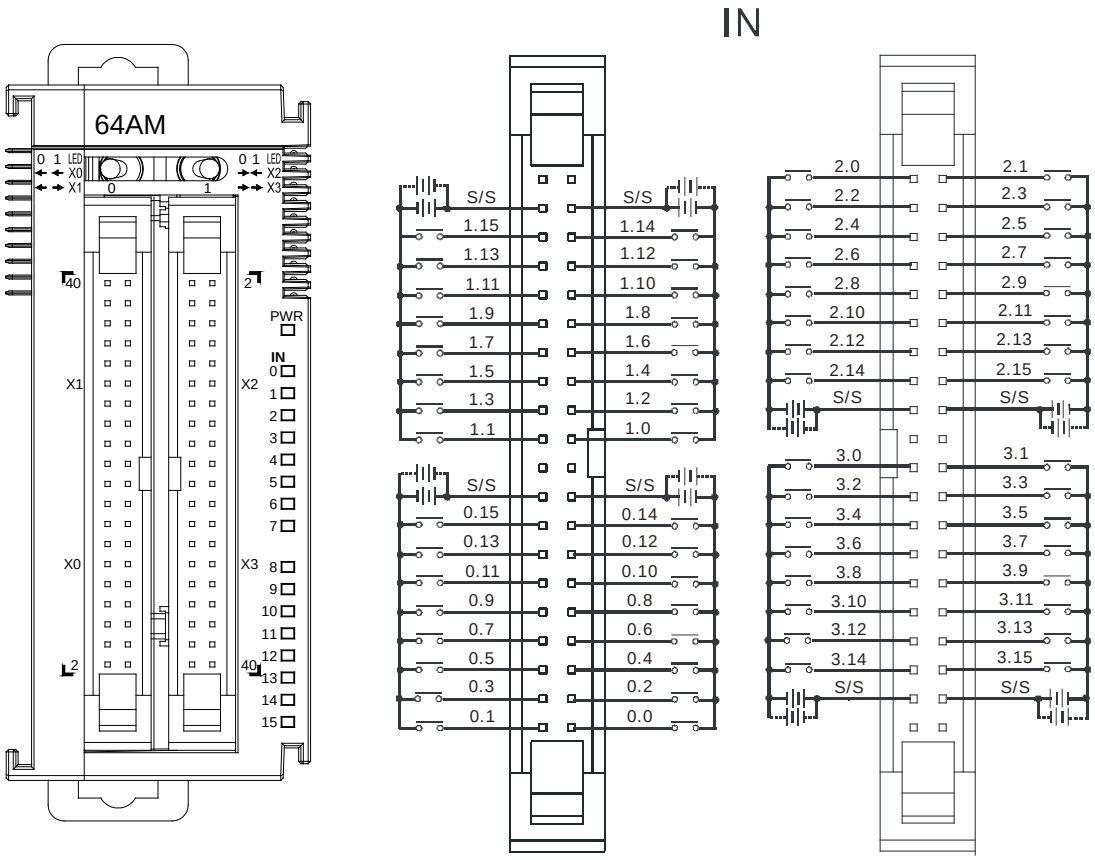
Length:

UC-ET010-24B(1M)
UC-ET020-24B(2M)
UC-ET030-24B(3M)



5.4.14 Wiring AS64AM10N-A

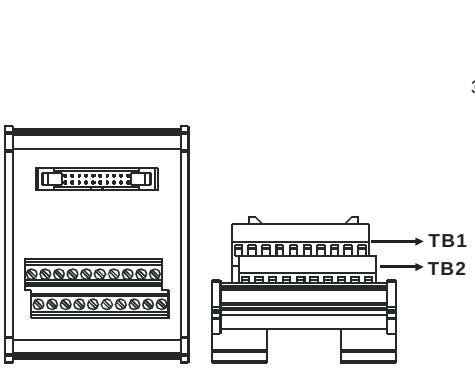
Input type	Direct current (sinking or sourcing)
Voltage specifications	24VDC, 5mA

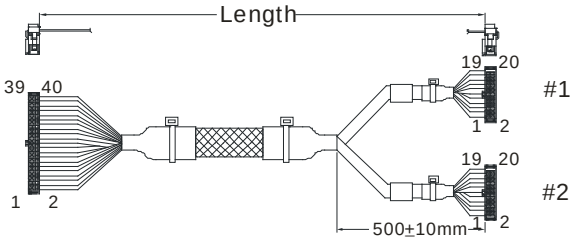


Wiring the External Terminal Module UB-10-ID16A

(For cables that can only be connected to the cables of group #2, see below)

Input form	Direct current (sinking or sourcing)
Voltage specifications	24VDC, 5mA





Length:

UC-ET010-24D(1M)(28AWG)
UC-ET020-24D(2M)(28AWG)
UC-ET030-24D(3M)(28AWG)

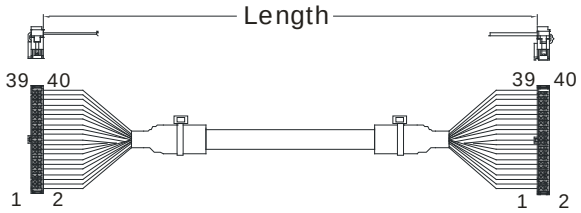
#2	TB1	X0.0	X0.2	X0.4	X0.6	X0.8	X0.10	X0.12	X0.14	S/S	-
	TB2	X0.1	X0.3	X0.5	X0.7	X0.9	X0.11	X0.13	X0.15	S/S	-

5

Wiring the External Terminal Module UB-10-ID32A

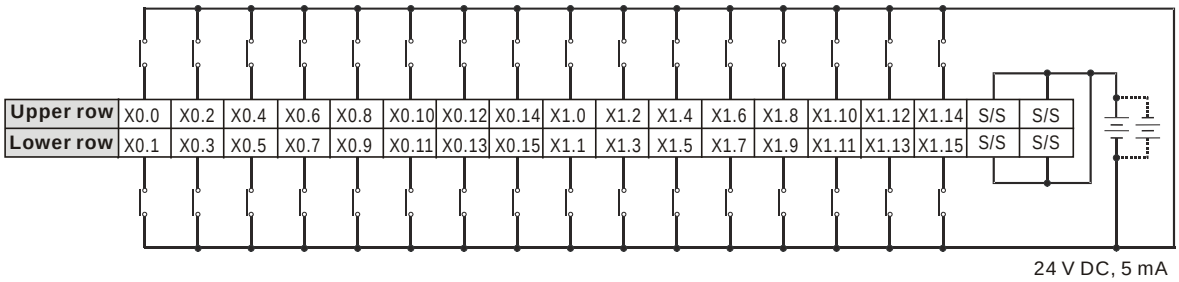
(For cables that can only be connected to the cables of group #2, see below)

Input form	Direct current (sinking or sourcing)
Voltage specifications	24VDC, 5mA



Length:

UC-ET010-24B(1M)
UC-ET020-24B(2M)
UC-ET030-24B(3M)

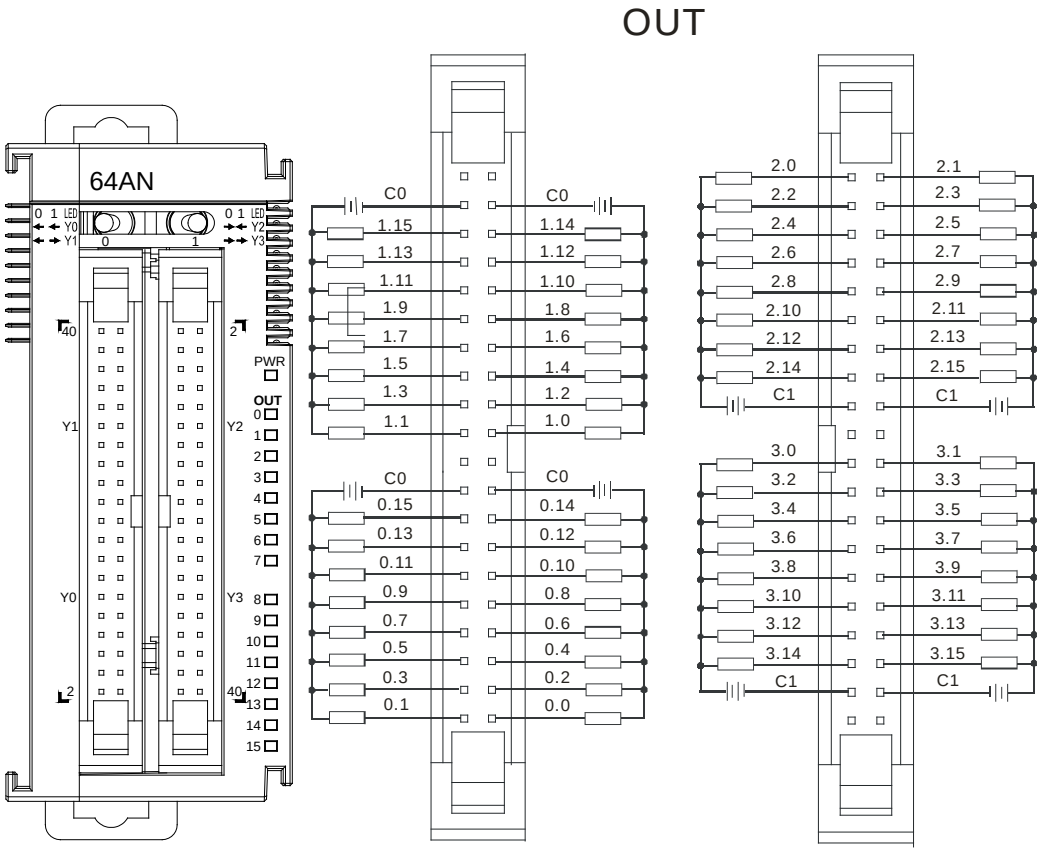


Upper row	X0.0	X0.2	X0.4	X0.6	X0.8	X0.10	X0.12	X0.14	X1.0	X1.2	X1.4	X1.6	X1.8	X1.10	X1.12	X1.14	S/S	S/S
Lower row	X0.1	X0.3	X0.5	X0.7	X0.9	X0.11	X0.13	X0.15	X1.1	X1.3	X1.5	X1.7	X1.9	X1.11	X1.13	X1.15	S/S	S/S

24 V DC, 5 mA

5.4.15 Wiring AS64AN02T-A

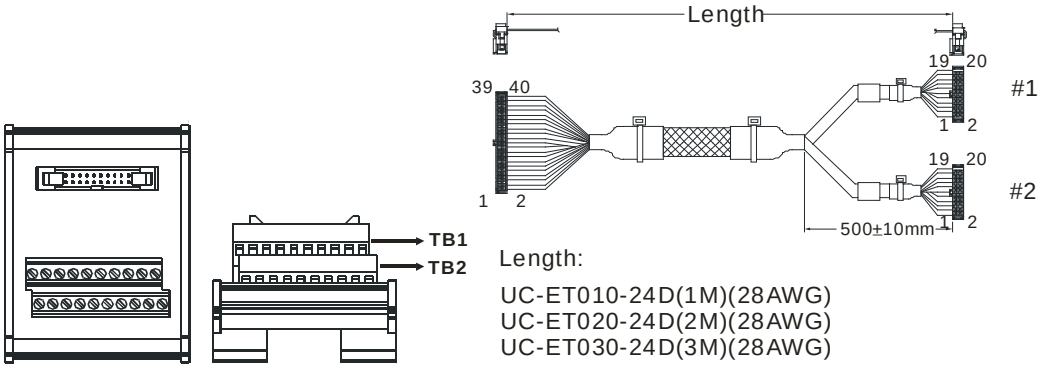
Output type	Transistor-T (sinking)
Voltage specifications	5~30VDC, 0.1A



Wiring the External Terminal Module UB-10-ID16A

(For cables that can only be connected to the cables of group #1, see below)

Output type	Transistor-T (sinking)
Voltage specifications	5~30VDC, 0.1A



Length:

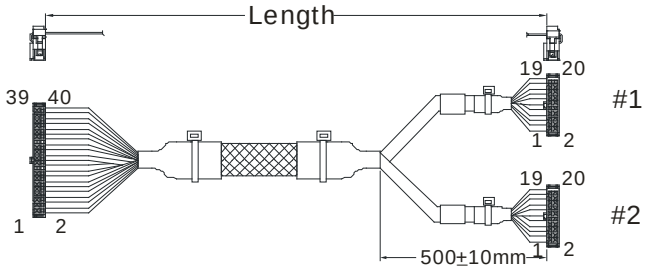
UC-ET010-24D(1M)(28AWG)
UC-ET020-24D(2M)(28AWG)
UC-ET030-24D(3M)(28AWG)

#1	TB1	Y0.0	Y0.2	Y0.4	Y0.6	Y0.8	Y0.10	Y0.12	Y0.14	C0	-
	TB2	Y0.1	Y0.3	Y0.5	Y0.7	Y0.9	Y0.11	Y0.13	Y0.15	C0	-

Wiring the External Terminal Module UB-10-OR16A

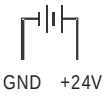
(For cables that can only be connected to the cables of group #1, see below)

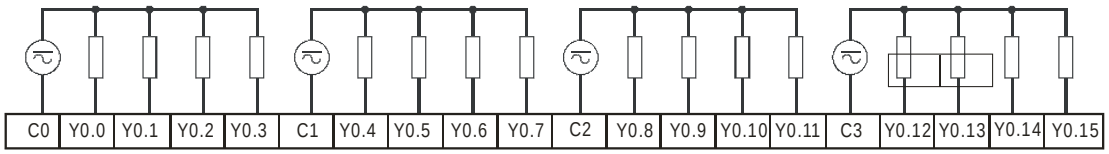
Output form	Relay
Voltage specifications	Less than 250VAC, 30VDC, 2A



Length:

UC-ET010-24D(1M)(28AWG)
UC-ET020-24D(2M)(28AWG)
UC-ET030-24D(3M)(28AWG)

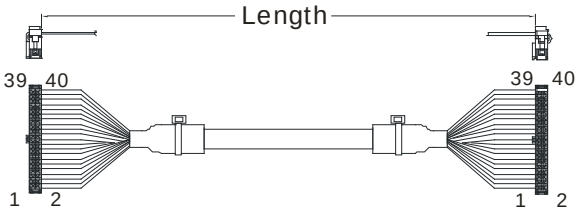




5

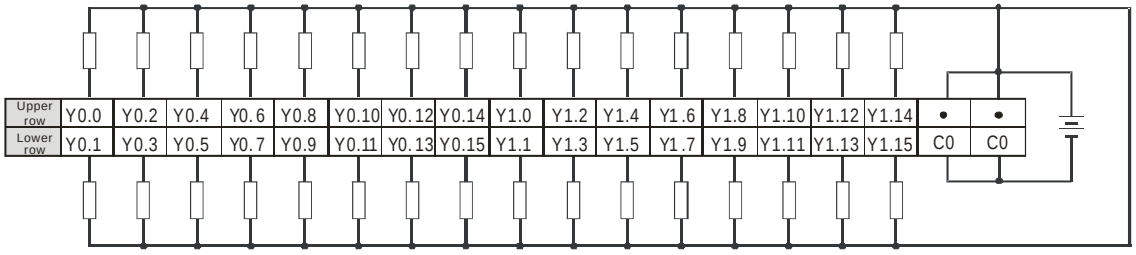
Wiring the External Terminal Module UB-10-OT32A

Output form	Transistor-T (sinking)
Voltage specifications	5~30VDC, 0.1A



Length:

UC-ET010-24B(1M)
UC-ET020-24B(2M)
UC-ET030-24B(3M)



5.5 Wiring Digital Input/Output Terminals

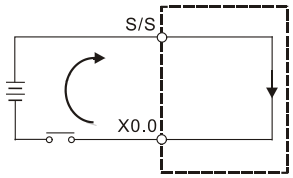
5.5.1 Wiring Digital Input Terminals

5.5.1.1 Sinking and Sourcing

The input signal is the 24 VDC power input. Sinking and sourcing are current driving capabilities of a circuit. They are defined as follows.

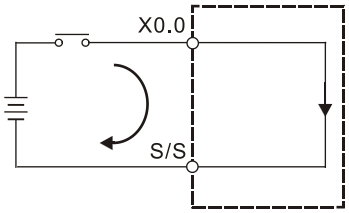
- Sinking

  Sinking=The current flows into the common terminal S/S.



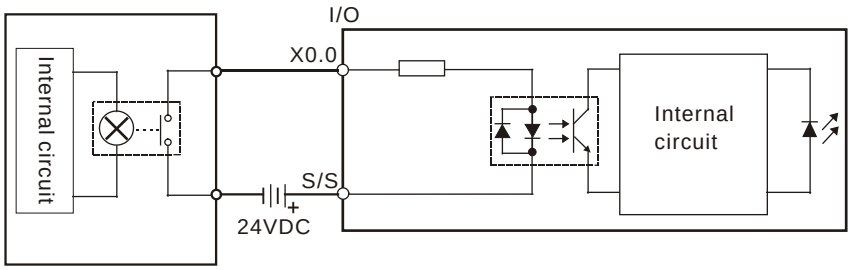
- Sourcing

  Souring=The current flows from the common terminal S/S.

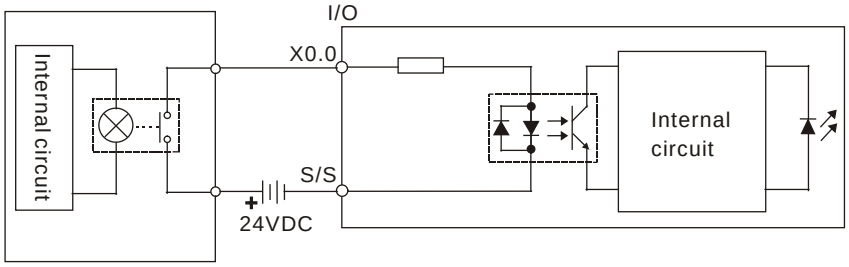


5.5.1.2 Relay Type

- Sinking



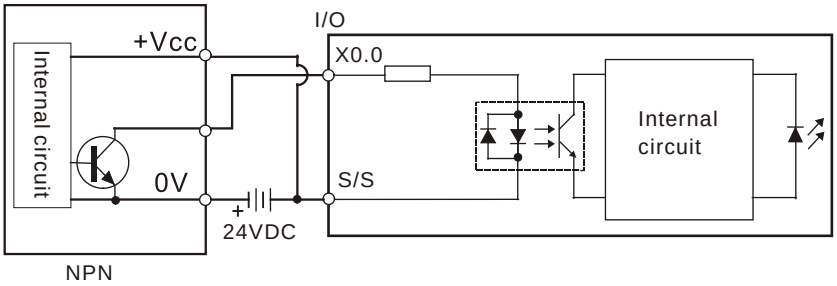
- Sourcing



5.5.1.3 Open-collector Input Type

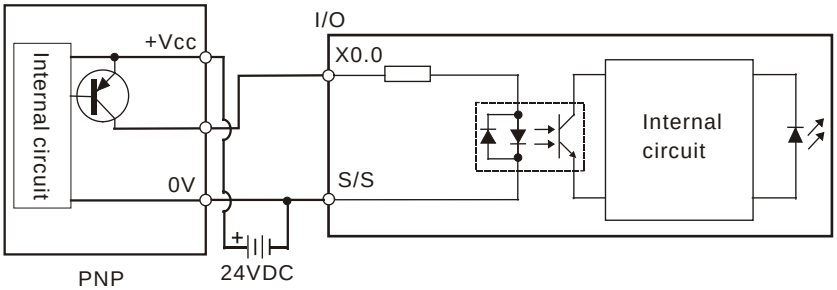
- Sinking

(NPN transistor whose collector is open)



- Sourcing

(PNP transistor whose collector is open)

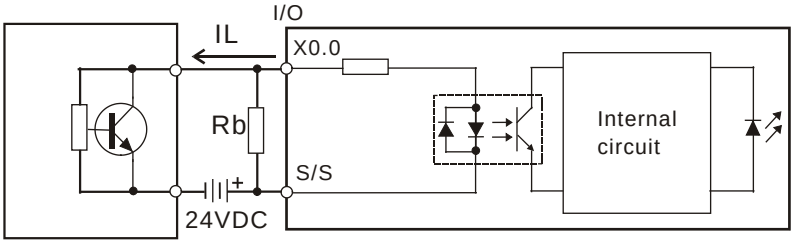


5.5.1.4 Two-wire Proximity Switch

Please use the two-wire proximity switch whose leakage current I_L is less than 1.5 mA when the switch is OFF. If the leakage current is larger than 1.5 mA, please connect the divider resistance Rb gotten from the formula below.

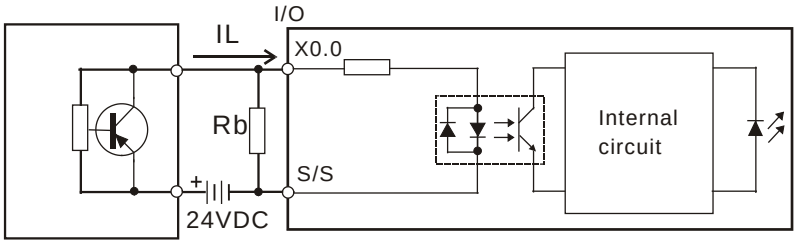
$$Rb \leq \frac{6}{IL - 1.5} \text{ (k Ω)}$$

- Sinking



Two-wire proximity switch

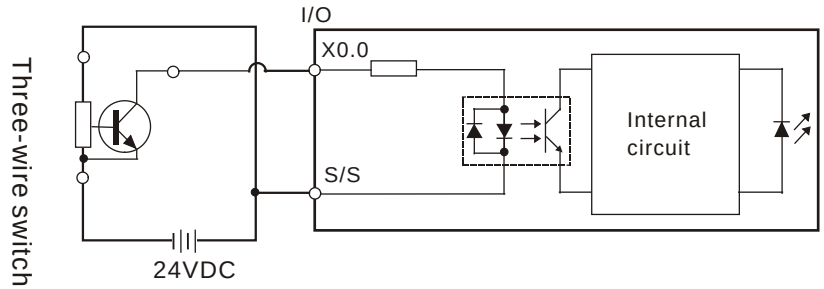
- Sourcing



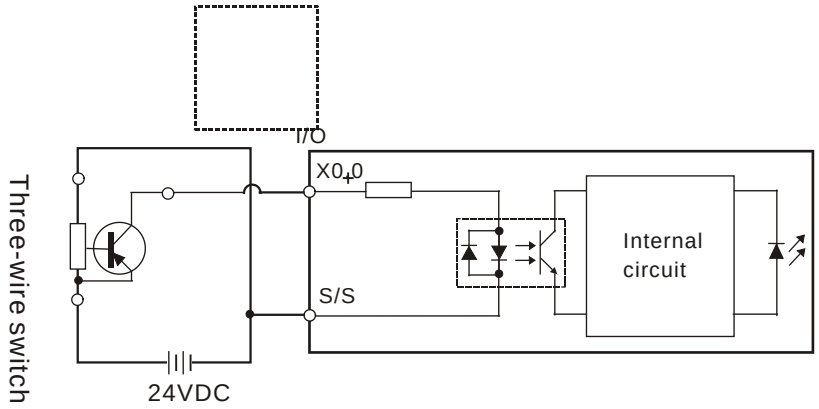
Two-wire proximity switch

5.5.1.5 Three-wire Switch

- Sinking

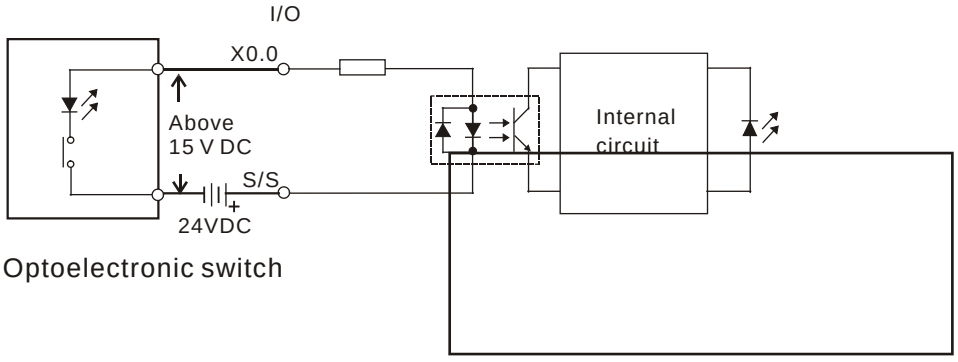


- Sourcing



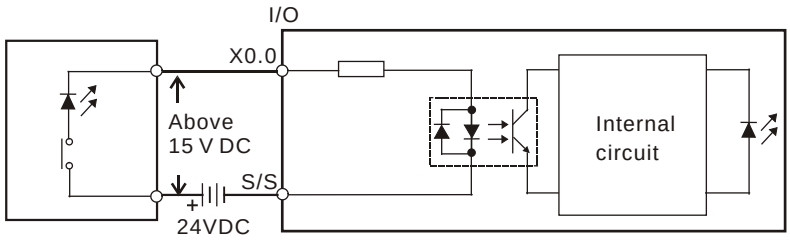
5.5.1.6 Optoelectronic Switch

- Sinking



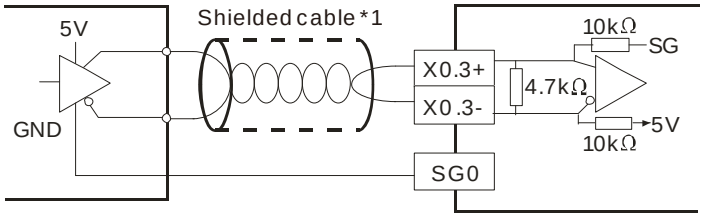
Optoelectronic switch

- Sourcing



Optoelectronic switch

5.5.1.7 Differential Input

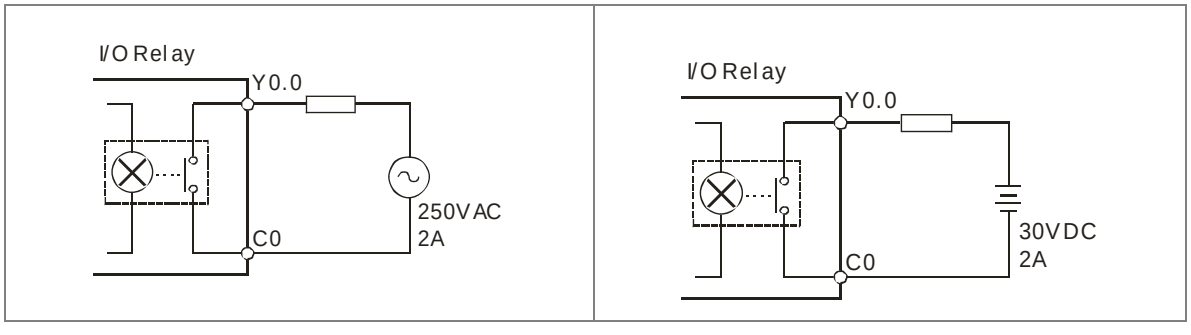


5.5.2 Wiring Digital Output Terminals

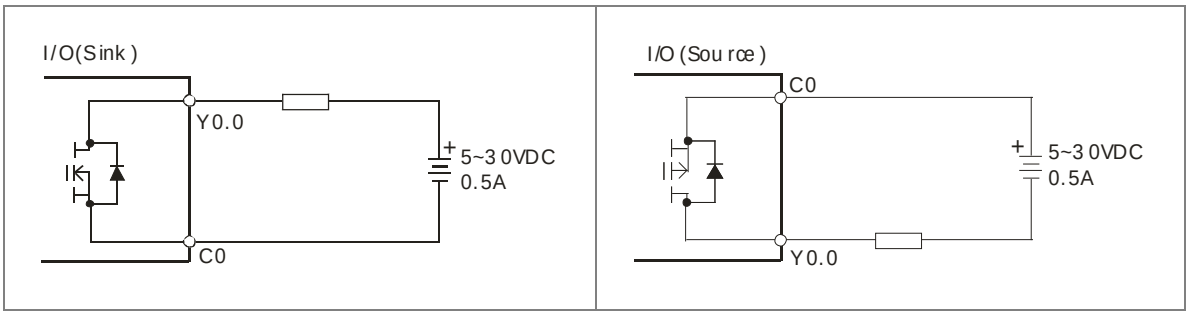
5.5.2.1 Output Circuits

There are three types of output units. They are relay outputs, transistor outputs, and differential outputs.

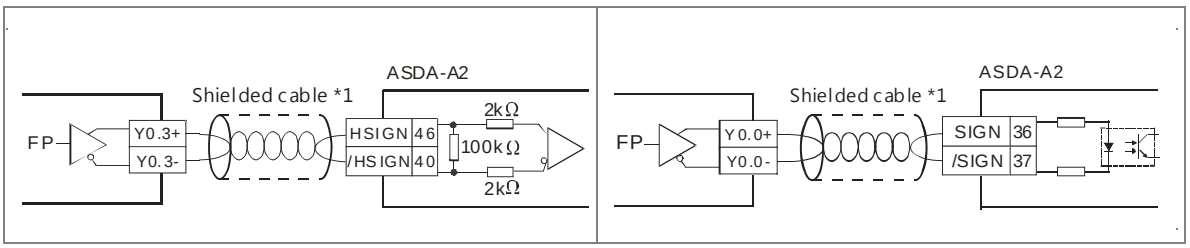
1. Relay output



2. Transistor output

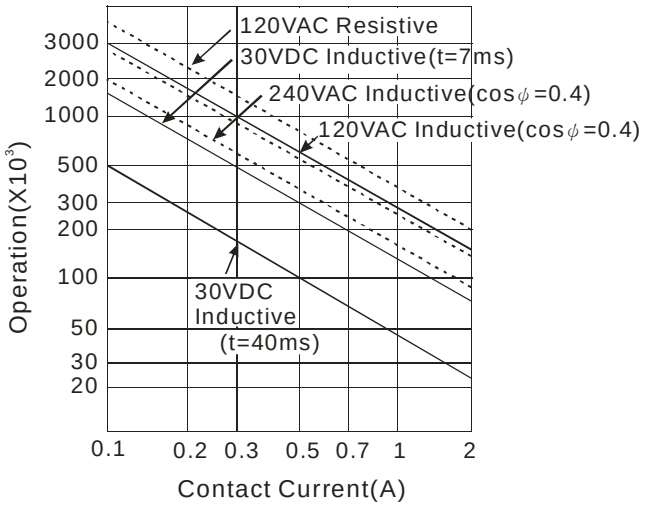


3. Differential output

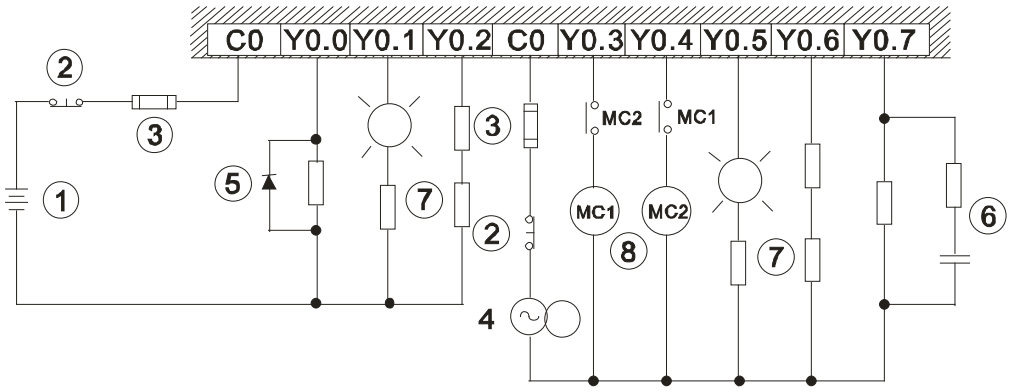


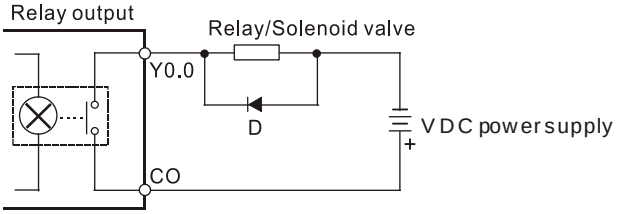
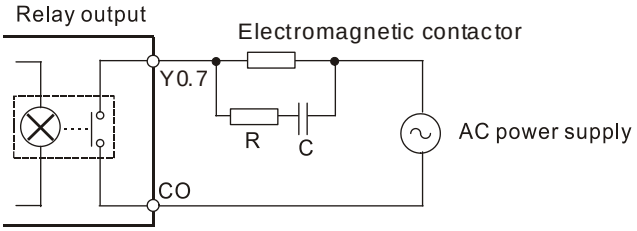
5.5.2.2 Relay Output Circuit

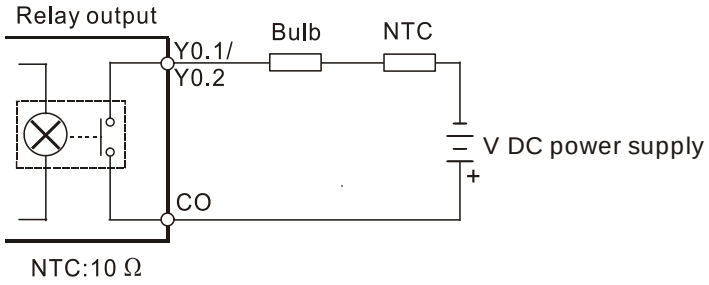
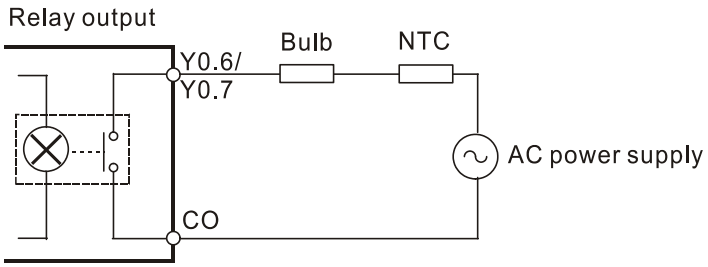
Relay terminals have no polarity. They can be applied to alternating current which passes through a load, or direct current which passes through a load. The maximum current which can passes through every relay terminal is 2 A, and the maximum current which can passes through every common terminal is 5 A. The lifetime of a relay terminal varies with the working voltage, the load type (the power factor cos ϕ), and the current passing through the terminal. The relation is shown in the life cycle curve below.



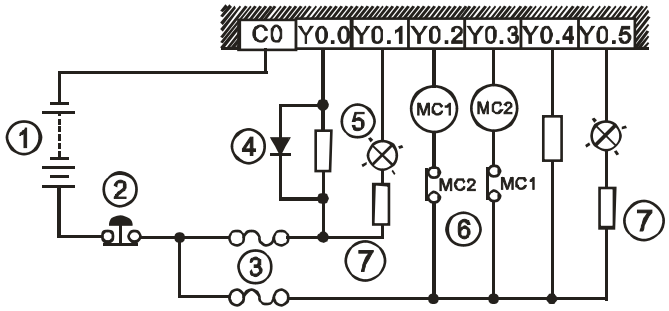
- Relay output circuit

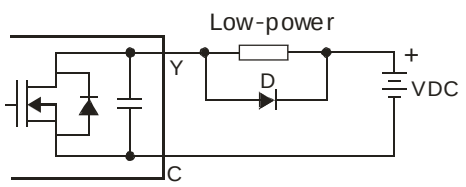


①	Direct-current power supply
②	Emergency stop: An external switch is used.
③	Fuse: To protect the output circuit, a fuse having a breaking capacity in the range of 5 A to 10 A is connected to the common terminal.
④	Alternating-current power supply
⑤	A relay or a solenoid valve is used as a DC load. A diode is connected in parallel to absorb the surge voltage which occurs when the load is OFF.  D: 1N4001 diode
⑥	An electromagnetic contactor is used as an AC load. A resistor and a capacitor are connected in parallel to absorb the surge voltage which occurs when the load is OFF.  R: 100~120 Ω C: 0.1~0.24 uF

⑦	A bulb (incandescent lamp) is used as a DC load. A thermistor is connected in series to absorb the surge current which occurs when the load is ON.  NTC:10 Ω A bulb (neon lamp) is used as an AC load. A thermistor is connected in series to absorb the surge current which occurs when the load is ON.  NTC: 10Ω
⑧	Mutually exclusive output: For example, Y0.3 controls the clockwise rotation of the motor, and Y0.4 controls the counterclockwise rotation of the motor. The interlock circuit which is formed, and the program in the PLC ensure that there are protective measures if an abnormal condition occurs.

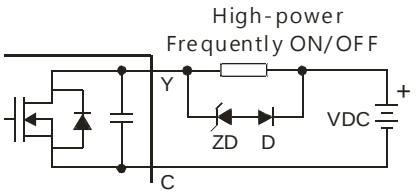
5.5.2.3 Transistor Output Circuit (NPN)





D: 1N4001 diode

[Figure 1]



D: 1N4001 diode
ZD: 9V Zener, 5W

[Figure 2]

①	Direct-current power supply
②	Emergency stop
③	Fuse

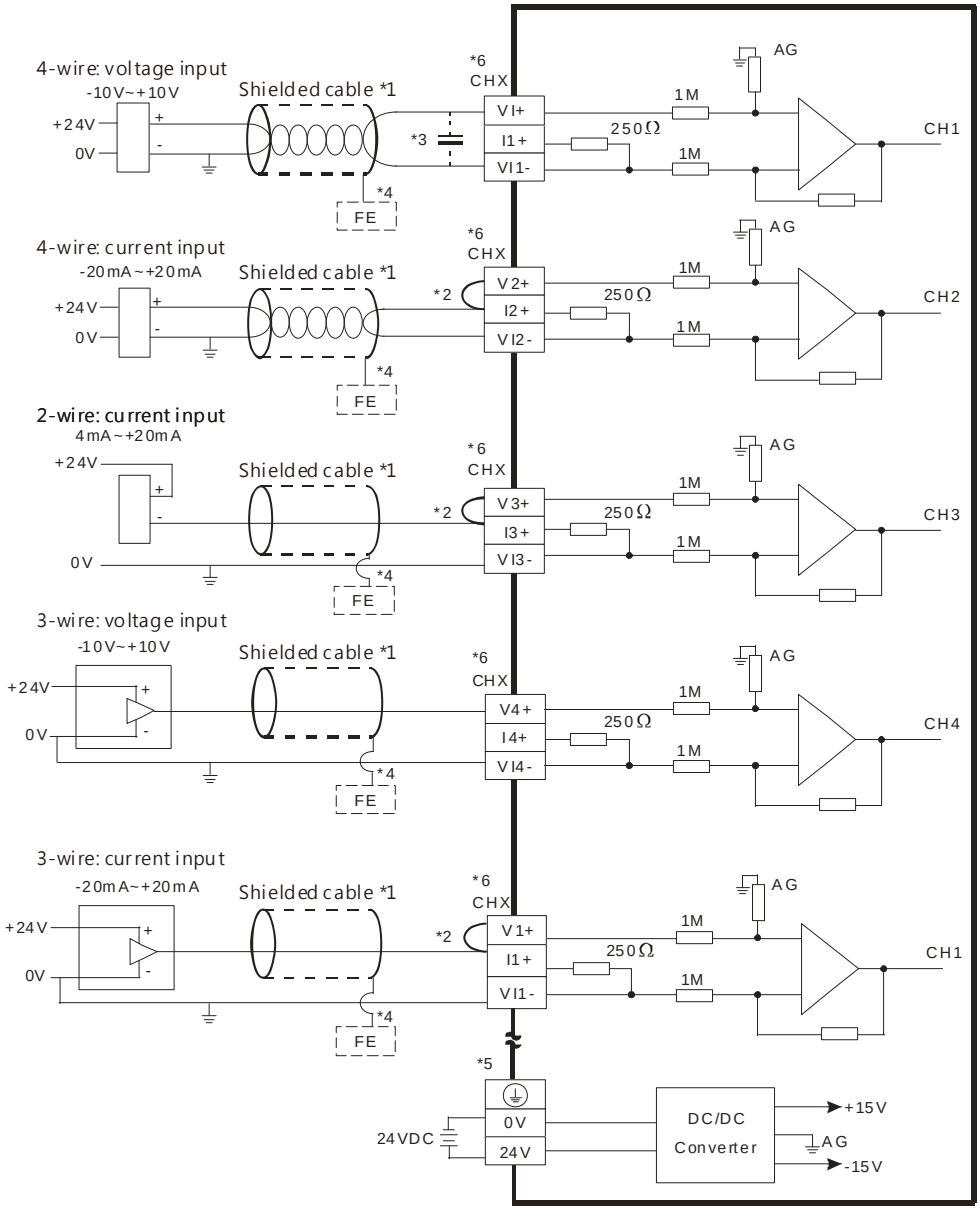
④	The output terminals of a transistor module are open-collector output terminals. If Y0.0/Y0.1 is a pulse train output terminal of a transistor module, the output current passing through its output pull-up resistor must be greater than 0.1 A to ensure that the transistor module operates normally. 1. A diode is connected in parallel to absorb the surge voltage: used in low-power situations (refer to Figure 1) 2. A diode and Zener are connected in parallel to absorb the surge voltage: used in high-power and power-on/off frequently situations (refer to Figure 2)
⑤	A bulb (incandescent lamp) is used as a DC load. A thermistor is connected in series to absorb the surge current which occurs when the load is ON.
⑥	Mutually exclusive output: For example, Y0.2 controls the clockwise rotation of the motor, and Y0.3 controls the counterclockwise rotation of the motor. The interlock circuit which is formed, and the program in the PLC ensure that there are protective measures if an abnormal condition occurs.
⑦	Connected to a NTC thermistor (negative temperature coefficient), when a bulb (incandescent lamp) is used as a DC load and a thermistor is connected in series to absorb the surge current.

5.6 Wiring Analog Input/Output Modules

(1) Definitions of the terminals

- 2-/3-wire (passive sensor): the sensor and the system share the same power circuit.
- 4-wire (active sensor): the sensor uses independent power supply and suggested not to share the same power circuit with the system.

5.6.1 Wiring AS04AD-A



*1. Please use shielded cables to isolate the analog input signal cable from other power cables.

*2. If the module is connected to a current signal, the terminals Vn and In+ (n=1~4) must be short-circuited.

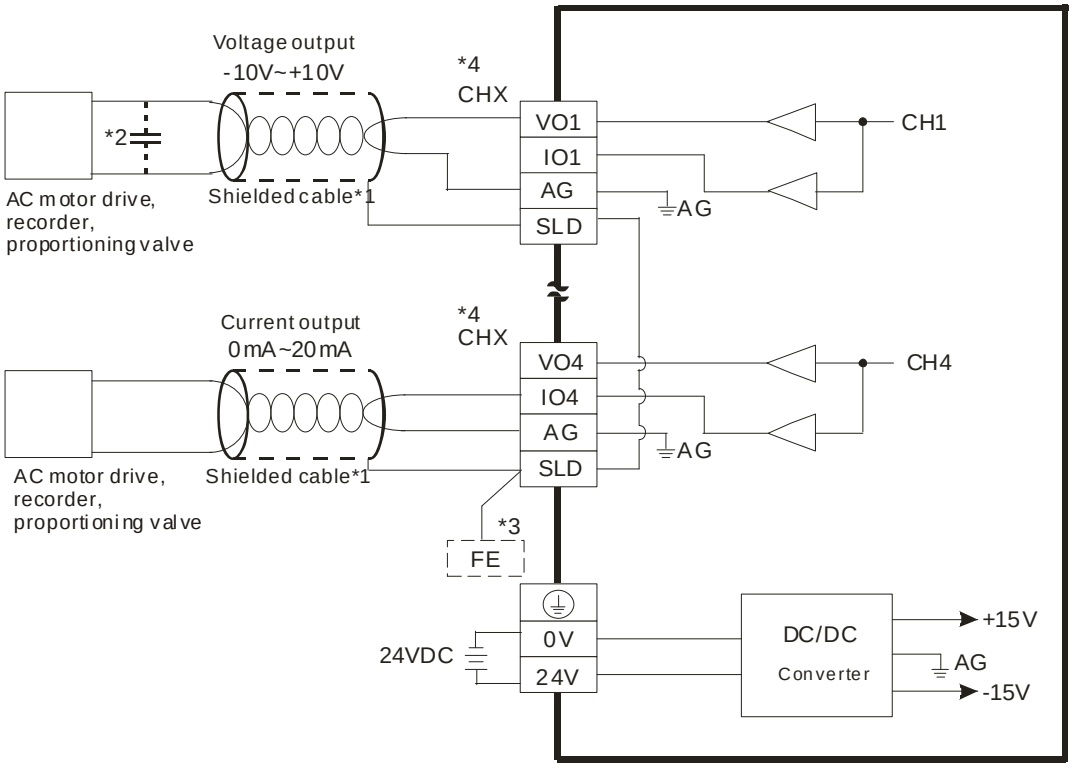
*3. If the ripple in the input voltage results in the noise interference with the wiring, please connect the module to the capacitor having a capacitance in the range of 0.1 μF to 0.47 μF with a working voltage of 25 V.

*4. The FE of the shielded cable should be connected to earth ground.

*5. Please connect the terminal ⏚ to earth ground.

*6. Every channel can work with the wiring presented above.

5.6.2 Wiring AS04DA-A



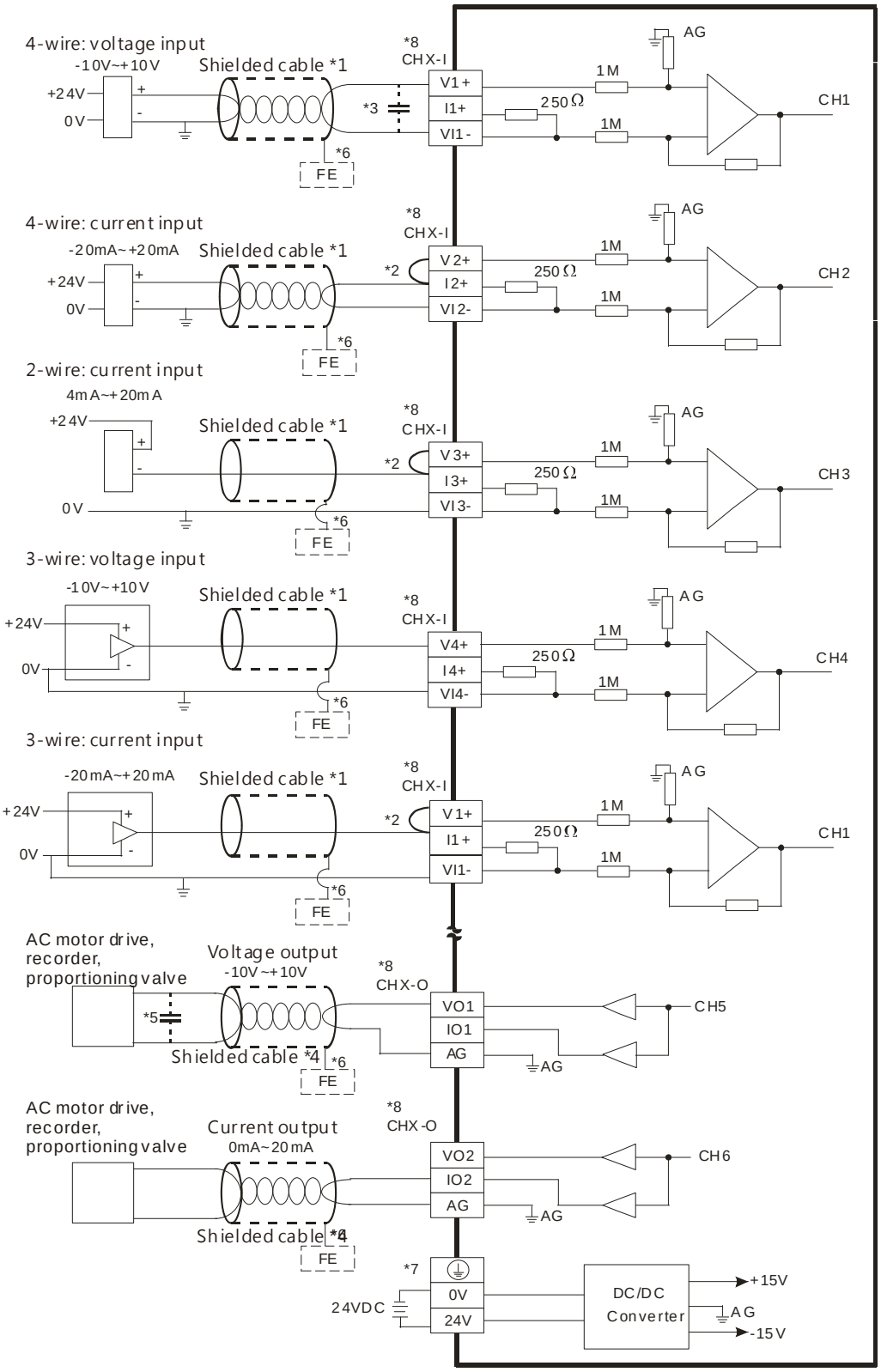
*1. Please use shielded cables to isolate the analog input signal cable from other power cables.

*2. If the ripple in the input voltage results in the noise interference with the wiring, please connect the module to the capacitor having a capacitance in the range of 0.1 µF to 0.47 µF with a working voltage of 25 V.

*3. Please connect the SLD to FE and the FE and the terminal ⏚ should be connected to earth ground.

*4. Every channel can work with the wiring presented above.

5.6.3 Wiring AS06XA-A



*1. Please use shielded cables to isolate the analog input/output signal cable from other power cables.

*2. If the module is connected to a current signal, the terminals Vn and In+ (n=1~4) must be short-circuited.

*3. If the ripple in the input voltage results in the noise interference with the wiring, please connect the module to the capacitor having a capacitance in the range of 0.1 μF to 0.47 μF with a working voltage of 25 V.

*4. Please use shielded cables to isolate the analog output signal cable from other power cables.

*5. If the ripple in the output voltage results in the noise interference with the wiring, please connect the module to the capacitor having a capacitance in the range of 0.1 μF to 0.47 μF with a working voltage of 25 V.

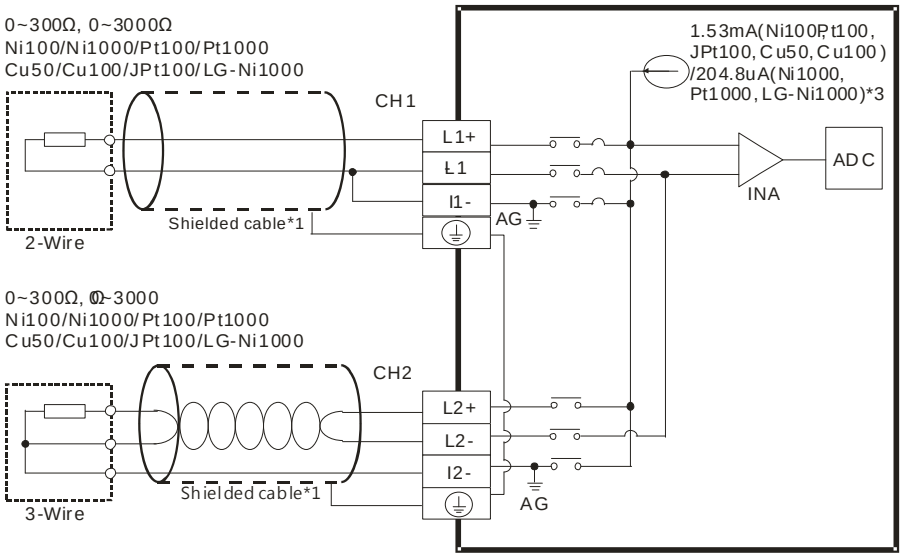
*6. The FE of the shielded cable should be connected to earth ground.

*7. Please connect the terminal ⏚ to earth ground.

*8. CHX-I: Every channel can work with the input wiring presented above. CHX-O: Every channel can work with the output wiring present above.

5.7 Wiring Temperature Measurement Modules

5.7.1 Wiring AS04RTD-A

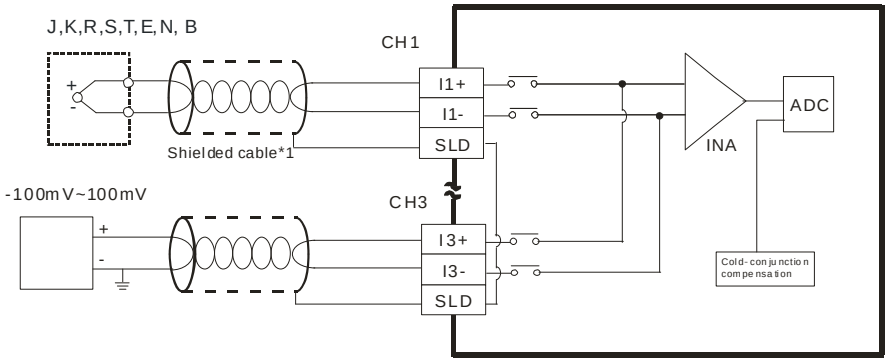


*1. The cable connected to the input terminal should be the cable or the shielded twisted pair cable which can be connected to an Ni100/Ni1000, Pt100/Pt1000, Cu50/Cu100, JPt100, LG-Ni1000 sensor and should be kept separate from other power cables and cables which generate noise. Please use a three-wire temperature sensor. If users want to use a two-wire temperature sensor, Ln+ and In+ must be short-circuited, and Ln- and In- must be short-circuited. (n=1~4)

*2. If users want to measure resistance in the range of 0 Ω to 300 Ω, they can use a two-wire or three-wire sensor instead of a four-wire sensor.

*3. Users need to select an appropriate sensor. If an Ni100/Ni1000, Pt100/Pt1000, Cu50/Cu100, JPt100, LG-Ni1000, or a resistance sensor is used, the internal excitation current is 1.53 mA. If an Ni1000, Pt1000 or LG-Ni1000 temperature sensor is used, the internal excitation current is 204.8 μA.

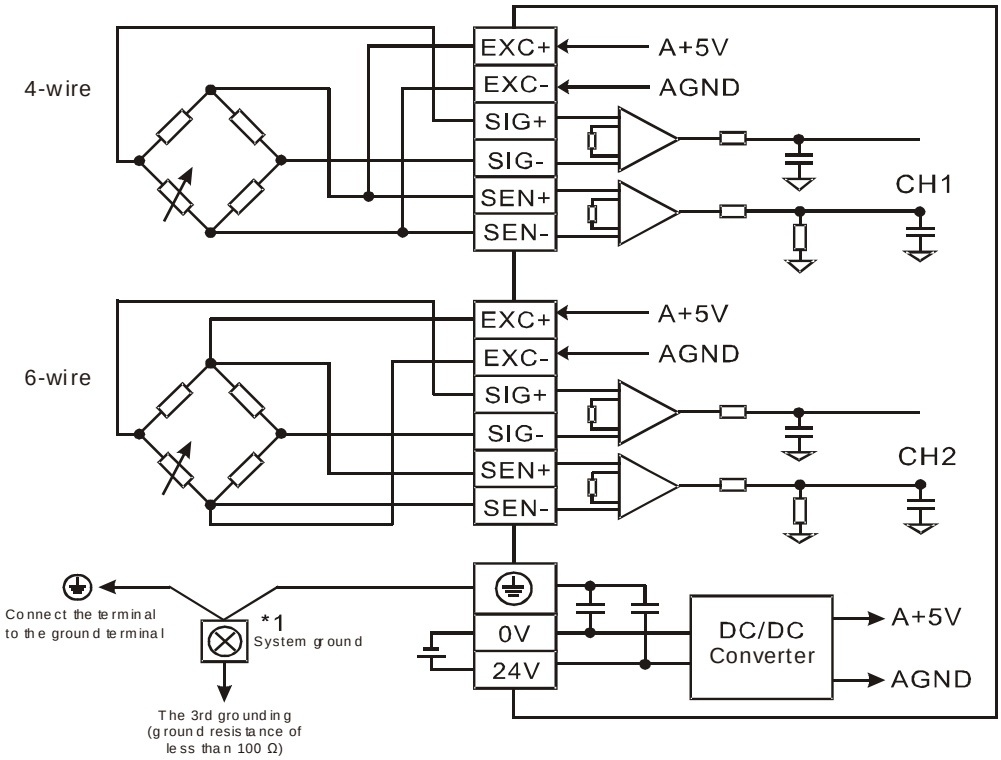
5.7.2 Wiring AS04TC-A



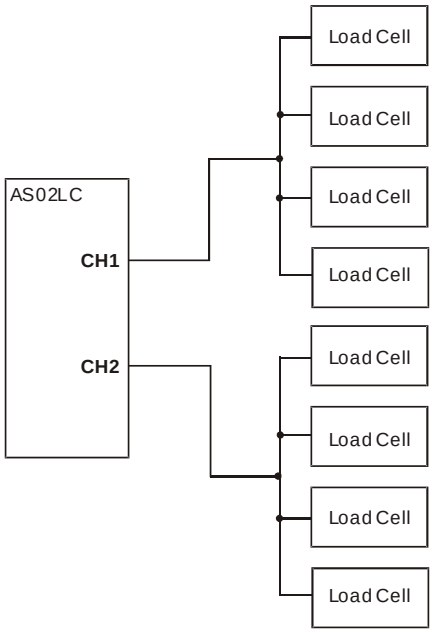
*1. The cable connected to the input terminal should be the cable or the shielded twisted pair cable which can be connected to a type J, K, R, S, T, E, N, B thermocouple, and should be kept separate from other power cables and cables which generate noise.

5.8 Load Cell Modules

5.8.1 Wiring AS02LC-A



- Multiple load cells connected to one load cell module:

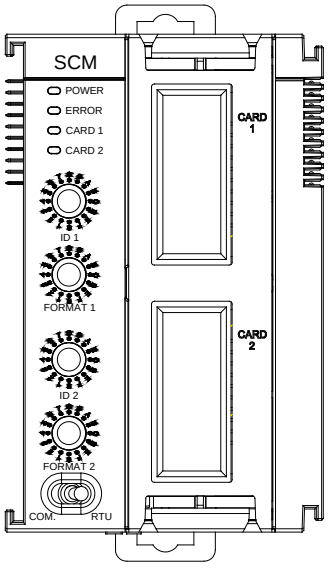


*1. Please connect the ⏚ of the power module and the ⏚ of the load cell module to the system ground terminal and use the system ground as the third grounding or connect it to the control box.

*2. In the case of connecting multiple load cells, the total resistance of the load cell should be greater than 40Ω.

5.9 Wiring Network Modules

5.9.1 AS00SCM-A



5.9.2 Wiring AS00SCM-A

5.9.2.1 AS00SCM-A module wiring for communication

- COM communication mode

  AS00SCM-A module is built-in with 2 function card slots, CARD1 and CARD2, supporting function cards AS-F232, AS-F422, and AS-F485. Please refer to section 5.10 for wiring.

- RTU remote control mode

  The card slot CARD2 supports AS-FCOPM. Please refer to section 5.10 for wiring.

5.9.2.2 AS00SCM-A module wiring for power

- COM: extension via serial ports

  Switch the dip switch of the AS00SCM-A module to COM and install the module on the right side of the AS300 series CPU module. Do not supply extra power to this module to avoid errors.

- RTU remote control mode

  Switch the dip switch of the AS00SCM-A module to RTU. This module uses independent direct-current power supply. Please note the followings while wiring.

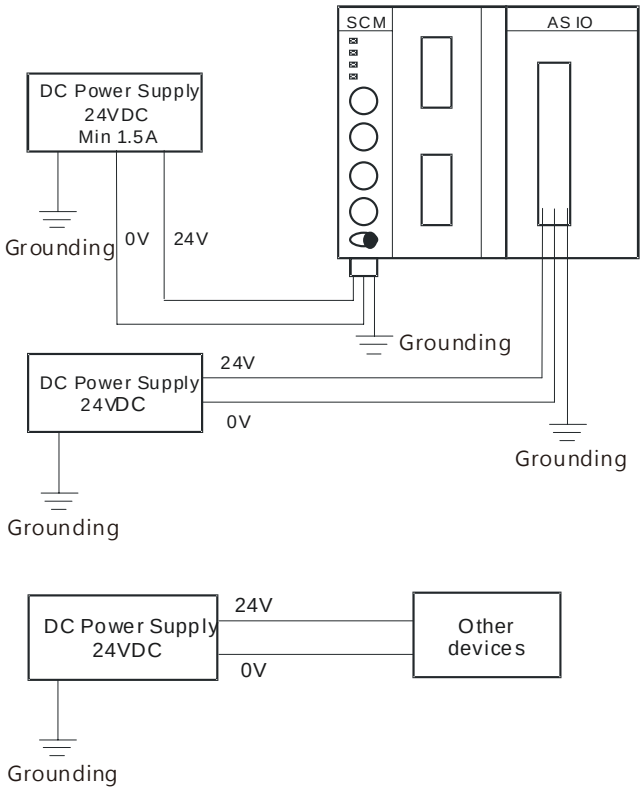
  (1) Please keep the input cables, the output cables, and the power cable separate form one another as shown in the following illustration. Use an independent power supply for this module.

  (2) The 24 VDC cable should be twisted, and connected to a module within a short distance.

  (3) Do not bundle 110 VAC cable, the 220 VAC cable, the 24 VDC cable, the (high-voltage high-current) main circuit, and the I/O signal cable together. Besides, it is recommended that the distance between adjacent cables should be more than 100 millimeters.

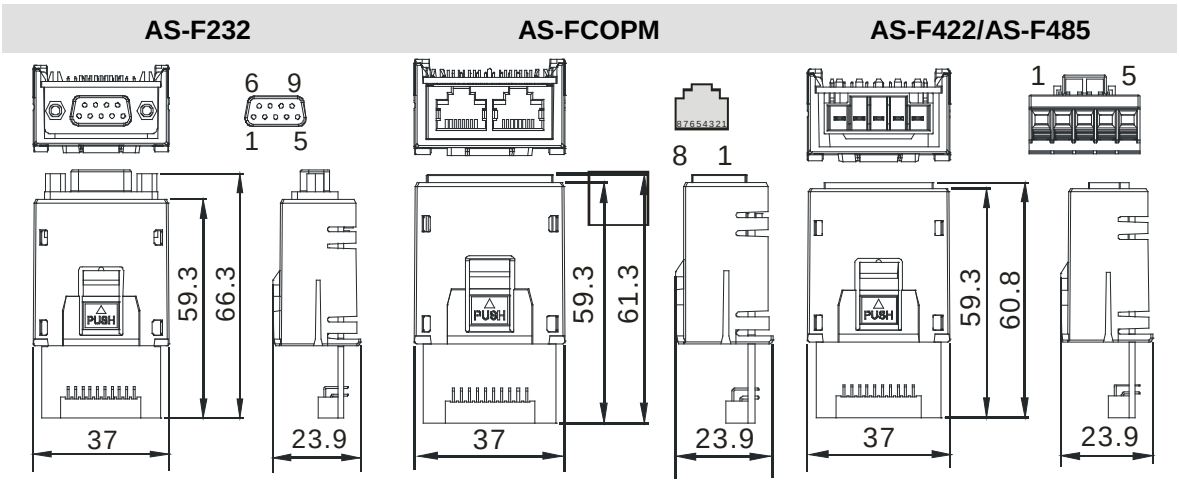
  (4) Please use

  (5) Please single-core cables or twin-core cables in a diameter of 20 AWG~14 AWG. Only use copper conducting wires with a temperature of 60/75°C.



5.10 Wiring Function Cards

5.10.1 Communicational Function Card Profiles and the Pin Definitions



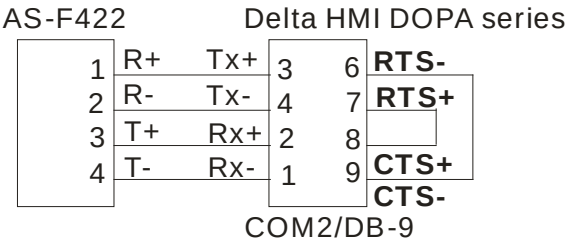
Pin no.	AS-F232	AS-FCOPM	AS-F422	AS-F485
1	-	CAN_H	R+	-
2	TX	CAN_L	R-	-
3	RX	GND	T+	D+
4	-	-	T-	D-
5	GND	-	SG	SG
6-9	-	-		

5.10.2 Wiring the Communicational Function Cards

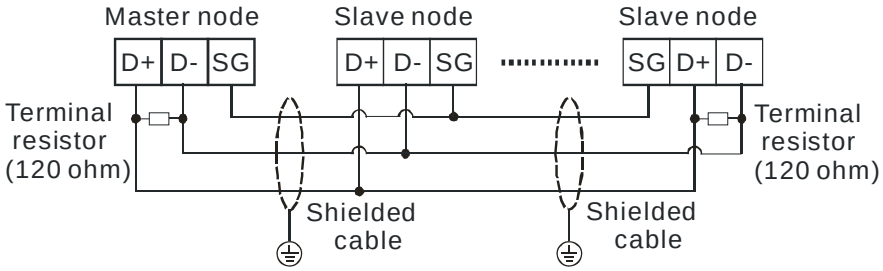
■ AS-F232 wiring example:

DB9 male to DB9 female (standard cable)

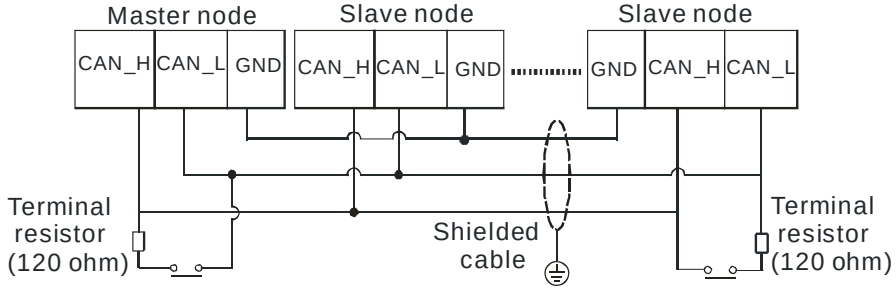
■ AS-F422 wiring example:



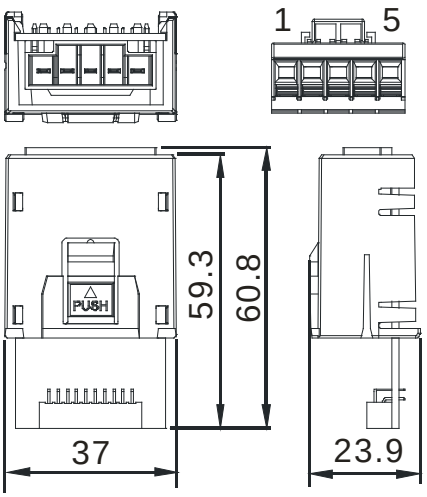
■ AS-F485 wiring example:



■ AS-FCOPM wiring example:

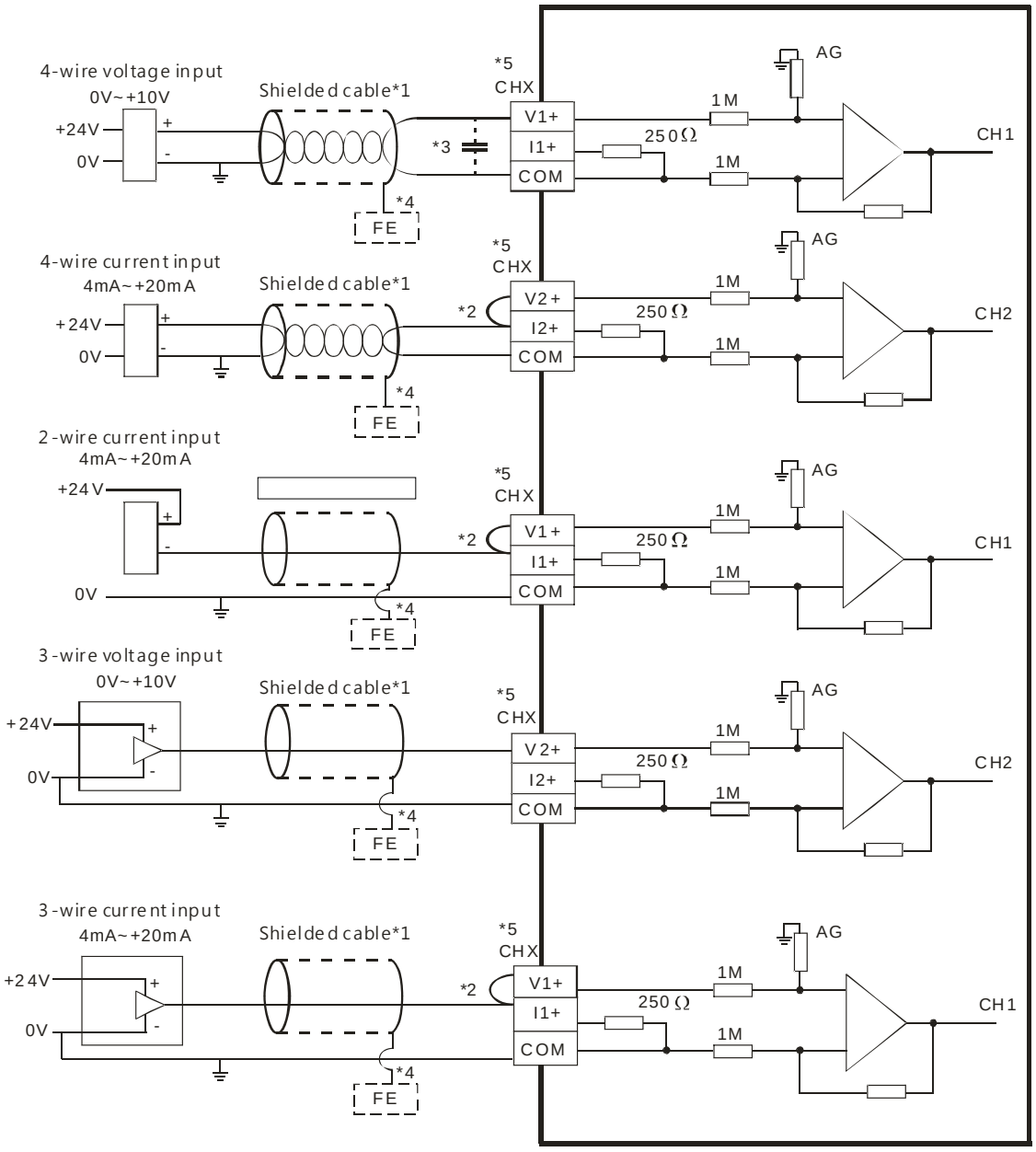


5.10.3 Analog Function Card Profiles and the Pin Definitions



Pin no.	AS-F2AD	AS-F2DA
1	V1+	VO1
2	I1+	IO1
3	V2+	VO2
4	I2+	IO2
5	COM	COM

5.10.4 Wiring AS-F2AD



*1. Please use shielded cables to isolate the analog input signal cable from other power cables.

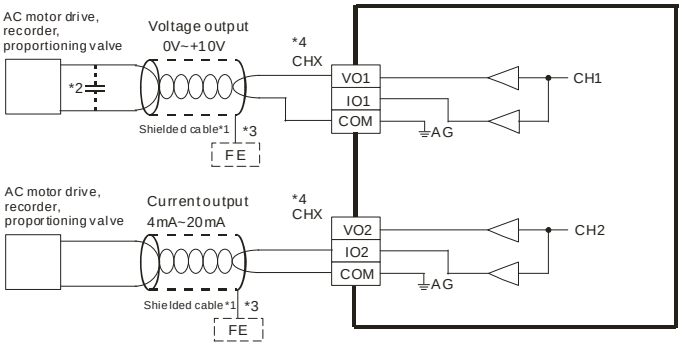
*2. If the module is connected to a current signal, the terminals Vn and In+ (n=1~2) must be short-circuited.

*3. If the ripple in the input voltage results in the noise interference with the wiring, please connect the module to the capacitor having a capacitance in the range of 0.1 μF to 0.47 μF with a working voltage of 25 V.

*4. The FE of the shielded cable should be connected to earth ground.

*5. CHX: Every channel can work with the input wiring presented above.

5.10.5 Wiring AS-F2DA



*1. Please use shielded cables to isolate the analog input signal cable from other power cables.

*2. If the ripple in the input voltage results in the noise interference with the wiring, please connect the module to the capacitor having a capacitance in the range of 0.1 μF to 0.47 μF with a working voltage of 25 V.

*3. The FE of the shielded cable should be connected to earth ground.

*4. CHX: Every channel can work with the input wiring presented above.

Chapter 6 Memory Card

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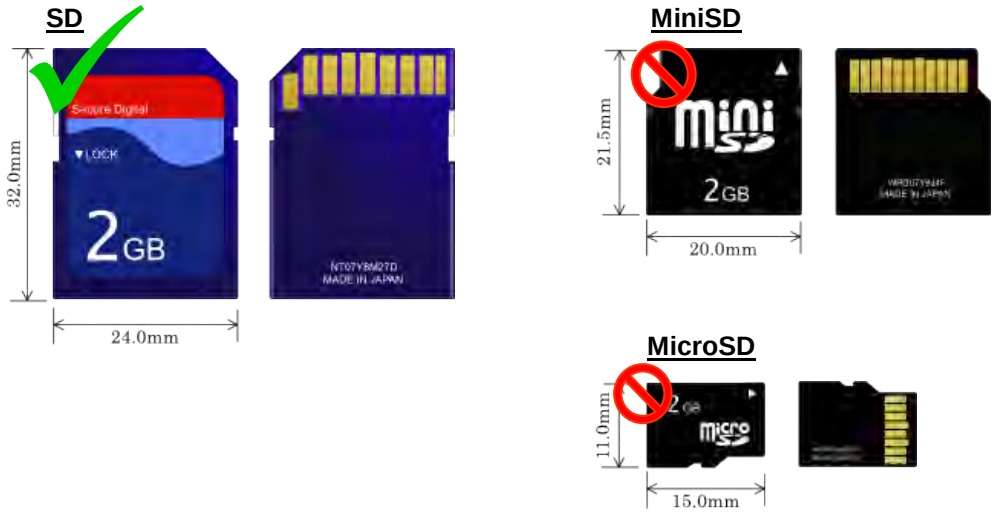
6.1 Overview of Memory Cards

The AS series CPU modules support standard SD cards. Users can purchase products which meet specifications. The specifications for the SD cards supported by the AS series CPU modules, and the usage of the SD cards are described in this chapter.

6.1.1 Appearances of Memory Cards

SD cards are classified into three types according to size. They are SD cards, miniSD cards, and microSD cards. The AS series CPU modules support standard-sized SD cards.



6.1.2 Specifications for Memory Cards

There are several specifications for SD cards on the market. SD cards not only can be classified according to size, but also can be classified into three types according to capacity. These types are SD cards, SDHC cards, and SDXC cards. The AS series presently only supports the maximum of 32GB in the FAT32 format. The following is the table of SD card families. The mini SDHC in the column of SDHC column indicates the specifications supported by the AS series. Be sure to purchase products which meet the specifications.

- SD card families

Type	SD		SDHC		SDXC	
Capacity	32MB~2GB		4GB~32GB		32GB~2TB	
File system	FAT16/FAT32		FAT32		exFAT (FAT64)	
Size	SD	SDHC	Mini SDHC	Micro SDHC	SDXC	Micro SDXC
Speed class rating	N/A		CLASS 2 (Min. 2MB/Sec.) CLASS 4 (Min. 4MB/Sec.) CLASS 6 (Min. 6MB/Sec.) CLASS 10 (Min. 10MB/Sec.)		CLASS 2 (Min. 2MB/Sec.) CLASS 4 (Min. 4MB/Sec.) CLASS 6 (Min. 6MB/Sec.) CLASS 10 (Min. 10MB/Sec.)	

6.2 Installing and Removing a Memory Card

6.2.1 Formatting of a Memory Card and a Write Protect Tab

As the image shown below, the memory card slot is in the front size of the AS series PLC.

6.2.2 Installing a Memory Card

Insert a memory card into the memory card slot in a CPU module, and push it downward until it clicks. After the memory card is installed, it is fixed firmly in the slot. If the memory card is loose, it is not installed correctly. Besides, the memory card has anti-misinsertion design. If it is inserted in the wrong direction, it can not be pushed downward. To prevent the CPU module from being damaged, users can not force the memory card in. The correct way to insert the memory card is shown below.

6.2.3 Removing a Memory Card

After a memory card is pushed downward, it springs from the slot, and users can take it out.

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Chapter 7 EMC Standards

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7.1 EMC Standards for an AS Series System

7.1.1 EMC Standards Applicable to an AS Series System

The EMC standards which are applicable to an AS series system are listed below.

- **EMI**

Port	Frequency range	Level (Normative)	Reference standard
Enclosure port (radiated) (measured at a distance of 10 meters)	30-230 MHz	40 dB (μV/m) quasi-peak	IEC 61000-6-4
	230-1000 MHz	47 dB (μV/m) quasi-peak	
AC power port (conducted)	0.15-0.5 MHz	79 dB (μV) quasi-peak	IEC 61000-6-4
		66 dB (μV) average	
	0.5-30 MHz	73 dB (μV) quasi-peak	
		60 dB (μV) average	

- **EMS**

Environmental phenomenon	Reference standard	Test		Test level
Electrostatic discharge	IEC 61000-4-2	Contact		± 4 kV
		Air		± 8 kV
Radio frequency electromagnetic field Amplitude modulated	IEC 61000-4-3	80% AM, 1 kHz sinusoidal	2.0-2.7 GHz	1 V/m
			1.4-2.0 GHz	3 V/m
			80-1000 MHz	10 V/m
Power frequency magnetic field	IEC 61000-4-8	60 Hz		30 A/m
		50 Hz		30 A/m

- **Conducted immunity test**

Environmental phenomenon		**Fast transient burst**	**High energy surge**	**Radio frequency interference**
Reference standard		**IEC 61000-4-4**	**IEC 61000-4-5**	**IEC 61000-4-6**
Interface/Port	**Specific interface/port**	**Test level**	**Test level**	**Test level**
Data communication	Shielded cable	1 kV	1 kV CM	10V
	Unshielded cable	1 kV	1 kV CM	10V
Digital and analog I/O	AC I/O (unshielded)	2 kV	2 kV CM 1 kV DM	10V
	Analog or DC I/O(unshielded)	1 kV	1 kV CM	10V
	All shielded lines (to the earth)	1 kV	1 kV CM	10V
Equipment power	AC power	2 kV	2 kV CM 1 kV DM	10V
	DC power	2 kV	0.5 kV CM 0.5 kV DM	10V
I/O power and auxiliary power output	AC I/O and AC auxiliary power	2 kV	2 kV CM 1 kV DM	10V
	DC I/O and DC auxiliary power	2 kV	0.5 kV CM 0.5 kV DM	10V

7.1.2 Installation Instructions for the EMC Standards

A PLC must be installed in a control box. The control box protects the PLC, and shields off the electromagnetic interference generated by the PLC.

(1) Control box

- Use a conductive control box.
- To ensure that an inner plate contacts the control box well, users have to mask the paint on the bolts of the plate.
- To ensure that the control box is grounded well even if there is high-frequency noise, users have to connect the control box with a thick wire.
- The diameter of a hole in the control box must be less than 10 millimeters, i.e. 3.94 inches. If the diameter of the hole is larger than 10 millimeters, the radio frequency noise may be emitted.
- To prevent the radio waves from leaking through the interval between the door of the control box and the PLC, the interval needs to be reduced. Besides, users can prevent the radio waves from leaking by putting an EMI gasket on the painted surface.

(2) Connecting a power cable and a ground

The power cable of the PLC system and the ground are connected in a way described below.

- Provide a ground point near the power supply module. Use thick and short wires to connect the terminals LG and FG with the ground. (The length of the wire should be less than 30 centimeters, i.e. 11.18 inches.) LG and FG function to pass the noise generated by the PLC system to the ground. Therefore, the impedance should be as low as possible. Besides, the wires are used to relieve the noise. They themselves carry a lot of noise. Using the short wires can prevent the wires from acting as antennas.
- Twist the ground and the power cable. After the ground and the power cable are twisted, the noise flowing through the power cable is passed to the ground. If a filter is installed on the power cable, the ground and the power cable do not need to be twisted.

7.1.3 Cables

Grounding a shielded cable

Cables drawn from the control box carry high-frequency noise. When they are outside the control box, they are like antennas emitting noise. To prevent the emission of noise, the cables connected to digital input/output modules, analog input/output modules, temperature measurement modules, network modules, and motion control modules should be shielded cables.

The use of shielded cables also increases the resistance to noise. If the signal cables connected to digital input/output modules, analog input/output modules, temperature measurement modules, network modules, and motion control modules are shielded cables, and are grounded properly, the resistance to noise is improved. However, the resistance to noise will not meet the specified requirement if users do not use shielded cables or the shielded cables are not grounded correctly. If the shield of a cable is connected with the control box, users have to make sure that the shield contacts the control box. If the control box is painted, users have to scrape the paint. All fastening must be metal, and the shield must contact the surface of the control box. If the surface is not even, users need to use washers to correct the unevenness, or use an abrasive to level the surface.

If the shield of a shielded cable is grounded, it needs to be as close to a module as possible. Users have to make sure that there is no electromagnetic induction between the cable which is grounded and other cable which is grounded. Besides, users have to take appropriate measures so that the shield of a cable contacts the control box.

MEMO

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Chapter 8 Maintenance and Inspection

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8.1 Cautions

Before users undertake the maintenance and the inspection, they have to pay attention to the following items. **The incorrect or careless operation will lead to damage to the staff and the equipment.**

- To prevent a breakdown of an AS series system or a fire accident, please make sure that the ambient environment is not exposed to corrosive substances such as chloride gas and sulfide gas, flammable substances such as oil mist and cutting powder, or dirt.

- To prevent the connectors from oxidizing, or to prevent the staff from getting an electric shock, please do not touch the connectors.

- To prevent the staff from getting an electric shock, please turn off the power before pulling the connectors or loosening the screws.

- To prevent the cables from being damaged, or to prevent the connectors from being loosened, please do not impose weight on the cable, or pull them violently.

- Please make sure that the input voltage is within the rated range.

- Please do not disassemble or alter the modules. Otherwise, the products will break down, a fire accident will occur, or the staff will be injured.

- To prevent a controlled element from malfunctioning, please make sure that the program and the parameters are written into a new CPU module which replaces an old one before restarting the AS series system.

- To prevent the improper operation which results in the incorrect output or the damage to the equipment, please refer to the related manuals for more information about operating the modules.

- To prevent the damage to the modules, please touch metal which is grounded or wear an antistatic wrist strap to release the static electricity from the body.

- To prevent the noise from resulting in the breakdown of the system, please keep a proper distance from the system when using a cell phone or a communication apparatus.

- Please avoid installing an AS series system under the sun or in a humid environment.

- To prevent the temperature of an element from being high, please make sure that the AS series system keeps a proper distance from heat sources such as coils, heating apparatuses, and resistors.

- To protect an AS series system, please install an emergency stop switch and an overcurrent

protection according to the actual needs.

- Inserting and pulling a module several times may lead to the loose contact between the module and the backplane.
- To prevent an unexpected shock from resulting in the damage to an AS series system and a controlled element, please make sure that the modules are installed firmly.

8.2 Daily Maintenance

To keep an AS series system operating normally, please make sure that the ambient environment and the AS series system conform to the cautions listed in section 8.1. Users then can undertake the daily inspection described below. If any abnormal situation occurs, please follow the remedy and carry out the maintenance.

8.2.1 Tools Required for Inspection

- A screwdriver
- Industrial alcohol
- A clean cotton cloth

8.2.2 Daily Inspection

No.	Item	Inspection	Criterion	Remedy
1	Appearance	Check visually.	Dirt must not be present.	Remove the dirt.
2	Installation of a backplane	Check whether the set screws are loose.	The backplane must be installed firmly.	Further tighten the screws.
		Check whether the backplane is installed on the DIN rail properly.		Install the backplane on the DIN rail properly.
3	Installation of a module	Check whether the module is loose, the projection is inserted into the hole on the backplane, and the screw is tightened.	The projection under the module must be inserted into the hole in the backplane, and the screw must be tightened.	Install the module firmly.
4	Connection	Check whether the removable terminal block is loose.	The removable terminal block must not be loose.	Install the terminal block firmly.

No.	Item		Inspection	Criterion	Remedy
			Check whether the connector is loose.	The connector must not be loose.	Further tighten the screws on the connector.
5	Power supply module	POWER LED indicator	Check whether the POWER LED indicator is ON.	The POWER LED indicator must be ON.	Please refer to chapter 9 for more information about troubleshooting.
	CPU module	RUN LED indicator	When the CPU module is running, check whether the RUN LED is ON.	The RUN LED indicator must be ON.	
		ERROR LED indicator	Check whether the ERROR LED indicator is OFF.	The ERROR LED indicator must be OFF.	
		BUS FAULT LED indicator	Check whether the BUS FAULT LED indicator is OFF.	The BUS FAULT LED indicator must be OFF.	
		SYSTEM LED indicator	Check whether the SYSTEM LED indicator is OFF.	The SYSTEM LED indicator must be OFF.	
	LED indicators on an extension module		Check whether the LED indicators on the extension module are ON.	If the LED indicators are ON, the module operates normally.	

* Please refer to Module Manual for more information related to the LED indicators on the extension modules.

8.3 Periodic Maintenance

Under the condition that the daily inspection is undertaken, users are suggested that they should carry out the periodic maintenance according to the actual operating environment. After making sure that the ambient environment and the AS series system conform to the cautions listed in section 8.1, users then can undertake the periodic inspection described below. If any abnormal situation occurs, please follow the remedy and carry out the maintenance.

8.3.1 Tools Required for Inspection

- A screwdriver
- Industrial alcohol
- A clean cotton cloth
- A multimeter

- A thermometer
- A hygrometer

8.3.2 Periodic Inspection

No.	Item		Inspection	Criterion	Remedy
1	Ambient environment	Ambient temperature/humidity	The ambient temperature and the ambient humidity are measured by a thermometer and a hygrometer.	The ambient temperature and the ambient humidity must conform to the specifications for the modules or the backplane. If the specifications are different, the strictest specifications have high priority.	To ensure that the system operates in a stable environment, check the reason why the environment varies, and eliminate it.
		Atmosphere	Measure corrosive gas.	Corrosive gas must not be present.	
2	Supply voltage		Measure the AC power supply.	The power supply should meet the specifications for the power supply module.	Check the power supply.
3	Installation	Looseness	Check whether the module is loose.	The module must be installed firmly.	Please refer to chapter 2 for more information about installing the module.
		Adhesion of dirt	Check the appearance.	Dirt must not be present.	Remove the dirt.
4	Connection	Looseness of terminal screws	Tighten the screws with a screwdriver.	The screws must not be loose.	Further tighten the screws.
		Looseness of connectors	Pull the connectors.	The connectors must not be loose.	Further tighten the screws on the connectors.

No.	Item	Inspection	Criterion	Remedy
5	PLC system diagnosis	Check the error logs.	No new error occurs.	Please refer to section 9.1.3 for more information.
6	Maximum scan time	Check the state of SR413 and that of SR414 through the device monitoring table in ISPSoft.	The maximum scan cycle must be within the range specified in the system specifications.	Check the reason why the scan time lengthens.

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Chapter 9 Troubleshooting

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9.1 Troubleshooting

9.1.1 Basic troubleshooting steps

This chapter includes kinds of possible errors occurred during operation and the causes of them and what actions should be taken to correct the errors.

(1) Check the followings:

- PLC should be operated in a safe environment (the environmental, electronical, vibrational safties should be considered.)
- Power supply should be correctly connected and supply power to the PLC.
- Installations of modules, terminals and cables are secured.
- All the LED indicators are shown correct.
- All the switches are correctly set.

(2) Check the followings for the AS series to operate:

- Switch the RUN/STOP
- Check the settings for the AS series to RUN/STOP
- Check and eliminate the errors from the external devices
- Use the System Log function of the ISPSoft to check the system operation and the logs.

(3) Identify the source of the possible causes:

- AS series or external device
- CPU modules or the extension moudles
- Setting parameters or programs

9.1.2 Clear the States of Errors

Use the following methods to clear the status of errors when errors occurred. But if the soruce of error is not fixed, the system will still show errors.

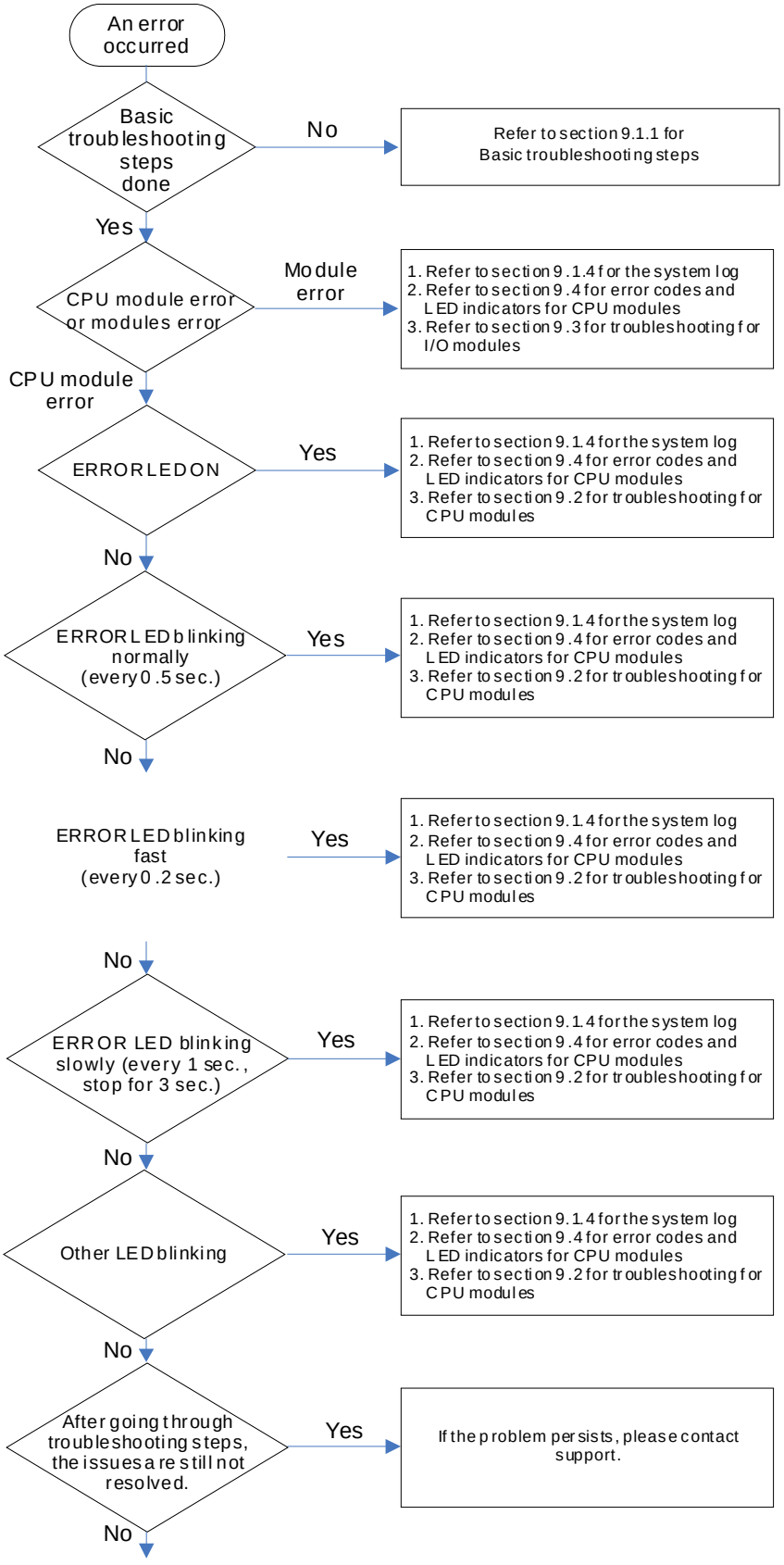
(1) Switch the state of the CPU moudel to STOP and then to RUN.

(2) Turn off the CPU and turn on again.

(3) Use the ISPSoft to clear the error logs.

(4) Reset the CPU and set the settings to defaults and download the project again to operate.

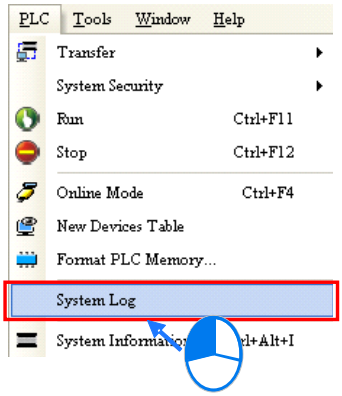
9.1.3 Troubleshooting SOP



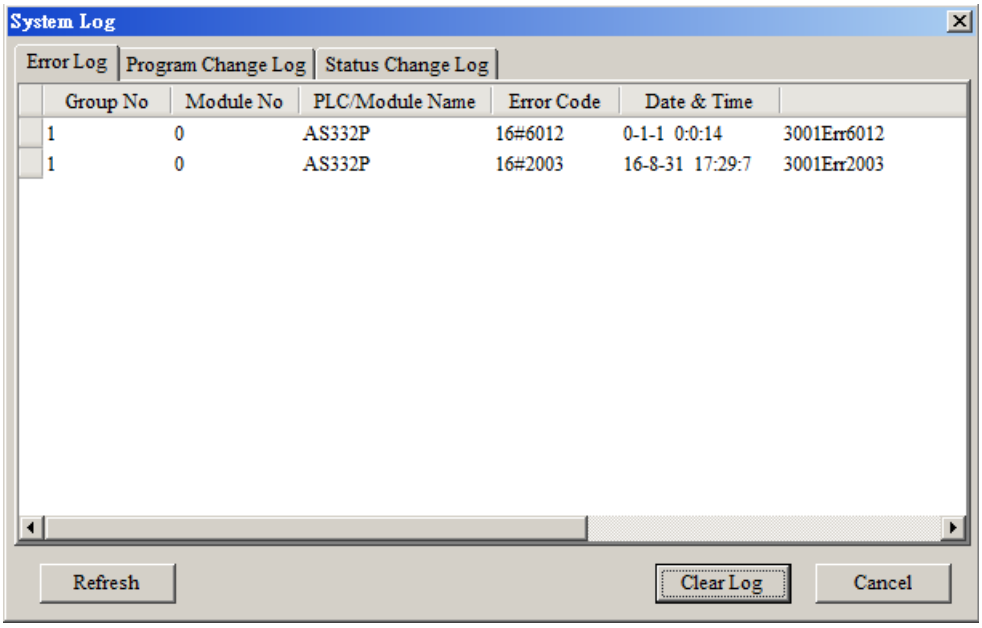
9.1.4 System Log

If ISPSoft is connected to an AS series normally, users can view the actions and the errors occur in the AS series after they click **System Log** on the **PL**C menu. Up to 20 piece of error logs can be stored in the CPU. After the 20 sets are stored, the 1st log will be replaced with the 21st if there are new logs coming in; the old logs will be replaced with the new ones accordingly. When the memory card is installed in the CPU module, 20 pieces of the old logs will be backedup in the memory card and up to 10000 logs can be recorded. If the stored log exceeds the limitation of 1000, the oldest 20 logs will be replaced with the newest 20 logs in the memeory card.

(1) Click **System Log** on the **PL**C menu. PLC> System Log.



(2) After users click **System Log** on the **PL**C menu, the **System Log** window will appear. After users click **Clear Log**, the error log in the window and the error log in the CPU module will be cleared, and the CPU module will be reset.



- Group No.: The number 1 indicates the error occurred in the CPU module or the right-side module 1. The number 2~16 indicates the error occurred in the remote module 1~15.
- Module No.: The number 0 indicates the error occurred in the CPU module or the remote module. The number 1~32 indicates the error occurred in the right-side modue of the CPU module / remote module. (The number 1 represents the closest module to the CPU module or the remote module; this number increases from the closest to the furthest to the CPU module or the remote module.) Note: Up to 8 extension modules can be connected to the right-side of the remote module.
- PLC/Module name: Model names of the CPU modules, remote modules and the extension modules.

- Error Code: Error codes of the error log.
- Date & Time: The error occurred date and time. The most recent occurred error will be listed on the top.
- The last column shows the relative descriptions for the error.

9.2 Troubleshooting for CPU Modules

Check the LED indicators and the error codes from the CPU module and refer to the following table for troubleshooting. V in the Log column indicates the error will be recorded in the log; X in the Log column indicates the error will not be recorded in the log; H in the Log column indicates whether to record the error in the log or not can be set in HWCONFIG.

9.2.1 ERROR LED Indicator's Being ON

Error Code (16#)	Description	Solution	Flag	Log
000A	Scan timeout	1. Check the setting of the watchdog timer in HWCONFIG. 2. Check whether the program causes the long scan time	SM8	V

9.2.2 ERROR LED Indicator's Blinking Every 0.5 Seconds

Error Code (16#)	Description	Solution	Flag	Log
000C	The program in the PLC is damaged.	Download the program again.	SM9	V
0010	The access to the memory in the CPU is denied.	Please contact the factory.	SM9	V
002E	The access to the external memory of the CPU is denied.	Please contact the factory.	SM9	V
002F	PLC programs are not consistentwith the system logs.	Download the program again.	SM34	V
0070	The actual arrangement of the function cards is not consistent with the settings.	Check whether the settings in HWCONFIG are consistent with the actual arrangement of the function cards.	SM10	V
0102	The interrupt number exceeds the range.	Check the program, compile the program again, and download the program again.	SM5	X
0202	The MC instruction exceeds the range.	Check the program, compile the program again, and download the program again.	SM5	X
0302	The MCR instruction exceeds the range.	Check the program, compile the program again, and download the program again.	SM5	X
0D03	The operands used in DHSCS are not used properly.	Check the program, compile the program again, and download the program again.	SM5	X
0E05	The operands HCXXX used in DCNT are not used properly.	Check the program, compile the program again, and download the program again.	SM5	X

Error Code (16#)	Description	Solution	Flag	Log
1300 ~ 130F	Errors occurred in the remote modules	Refer to section 9.3.4 for more information on the error codes of the remote modules.	SM30	V
1402	The actual arrangement of the I/O modules is not consistent with the settings.	Check whether the settings in HWCONFIG are consistent with the actual arrangement of the I/O modules.	SM10	V
140B	The communication modules exceed the limit of 4.	Check the total number of the communication modules.	SM10	V
140D	The extension modules exceed the limit of 32.	Check the total number of the extension modules.	SM10	V
140E	The remote modules exceed the limit of 8 on the right side of the CPU module.	Check the total number of the remote modules on the right side of the CPU module.	SM30	V
1600	The ID of the extension module exceeds the range.	1. Make sure the module is well-connected to the CPU module and tuno-on the modules again. 2. If the error still occurs, please contact the factory.	SM10	V
1601	The ID of the extension module cannot be set.	1. Make sure the module is well-connected to the CPU module and tuno-on the modules again. 2. If the error still occurs, please contact the factory.	SM10	V
1602	The ID of the extension module is duplicated.	1. Make sure the module is well-connected to the CPU module and tuno-on the modules again. 2. If the error still occurs, please contact the factory.	SM10	V
1603	The extension module cannot be opearated.	1. Make sure the module is well-connected to the CPU module and tuno-on the modules again. 2. If the error still occurs, please contact the factory.	SM10	V
1604	Extension module communication timeout	1. Make sure the module is well-connected to the CPU module and tuno-on the modules again. 2. If the error still occurs, please contact the factory.	SM10	V
1605	Hardware failure	Please contact the factory.	SM10	V
1606	Errors on the function card of the communication module	Make sure the function card is well-connected to the CPU module and tuno-on the modules again.	SM10	V
1607	The external voltage is abnormal.	Check whether the external 24 V power supply to the module is normal.	SM10	V
1608	The Internal factory calibration or the CJC is abnormal.	Please contact the factory.	SM10	V
1609 ~ 160F	Reserved (Error codes for the extension modules)			
200A	Invalid instruction	Check the program, compile the program again, and download the program again.	SM5	V
6010	The number of the MODBUS TCP connections exceeds the range.	Check if the number of the superior devices exceeds the limit of 32.	SM 1092	V
6011	The number of the EtherNet/IP connections exceeds the range.	Check if the number of the conncetions exceeds the range of 16.	SM 1093	V

9.2.3 ERROR LED Indicator's Raipid Blinking Every 0.2 Seconds

This happens when the power supply 24VDC of the CPU module is disconnecting or the power supply is not sufficient, not stable or abnormal so that it can not be operated.

Error Code (16#)	Description	Solution	Flag	Log
002A	The external voltage is abnormal.	Check whether the external 24 V power supply to the module is normal.	SM7	V

9.2.4 ERROR LED Indicator's Slow Blinking Every 3 Seconds and Lighting up for 1 Second

Error Code (16#)	Description	Solution	Flag	Log
1500	Connection lost in the remote modules	Please check the network connection cable.	SM30	V
1502 ~ 150F	Errors occurred in the remote modules	Refer to section 9.3.4 for more information on the error codes of the remote modules.	SM30	V
1800 ~ 180F	Errors occurred in the extension modules	Refer to section 9.3 for more information on the error codes of the extension modules.	SM10	V
1900 ~ 191C	Heartbeat errors occurred in the slave of Delta ASD-A2 control.	1. Check the CANopen connection cable. 2. Check if the specific salve is working properly. Note: The last 2 digits of the error code represent the ID number of the slave (hexadecimal should convert to decimal).	-	V

9.2.5 BAT. LOW LED Indicator's Being ON

This happens when there is no battery (CR1620) or the power is low. Users can set this opion off in the HWCONFIG > CPU > Device Setting > Show Battery Low Voltage Error CPU, when users don't need the function of RTC to keep track of the current time. (Default is enabled.)

Error Code (16#)	Description	Solution	Flag	Log
0027	Battery Low	Change battery or set this option off	SM219	X

9.2.6 BAT. LOW LED Indicator's Blinking Every 0.5 Seconds

This happens when RTC cannot keep track of the current time.

Error Code (16#)	Description	Solution	Flag	Log
0026	RTC cannot keep track of the current time	Please contact the factory.	SM218	V

9.2.7 The LED Indicators of RUN and ERROR are Blinking Every 0.5 Seconds Simultaneously

This happens when the firmware of the CPU module is being upgraded. If this happens once the power is supplied to the

CPU module, it means errors occurred during the previous firmware upgrade. Users need to upgrade the firmware again or contact your point of purchase.

9.2.8 The LED Indicators of RUN and ERROR are Blinking One After Another Every 0.5 Seconds.

This happens when the memory card of the CPU module is backing up / restoring / or saving.

9.2.9 Other Errors (Without LED Indicators)

Error Code (16#)	Description	Solution	Flag	Log
0011	The PLC ID is incorrect.	Please check the PLC ID.	SM34	V
0012	The PLC password is incorrect.	Please check the PLC password.	SM34	V
002D	The PLC maximum password attempts exceeded.	Reset the CPU module or restore the CPU module to its factory settings.	SM34	V
0050	The memories in the latched special auxiliary relays are abnormal.	1. Reset the CPU module or restore the CPU module to its factory settings, and then download the program and the parameters again. 2. If the error still occurs, please contact the factory.	SM6	V
0051	The latched special data registers are abnormal.	1. Reset the CPU module or restore the CPU module to its factory settings, and then download the program and the parameters again. 2. If the error still occurs, please contact the factory.	SM6	V
0052	The memories in the latched auxiliary relays are abnormal.	1. Reset the CPU module or restore the CPU module to its factory settings, and then download the program and the parameters again. 2. If the error still occurs, please contact the factory.	SM6	V
0054	The latched counters are abnormal.	1. Reset the CPU module or restore the CPU module to its factory settings, and then download the program and the parameters again. 2. If the error still occurs, please contact the factory.	SM6	V
0055	The latched 32-bit counters are abnormal.	1. Reset the CPU module or restore the CPU module to its factory settings, and then download the program and the parameters again. 2. If the error still occurs, please contact the factory.	SM6	V
0056	The latched special auxiliary relay is abnormal.	1. Reset the CPU module or restore the CPU module to its factory settings, and then download the program and the parameters again. 2. If the error still occurs, please contact the factory.	SM6	V
0059	The latched data registers are abnormal.	1. Reset the CPU module or restore the CPU module to its factory settings, and then download the program and the parameters again. 2. If the error still occurs, contact the factory.	SM6	V
005D	The CPU module does not detect a memory card.	Check whether a memory card is inserted into the CPU module correctly.	SM453	V
005E	The memory card is initialized incorrectly.	Check whether the memory card is broken.	SM453	V
0063	An error occurs when data is written to the memory card.	Check whether the file path is correct, or whether the memory card breaks down.	SM453	V

0064	A file in the memory card can not be read.	Check whether the file path is correct, or whether the file is damaged.	SM453	V
2001	Without using the FCOMP card or not in the right mode for the ASDA-A2 while using the CANopen communication instruction.	Make sure to use the FCOMP card in the function card 2 and check if the operation mode is correct.	SM0	V
2003	The device used in the program exceeds the device range.	Check the program, compile the program again, and download the program again.	SM0	V
200B	The operand n or the other constant operands K/H exceed the range.	Check the program, compile the program again, and download the program again.	SM0	V
200C	The operands overlap.	Check the program, compile the program again, and download the program again.	SM0	V
200D	The binary to the binary-coded decimal conversion is incorrect.	Check the program, compile the program again, and download the program again.	SM0	V
200E	The string does not end with 00.	Check the program, compile the program again, and download the program again.	SM0	V
2012	Incorrect division operation	Check the program, compile the program again, and download the program again.	SM0	V
2013	The value exceeds the range of values which can be represented by the floating-point numbers.	Check the program, compile the program again, and download the program again.	SM0	V
2014	The task designated by TKON/YKOFF is incorrect, or exceeds the range.	Check the program, compile the program again, and download the program again.	SM0	V
2017	The instruction BREAK is written outside of the FOR-NEXT.	Check the program, compile the program again, and download the program again.	SM0	V
2027	No such position planning table number or the format is incorrect.	1. Check the program, compile the program again, and download the program again. 2. Check the settings of the position planning table.	SM0	V
2028	The high speed output instruction is being executed. Only one instruction can be executed at a time.	Refer to SR28 for the record of the axis number and rearrange the output control procedures.	-	V
6004	The IP address filter is set incorrectly.	Set the Ethernet parameter for the CPU module in HWCONFIG again.	SM1108	X
600D	RJ45 port is not connected.	Check the connection.	SM1100	X
6012	There are devices using the same IP address.	1. Check if there are devices using the sameIP address. 2. Check if there are more than 1 DHCP or BOOTP server on the network.	SM1101	V
6100	The email connection is busy.	Retry the email connection later. (This error does not cause the PLC to stop running. Users can perform the corresponding solution by means of the related flag in the program.)	SM1113	X
6103	The trigger attachment mode in the email is set incorrectly.	Set up the trigger attachment mode in HWCONFIG > CPU Module > Device Setting > Options > Ethernet Port Advanced > Email > Trigger Setting > Trigger Attachment Mode.	SM1113	X
6104	The attachment in the email does not exist.	Check whether the attachment exists in the memory card.	SM1113	X
6105	The attachment in the email is oversized.	Check the size of the file which is specified as the attachment. If the size is over 2 MB, the file can not be specified as the attachment.	SM1113	X

6106	There is an SMTP server response timeout.	Check for the correct address and set up the SMTP server in HWCONFIG > CPU Module > Device Setting > Options > Ethernet Port Advanced > Email again.	SM1113	X
6107	There is an SMTP server response timeout.	1. Check whether the status of the SMTP server is normal. 2. Retry the sending of the email later. (This error does not cause the PLC to stop running. Users can perform the corresponding solution by means of the related flag in the program.)	SM1113	X
6108	SMTP verification failed	Check for the correct ID/Password and set up in HWCONFIG > CPU Module > Device Setting > Options > Ethernet Port Advanced > Email again.	SM1113	X
6200	The remote communication IP address set in the TCP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > TCP Socket.	-	X
6201	The local communication port set in the TCP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > TCP Socket.	-	X
6202	The remote communication port set in the TCP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > TCP Socket.	-	X
6203	The device from which the data is sent in the TCP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > TCP Socket.	-	X
6206	The device which receives the data in the TCP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > TCP Socket.	-	X
6208	The data which is received through the TCP socket exceeds the device range.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > TCP Socket.	-	X
6209	The remote communication IP address set in the UDP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > UDP	-	X

		Socket.		
620A	The local communication port set in the UDP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > UDP Socket.	-	X
620C	The device from which the data is sent in the UDP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > UDP Socket.	-	X
620F	The device which receives the data in the UDP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > UDP Socket.	-	X
6210	The data which is received through the UDP socket exceeds the device range.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > UDP Socket.	-	X
6212	There is no response from the remote device after the timeout period.	Make sure that the remote device is connected.	-	X
6213	The data received exceeds the limit.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > UDP Socket.	-	X
6214	The remote device refuses the connection.	Make sure that the remote device operates normally.	-	X
6215	The socket is not opened.	Check whether operational sequence in the program is correct.	-	X
6217	The socket is opened.	Check whether operational sequence in the program is correct.	-	X
6218	The data has been sent through the socket.	Check whether operational sequence in the program is correct.	-	X
6219	The data has been received through the socket.	Check whether operational sequence in the program is correct.	-	X
621A	The socket is closed.	Check whether operational sequence in the program is correct.	-	X
7011	The device communication function code in COM1 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7012	The device communication address used in COM1 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H

7013	The device used in COM1 exceeds the device range.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7014	The device length of the communication data in COM1 exceeds the limit.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7017	The device checksum for the communication serial port of COM1 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7021	The device communication function code in COM2 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7022	The device communication address used in COM2 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7023	The device used in COM2 exceeds the device range.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7024	The device length of the communication data in COM2 exceeds the limit.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7027	The device checksum for the communication serial port of COM2 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7031	The device communication function code in the Ethernet is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7032	The device communication address used in the Ethernet is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7033	The device used in the Ethernet exceeds the device range.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7034	The device length of the communication data in the Ethernet exceeds the limit.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7037	The device checksum for the communication serial port of the Ethernet is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7041	The device communication function code in the USB is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7042	The device communication address used in the USB is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7043	The device used in the USB exceeds the device range.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7044	The device length of the communication data in the USB exceeds the limit.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H

7047	The device checksum for the communication serial port of the USB is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70B1	The device communication function code in the function card 1 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70B2	The device communication address used in the function card 1 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70B3	The device used in the function card 1 exceeds the device range.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70B4	The device length of the communication data in the function card 1 exceeds the limit.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70B7	The device checksum for the communication serial port of the function card 1 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70C1	The device communication function code in the function card 2 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70C2	The device communication address used in the function card 2 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70C3	The device used in the function card 2 exceeds the device range.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70C4	The device length of the communication data in the function card 2 exceeds the limit.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70C7	The device checksum for the communication serial port of the function card 2 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7203	Invalid communication function code	Refer to the function codes defined by the communication prototcols	-	H
8105	The contents of the program downloaded are incorrect. The program syntax is incorrect.	Download the program and the parameters again.	-	H
8106	The contents of the program downloaded are incorrect. The length of the execution code exceeds the limit.	Download the program and the parameters again.	-	H
8107	The contents of the program downloaded are incorrect. The length of the source code exceeds the limit.	Download the program and the parameters again.	-	H

9.3 Troubleshooting for I/O Modules

- **Introduction of modules**

  Digital I/O modules, analog I/O modules, temperature measurement modules, load cell modules, and network modules can be installed in an AS series system. There are 2 types of error codes, for errors and for warning. The CPU module and its modules will stop operating when errors occurred. The CPU moduels and its modules will not stop operating when warnings triggered.

9.3.1 Troubleshootings for Analog Modules (AD/DA/XA) and Temperature Modules (RTD/TC)

9.3.1.1 ERROR LED Indicator's Being ON

The Following errors will be specified as warnings. Users need to set up in HWCONFIG to have them shown as errors when the following errors occurred.

Error Code	Description	Solution
16#1605	Hardware failure	Please contact the factory.
16#1607	The external voltage is abnormal.	Check the power supply.
16#1608	The factory calibration or the CJC is abnormal.	Please contact the factory.

9.3.1.2 ERROR LED Indicator's Blinking Every 0.5 Seconds

The following errors are specified as warnings to ensure the CPU module can still run even when the warnings are triggered by its AIO modules. Users can set up in HWCONFIG to have them shown as errors when the first 4 errors occurred.

Error Code	Description	Solution
16#1801	The external voltage is abnormal.	Check the power supply.
16#1802	Hardware failure	Please contact the factory.
16#1804	The factory calibration is abnormal.	Please contact the factory.
16#1807	The CJC is abnormal.	Please contact the factory.
16#1808	The signal received by channel 1 exceeds the range of analog inputs (temperature).	Check the signal received by channel 1
16#1809	The signal received by channel 2 exceeds the range of analog inputs (temperature).	Check the signal received by channel 2
16#180A	The signal received by channel 3 exceeds the range of analog inputs (temperature).	Check the signal received by channel 3
16#180B	The signal received by channel 4 exceeds the range of analog inputs (temperature).	Check the signal received by channel 4

9.3.2 Troubleshootings for Load Cell Module AS02LC

9.3.2.1 ERROR LED Indicator's Being ON

Users can set up in HWCONFIG to have them shown as errors when the following errors occurred.

Error Code	Description	Solution
16#1605	Hardware failure (e.g. the diver board)	Please contact the factory.
16#1607	The external voltage is abnormal.	Check the power supply.

9.3.2.2 ERROR LED Indicator's Blinking Every 0.5 Seconds

The following errors are specified as warnings to ensure the CPU module can still run even when the warnings are triggered by its AIO modules. Users can set up in HWCONFIG to have them shown as errors when the first 3 errors occurred.

Error Code	Description	Solution
16#1801	The external voltage is abnormal.	Check the power supply.
16#1802	Hardware failure	Please contact the factory.
16#1807	Diver board failure	Please contact the factory.
16#1808	The signal received by channel 1 exceeds the range of analog inputs or the SEN voltage is abnormal.	Check the signal received by channel 1 and the cable connections.
16#1809	The signal received by channel 1 exceeds the weight limit.	Check the value inputed in channel 1 and the setting of the maximum weight.
16#180A	The factory calibration in channel 1 is incorrect.	Check the weight calibration in channel 1.
16#180B	The signal received by channel 2 exceeds the range of analog inputs or the SEN voltage is abnormal.	Check the signal received by channel 2 and the cable connections.
16#180C	The signal received by channel 2 exceeds the weight limit.	Check the value inputed in channel 2 and the setting of the maximum weight.
16#180D	The factory calibration in channel 2 is incorrect.	Check the weight calibration in channel 1.

9.3.3 Troubleshootings for Module AS00SCM as a Communication Module

9.3.3.1 ERROR LED Indicator's Being ON

The following error codes are for users to identify possible errors occurred when the AS00SCM module is installed on the right side of the CPU module and acts as a ccommunication module.

Error Code	Description	Solution
16#1605	Hardware failure	1. Check if the module is securely installed. 2. Change and install a new AS00SCM or contact the factory.

Error Code	Description	Solution
16#1606	The setting of the function card is incorrect.	1. Check if the function card is securely installed. 2. Change and install a new function card or contact the factory. 3. Check if the setting in HWCONFIG is consistent with the actual setting in the function card. 4. Change and install a new AS00SCM or contact the factory.

9.3.3.2 ERROR LED Indicator's Blinking Every 0.5 Seconds

The following error codes are for users to identify possible errors occurred when the AS00SCM module is installed on the right side of the CPU module and acts as a ccommunication module.

Error Code	Description	Solution
16#1802	Incorrect parameters	Check the parameter in HWCONFIG, and the parameter. Download the parameter again.
16#1803	Communication timeout	1. Check whether the communication cable is connected well. 2. Check if the station number and the communication format are correctly set. 3. Check if the connection with the function card is working fine.
16#1804	The settingof the UD Link is incorrect.	1. Check the settings of the UD Link. 2. Check the settings to trigger warnings in the PLC.

The following error codes can only be viewed via SCMSoft; when the following errors occurred, they will not be shown on the LED indicators and the system will not send the error messages to the CPU module.

Error Code	Description	Solution
16#0107	The settings in HWCONFIG and actual manual settings are not consistent for the function card 1.	Check the settings in HWCONFIG and actual manual settings for the function card 1.
16#0108	The settings in HWCONFIG and actual manual settings are not consistent for the function card 2.	Check the settings in HWCONFIG and actual manual settings for the function card 2.
16#0201	Incorrect parameters	Check the parameter in HWCONFIG, and the parameter. Download the parameter again.
16#0301	Function card 1 communication timeout	1. Check if the station number and the communication format are correctly set. 2. Check if the connection with the function card is working fine.
16#0302	Function card 2 communication timeout	1. Check if the station number and the communication format are correctly set. 2. Check if the connection with the function card is working fine.
16#0400	Invalid UD Link Group ID for the function card 1	1. Check the settings of the UD Link. 2. Check the settings to trigger warnings in the PLC.
16#0401	Invalid UD Link Group ID for the function card 2	1. Check the settings of the UD Link. 2. Check the settings to trigger warnings in the PLC.

Error Code	Description	Solution
16#0402	Invalid UD Link Command for the function card 1	1. Check the settings of the UD Link. 2. Check the settings to trigger warnings in the PLC.
16#0403	Invalid UD Link Command for the function card 1	1. Check the settings of the UD Link. 2. Check the settings to trigger warnings in the PLC.

9.3.4 Troubleshootings for Module AS00SCM as a Remote Module

Errors from the remote modules are regarded as warnings for AS CPU modules. The LED indicator of the CPU module will blink and the CPU module can still operate. Users can use the flag SM30 to work with the programs in the PLC to manage the ways to present the errors from the remote modules.

9.3.4.1 Error LED Indicator's Being ON

Error codes for the error tyep

Error Code	Description	Solution
16#1301	Hardware failure	1. Check if the module is securely installed. 2. Change and install a new AS00SCM or contact the factory.
16#1302	The setting of the function card is incorrect.	1. Check if the function card is securely installed with the AS-FCOPM card. 2. Change and install a new function card or contact the factory. 3. Check if the setting in HWCONFIG is consistent with the actual setting in the function card. 4. Change and install a new AS00SCM or contact the factory.

9.3.4.2 ERROR LED Indicator's Blinking Every 0.5 Seconds

Error codes for the warning type

Error Code	Description	Solution
16#1502	Incorrect parameters	Check the parameter in HWCONFIG, and the parameter. Download the parameter again.
16#1503	Extension module communication timeout	Make sure the module is well-connected to the CPU module and tuno-on the modules again.

9.3.4.3 ERROR LED Indicator's Blinking Every 0.2 Seconds

This happens when the power supply of 24VDC for the remote module is not sufficient. Please check the power supply. If the power supply is normal, remove the extension module from the CPU module and then check if the SCM remote module is out of order. The error codes below are of the warning types.

Error Code	Description	Solution
16#1303	24VDC power supply is not sufficient and then is recovered from a low-voltage less than 10ms situation.	Check whether the 24 V power supply to the module is normal.

9.4 Error Codes and LED Indicators for CPU Modules

A. Columns

a. Error code: If the error occurs in the system, the error code is generated.

b. Description: The description of the error

c. CPU status: If the error occurs, the CPU stops running, keeps running, or in the status defined by users.

- Stop: The CPU stops running when the error occurs.
- Continue: The CPU keeps running when the error occurs.

d. LED indicator status: If the error occurs, the LED indicator is ON, OFF, or blinks.

- ERROR: The system error

- **Descriptions**

Module Type	LED indicator	Descriptions
CPU	Error LED	There are 5 types of error indicator status for the errors of the CPU module, including LED indicator ON, OFF, blinking fast, blinking normally, and blinking slowly. When the LED indicator is ON, blinking fast/normally, users need to clear the problems first in order to run the CPU module. When the LED indicator is blinking slowly, indicating a warning type of error codes, it does not require immediate action. It is suggested to clear the prolems when the module is power-off. Error type: ON: A serious error occurs in the module. Blinking fast (evey 0.2 seconds): unstable power supply or hardware failure Blinking normally (evey 0.5 second): system program errors or system cannot run. Warning type: Blinking slowly (every 1 second and stop for 3 seconds): a warning is triggered, but the system can still run. OFF: a warning is triggered, but the system can still run. Users can modify the rules of how a warning is triggered or use the SM/SR to show the warnings.

9.4.1 Error Codes and LED Indicators for CPU Modules

Note: refer to the section 9.3 for the status descriptions of the Error LED indicatiors.

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
000A	Scan timeout	Stop	V				
000C	The program in the PLC is damaged.	Stop			V		
0010	The access to the memory in the CPU is denied.	Stop			V		
0011	The PLC ID is incorrect.	Continue					V

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
0012	The PLC password is incorrect.	Continue					V
0026	RTC cannot keep track of the current time (The battery LED is blinking.)	Continue					
0027	Battery low (The battery LED is ON.)	Continue					
002A	24VDC power supply is not sufficient and then is recovered from a low-voltage less than 10ms situation.	Continue		V			
002D	The PLC maximum password attempts exceeded.	Continue					V
002E	The access to the external memory of the CPU is denied.	Stop			V		
002F	PLC programs are not consistentwith the system logs.	Stop			V		
0050	The memories in the latched special auxiliary relays are abnormal.	Continue					V
0051	The latched special data registers are abnormal.	Continue					V
0052	The memories in the latched auxiliary relays are abnormal.	Continue					V
0054	The latched counters are abnormal.	Continue					V
0055	The latched 32-bit counters are abnormal.	Continue					V
0056	The latched special auxiliary relay is abnormal.	Continue					V
0059	The latched data registers are abnormal.	Continue					V
005D	The CPU module does not detect a memory card.	Continue					V
005E	The memory card is initialized incorrectly.	Continue					V
0063	An error occurs when data is written to the memory card.	Continue					V
0064	A file in the memory card can not be read.	Continue					V
0070	The actual arrangement of the function cards is not consistent with the settings.	Stop			V		
0102	The interrupt number exceeds the range.	Stop			V		
0202	The MC instruction exceeds the range.	Stop			V		
0302	The MCR instruction exceeds the range.	Stop			V		
0D03	The operands used in DHSCS are not used properly.	Stop			V		
0E05	The operands HCXXX used in DCNT are not used properly.	Stop			V		
1300 ~ 130F	Errors occurred in the remote modules	Continue				V	
1402	The actual arrangement of the I/O modules is not consistent with the settings.	Stop			V		
140B	The communication modules exceed the limit of 4.	Stop			V		
140D	The extension modules exceed the limit of 32.	Stop			V		
140E	The remote modules exceed the limit of 8 on the right side of the CPU module.	Stop			V		

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
1500	Connection lost in the remote modules	Continue				V	
1502 ~ 150F	Errors occurred in the remote modules	Continue				V	
1600	The ID of the extension module exceeds the range.	Stop			V		
1601	The ID of the extension module cannot be set.	Stop			V		
1602	The ID of the extension module is duplicated.	Stop			V		
1603	The extension module cannot be opearated.	Stop			V		
1604	Extension module communication timeout	Stop			V		
1605	Hardware failure	Stop			V		
1606	Errors on the function card of the communication module	Stop			V		
1607	The external voltage is abnormal.	Stop			V		
1608	The Internal factory calibration or the CJC is abnormal.	Stop			V		
1609 ~ 160F	Reserved (Error codes for the extension modules)	Stop			V		
1800 ~ 180F	Errors occurred in the extension modules	Continue				V	
1900 ~ 191C	Heartbeat errors occurred in the slave of Delta ASD-A2 control.	Continue				V	
1950	The initialization of Delta ASD-A2 control has not yet been completed, the CANopen instructions cannot be executed.	Continue					V
2001	Without using the FCOMP card or not in the right mode for the ASDA-A2 while using the CANopen communication instruction.	Continue					V
2003	The device used in the program exceeds the device range.	Continue					V
200A	Invalid instruction	Stop			V		
200B	The operand n or the other constant operands K/H exceed the range.	Continue					V
200C	The operands overlap.	Continue					V
200D	The binary to the binary-coded decimal conversion is incorrect.	Continue					V
200E	The string does not end with 00.	Continue					V
2012	Incorrect division operation	Continue					V
2013	The value exceeds the range of values which can be represented by the floating-point numbers.	Continue					V
2014	The task designated by TKON/YKOFF is incorrect, or exceeds the range.	Continue					V

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
2017	The instruction BREAK is written outside of the FOR-NEXT.	Continue					V
2027	No such position planning table number or the format is incorrect.	Continue					V
2028	The high speed output instruction is being executed. Only one instruction can be executed at a time.	Continue					V
6004	The IP address filter is set incorrectly.	Continue					V
600D	RJ45 port is not connected.	Continue					V
6010	The number of the MODBUS TCP connections exceeds the range.	Continue			V		
6011	The number of the EtherNet/IP connections exceeds the range.	Continue			V		
6012	There are devices using the same IP address.	Continue					V
6100	The email connection is busy.	Continue					V
6103	The trigger attachment mode in the email is set incorrectly.	Continue					V
6104	The attachment in the email does not exist.	Continue					V
6105	The attachment in the email is oversized.	Continue					V
6106	There is an SMTP server response timeout.	Continue					V
6107	There is an SMTP server response timeout.	Continue					V
6108	SMTP verification failed	Continue					V
6200	The remote communication IP address set in the TCP socket function is illegal.	Continue					V
6201	The local communication port set in the TCP socket function is illegal.	Continue					V
6202	The remote communication port set in the TCP socket function is illegal.	Continue					V
6203	The device from which the data is sent in the TCP socket function is illegal.	Continue					V
6206	The device which receives the data in the TCP socket function is illegal.	Continue					V
6208	The data which is received through the TCP socket exceeds the device range.	Continue					V
6209	The remote communication IP address set in the UDP socket function is illegal.	Continue					V
620A	The local communication port set in the UDP socket function is illegal.	Continue					V
620C	The device from which the data is sent in the UDP socket function is illegal.	Continue					V
620F	The device which receives the data in the UDP socket function is illegal.	Continue					V
6210	The data which is received through the UDP socket exceeds the device range.	Continue					V

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
6212	There is no response from the remote device after the timeout period.	Continue					V
6213	The data received exceeds the limit.	Continue					V
6214	The remote device refuses the connection.	Continue					V
6215	The socket is not opened.	Continue					V
6217	The socket is opened.	Continue					V
6218	The data has been sent through the socket.	Continue					V
6219	The data has been received through the socket.	Continue					V
621A	The socket is closed.	Continue					V
7011	The device communication function code in COM1 is incorrect.	Continue					V
7012	The device communication address used in COM1 is incorrect.	Continue					V
7013	The device used in COM1 exceeds the device range.	Continue					V
7014	The device length of the communication data in COM1 exceeds the limit.	Continue					V
7017	The device checksum for the communication serial port of COM1 is incorrect.	Continue					V
7021	The device communication function code in COM2 is incorrect.	Continue					V
7022	The device communication address used in COM2 is incorrect.	Continue					V
7023	The device used in COM2 exceeds the device range.	Continue					V
7024	The device length of the communication data in COM2 exceeds the limit.	Continue					V
7027	The device checksum for the communication serial port of COM2 is incorrect.	Continue					V
7031	The device communication function code in the Ethernet is incorrect.	Continue					V
7032	The device communication address used in the Ethernet is incorrect.	Continue					V
7033	The device used in the Ethernet exceeds the device range.	Continue					V
7034	The device length of the communication data in the Ethernet exceeds the limit.	Continue					V
7037	The device checksum for the communication serial port of the Ethernet is incorrect.	Continue					V
7041	The device communication function code in the USB is incorrect.	Continue					V
7042	The device communication address used in the USB is incorrect.	Continue					V
7043	The device used in the USB exceeds the device range.	Continue					V

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
7044	The device length of the communication data in the USB exceeds the limit.	Continue					V
7047	The device checksum for the communication serial port of the USB is incorrect.	Continue					V
70B1	The device communication function code in the function card 1 is incorrect.	Continue					V
70B2	The device communication address used in the function card 1 is incorrect.	Continue					V
70B3	The device used in the function card 1 exceeds the device range.	Continue					V
70B4	The device length of the communication data in the function card 1 exceeds the limit.	Continue					V
70B7	The device checksum for the communication serial port of the function card 1 is incorrect.	Continue					V
70C1	The device communication function code in the function card 2 is incorrect.	Continue					V
70C2	The device communication address used in the function card 2 is incorrect.	Continue					V
70C3	The device used in the function card 2 exceeds the device range.	Continue					V
70C4	The device length of the communication data in the function card 2 exceeds the limit.	Continue					V
70C7	The device checksum for the communication serial port of the function card 2 is incorrect.	Continue					V
7203	Invalid communication function code	Continue					V
8105	The contents of the program downloaded are incorrect. The program syntax is incorrect.	Continue					V
8106	The contents of the program downloaded are incorrect. The length of the execution code exceeds the limit.	Continue					V
8107	The contents of the program downloaded are incorrect. The length of the source code exceeds the limit.	Continue					V

9.4.2 Error Codes and LED Indicators for Analog / Temperature Modules

Error code	Description	ERROR LED indicator status	
		A → D / D → A / A ↔ D	ERROR
16#1605	Hardware failure	OFF	ON
16#1607	The external voltage is abnormal.	OFF	ON
16#1608	The factory calibration or the CJC is abnormal.	OFF	ON
16#1801*1	The external voltage is abnormal.	OFF	Blinking

Error code	Description	ERROR LED indicator status	
		A → D / D → A / A ↔D	ERROR
16#1802*1	Hardware failure	OFF	Blinking
16#1804*1	The factory calibration is abnormal.	RUN: Blinking STOP: OFF	Blinking
16#1807*1	The CJC is abnormal.	OFF	Blinking
16#1808	The signal received by channel 1 exceeds the range of analog inputs (temperature).	RUN: Blinking STOP: OFF	Blinking
16#1809	The signal received by channel 2 exceeds the range of analog inputs (temperature).		
16#180A	The signal received by channel 3 exceeds the range of analog inputs (temperature).		
16#180B	The signal received by channel 4 exceeds the range of analog inputs (temperature).		

*1: The following errors are specified as warnings to ensure the CPU module can still run even when the warnings are triggered by its AIO modules. Users can set up in HWCONFIG to have them shown as errors when the first 4 errors occurred.

9.4.3 Error Codes and LED Indicators for Load Cell Module AS02LC

Error code	Description	ERROR LED indicator status	
		A → D	ERROR
16#1605	Hardware failure (the diver board included)	OFF	ON
16#1607	The external voltage is abnormal.	OFF	ON
16#1801*1	The external voltage is abnormal.	OFF	Blinking
16#1802*1	Hardware failure	OFF	Blinking
16#1807*1	Diver board failure	OFF	Blinking
16#1808	The signal received by channel 1 exceeds the range of analog inputs or the SEN voltage is abnormal.	RUN: Blinking STOP: OFF	Blinking
16#1809	The signal received by channel 1 exceeds the weight limit.		
16#180A	The factory calibration in channel 1 is incorrect.		
16#180B	The signal received by channel 2 exceeds the range of analog inputs or the SEN voltage is abnormal.		
16#180C	The signal received by channel 2 exceeds the weight limit.		
16#180D	The factory calibration in channel 2 is incorrect.		

*1: The following errors are specified as warnings to ensure the CPU module can still run even when the warnings are triggered by its AIO modules. Users can set up in HWCONFIG to have them shown as errors when the 3 errors occurred.

9.4.4 Error Codes and LED Indicators for Module AS00SCM as a Communication Module

Error Code	Description	ERROR LED indicator status	
		ON	Blinking
16#1605	Hardware failure	V	
16#1606	The setting of the function card is incorrect.	V	
16#1802	Incorrect parameters		V
16#1803	Communication timeout		V
16#1804	The settingof the UD Link is incorrect.		V

9.4.5 Error Codes and LED Indicators for Module AS00SCM as a Remote Module

Error Code	Description	ERROR LED indicator status		
		ON	Blinking	Blinking fast
16#1301	Hardware failure	V		
16#1302	The setting of the function card is incorrect.	V		
16#1303	24VDC power supply is not sufficient and then is recovered from a low-voltage less than 10ms situation.			V
16#1502	Incorrect parameters		V	
16#1503	Extension module communication timeout		V	

MEMO

9

Chapter 9 Troubleshooting

Table of Contents

9.1 Troubleshooting

9.1.1 Basic troubleshooting steps

This chapter includes kinds of possible errors occurred during operation and the causes of them and what actions should be taken to correct the errors.

(1) Check the followings:

- PLC should be operated in a safe environment (the environmental, electronical, vibrational safeties should be considered.)
- Power supply should be correctly connected and supply power to the PLC.
- Installations of modules, terminals and cables are secured.
- All the LED indicators are shown correct.
- All the switches are correctly set.

(2) Check the followings for the AS series to operate:

- Switch the RUN/STOP
- Check the settings for the AS series to RUN/STOP
- Check and eliminate the errors from the external devices
- Use the System Log function of the ISPSoft to check the system operation and the logs.

(3) Identify the source of the possible causes:

- AS series or external device
- CPU modules or the extension modules
- Setting parameters or programs

9.1.2 Clear the States of Errors

Use the following methods to clear the status of errors when errors occurred. But if the source of error is not fixed, the system will still show errors.

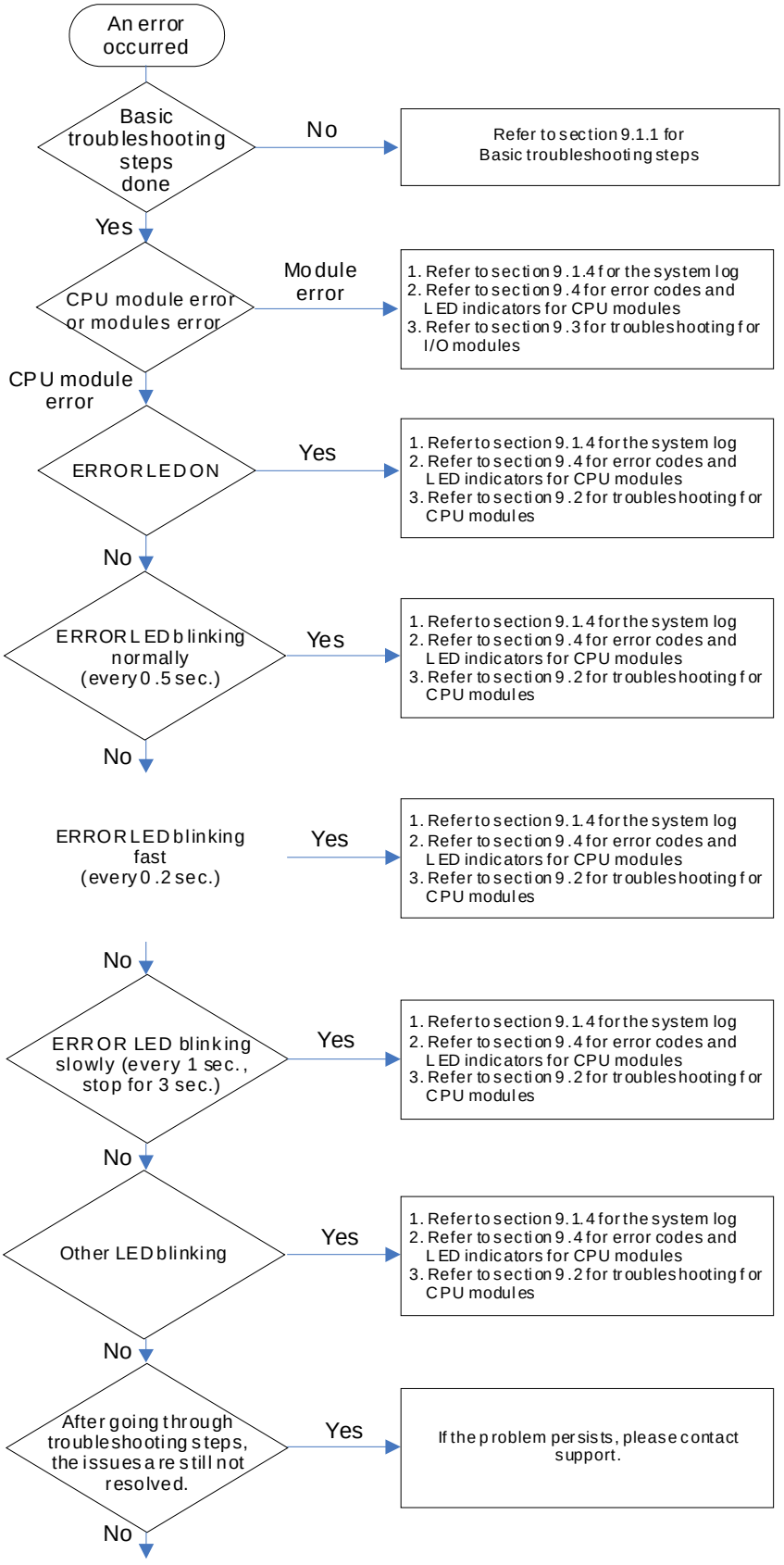
(1) Switch the state of the CPU model to STOP and then to RUN.

(2) Turn off the CPU and turn on again.

(3) Use the ISPSoft to clear the error logs.

(4) Reset the CPU and set the settings to defaults and download the project again to operate.

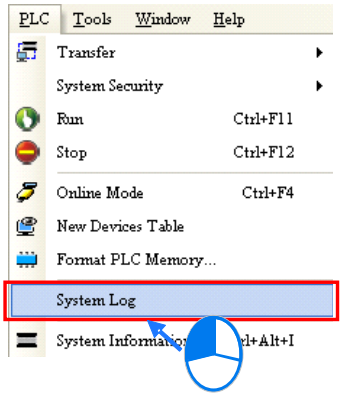
9.1.3 Troubleshooting SOP



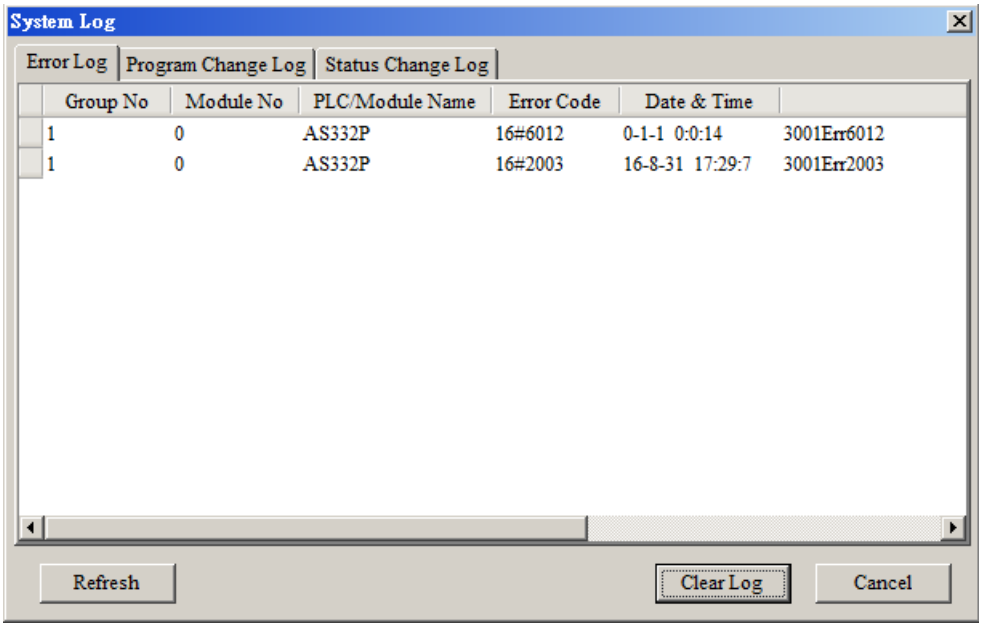
9.1.4 System Log

If ISPSoft is connected to an AS series normally, users can view the actions and the errors occur in the AS series after they click **System Log** on the **PL**C menu. Up to 20 piece of error logs can be stored in the CPU. After the 20 sets are stored, the 1st log will be replaced with the 21st if there are new logs coming in; the old logs will be replaced with the new ones accordingly. When the memory card is installed in the CPU module, 20 pieces of the old logs will be backedup in the memory card and up to 10000 logs can be recorded. If the stored log exceeds the limitation of 1000, the oldest 20 logs will be replaced with the newest 20 logs in the memeory card.

(1) Click **System Log** on the **PL**C menu. PLC> System Log.



(2) After users click **System Log** on the **PL**C menu, the **System Log** window will appear. After users click **Clear Log**, the error log in the window and the error log in the CPU module will be cleared, and the CPU module will be reset.



- Group No.: The number 1 indicates the error occurred in the CPU module or the right-side module 1. The number 2~16 indicates the error occurred in the remote module 1~15.
- Module No.: The number 0 indicates the error occurred in the CPU module or the remote module. The number 1~32 indicates the error occurred in the right-side modue of the CPU module / remote module. (The number 1 represents the closest module to the CPU module or the remote module; this number increases from the closest to the furthest to the CPU module or the remote module.) Note: Up to 8 extension modules can be connected to the right-side of the remote module.
- PLC/Module name: Model names of the CPU modules, remote modules and the extension modules.

- Error Code: Error codes of the error log.
- Date & Time: The error occurred date and time. The most recent occurred error will be listed on the top.
- The last column shows the relative descriptions for the error.

9.2 Troubleshooting for CPU Modules

Check the LED indicators and the error codes from the CPU module and refer to the following table for troubleshooting. V in the Log column indicates the error will be recorded in the log; X in the Log column indicates the error will not be recorded in the log; H in the Log column indicates whether to record the error in the log or not can be set in HWCONFIG.

9.2.1 ERROR LED Indicator's Being ON

Error Code (16#)	Description	Solution	Flag	Log
000A	Scan timeout	1. Check the setting of the watchdog timer in HWCONFIG. 2. Check whether the program causes the long scan time	SM8	V

9.2.2 ERROR LED Indicator's Blinking Every 0.5 Seconds

Error Code (16#)	Description	Solution	Flag	Log
000C	The program in the PLC is damaged.	Download the program again.	SM9	V
0010	The access to the memory in the CPU is denied.	Please contact the factory.	SM9	V
002E	The access to the external memory of the CPU is denied.	Please contact the factory.	SM9	V
002F	PLC programs are not consistent with the system logs.	Download the program again.	SM34	V
0070	The actual arrangement of the function cards is not consistent with the settings.	Check whether the settings in HWCONFIG are consistent with the actual arrangement of the function cards.	SM10	V
0102	The interrupt number exceeds the range.	Check the program, compile the program again, and download the program again.	SM5	X
0202	The MC instruction exceeds the range.	Check the program, compile the program again, and download the program again.	SM5	X
0302	The MCR instruction exceeds the range.	Check the program, compile the program again, and download the program again.	SM5	X
0D03	The operands used in DHSCS are not used properly.	Check the program, compile the program again, and download the program again.	SM5	X
0E05	The operands HCXXX used in DCNT are not used properly.	Check the program, compile the program again, and download the program again.	SM5	X

Error Code (16#)	Description	Solution	Flag	Log
1300 ~ 130F	Errors occurred in the remote modules	Refer to section 12.3.4 for more information on the error codes of the remote modules.	SM30	V
1402	The actual arrangement of the I/O modules is not consistent with the settings.	Check whether the settings in HWCONFIG are consistent with the actual arrangement of the I/O modules.	SM10	V
140B	The communication modules exceed the limit of 4.	Check the total number of the communication modules.	SM10	V
140D	The extension modules exceed the limit of 32.	Check the total number of the extension modules.	SM10	V
140E	The remote modules exceed the limit of 8 on the right side of the CPU module.	Check the total number of the remote modules on the right side of the CPU module.	SM30	V
1600	The ID of the extension module exceeds the range.	1. Make sure the module is well-connected to the CPU module and turn-on the modules again. 2. If the error still occurs, please contact the factory.	SM10	V
1601	The ID of the extension module cannot be set.	1. Make sure the module is well-connected to the CPU module and turn-on the modules again. 2. If the error still occurs, please contact the factory.	SM10	V
1602	The ID of the extension module is duplicated.	1. Make sure the module is well-connected to the CPU module and turn-on the modules again. 2. If the error still occurs, please contact the factory.	SM10	V
1603	The extension module cannot be operated.	1. Make sure the module is well-connected to the CPU module and turn-on the modules again. 2. If the error still occurs, please contact the factory.	SM10	V
1604	Extension module communication timeout	1. Make sure the module is well-connected to the CPU module and turn-on the modules again. 2. If the error still occurs, please contact the factory.	SM10	V
1605	Hardware failure	Please contact the factory.	SM10	V
1606	Errors on the function card of the communication module	Make sure the function card is well-connected to the CPU module and turn-on the modules again.	SM10	V
1607	The external voltage is abnormal.	Check whether the external 24 V power supply to the module is normal.	SM10	V
1608	The Internal factory calibration or the CJC is abnormal.	Please contact the factory.	SM10	V
1609 ~ 160F	Reserved (Error codes for the extension modules)			
200A	Invalid instruction	Check the program, compile the program again, and download the program again.	SM5	V
6010	The number of the MODBUS TCP connections exceeds the range.	Check if the number of the superior devices exceeds the limit of 32.	SM 1092	V
6011	The number of the EtherNet/IP connections exceeds the range.	Check if the number of the connections exceeds the range of 16.	SM 1093	V

9.2.3 ERROR LED Indicator's Rapid Blinking Every 0.2 Seconds

This happens when the power supply 24VDC of the CPU module is disconnecting or the power supply is not sufficient, not stable or abnormal so that it cannot be operated.

Error Code (16#)	Description	Solution	Flag	Log
002A	The external voltage is abnormal.	Check whether the external 24 V power supply to the module is normal.	SM7	V

9.2.4 ERROR LED Indicator's Slow Blinking Every 3 Seconds and Lighting up for 1 Second

Error Code (16#)	Description	Solution	Flag	Log
1500	Connection lost in the remote modules	Please check the network connection cable.	SM30	V
1502 ~ 150F	Errors occurred in the remote modules	Refer to section 12.3.4 for more information on the error codes of the remote modules.	SM30	V
1800 ~ 180F	Errors occurred in the extension modules	Refer to section 12.3 for more information on the error codes of the extension modules.	SM10	V
1900 ~ 191C	Heartbeat errors occurred in the slave of Delta ASD-A2 control.	1. Check the CANopen connection cable. 2. Check if the specific salve is working properly. Note: The last 2 digits of the error code represent the ID number of the slave (hexadecimal should convert to decimal).	-	V

9.2.5 BAT. LOW LED Indicator's Being ON

This happens when there is no battery (CR1620) or the power is low. Users can set this option off in the HWCONFIG > CPU > Device Setting > Show Battery Low Voltage Error CPU, when users don't need the function of RTC to keep track of the current time. (Default is enabled.)

Error Code (16#)	Description	Solution	Flag	Log
0027	Battery Low	Change battery or set this option off	SM219	X

9.2.6 BAT. LOW LED Indicator's Blinking Every 0.5 Seconds

This happens when RTC cannot keep track of the current time.

Error Code (16#)	Description	Solution	Flag	Log
0026	RTC cannot keep track of the current time	Please contact the factory.	SM218	V

9.2.7 The LED Indicators of RUN and ERROR are Blinking Every 0.5 Seconds Simultaneously

This happens when the firmware of the CPU module is being upgraded. If this happens once the power is supplied to the

CPU module, it means errors occurred during the previous firmware upgrade. Users need to upgrade the firmware again or contact your point of purchase.

9.2.8 The LED Indicators of RUN and ERROR are Blinking One After Another Every 0.5 Seconds.

This happens when the memory card of the CPU module is backing up / restoring / or saving.

9.2.9 Other Errors (Without LED Indicators)

Error Code (16#)	Description	Solution	Flag	Log
0011	The PLC ID is incorrect.	Please check the PLC ID.	SM34	V
0012	The PLC password is incorrect.	Please check the PLC password.	SM34	V
002D	The PLC maximum password attempts exceeded.	Reset the CPU module or restore the CPU module to its factory settings.	SM34	V
0050	The memories in the latched special auxiliary relays are abnormal.	1. Reset the CPU module or restore the CPU module to its factory settings, and then download the program and the parameters again. 2. If the error still occurs, please contact the factory.	SM6	V
0051	The latched special data registers are abnormal.	1. Reset the CPU module or restore the CPU module to its factory settings, and then download the program and the parameters again. 2. If the error still occurs, please contact the factory.	SM6	V
0052	The memories in the latched auxiliary relays are abnormal.	1. Reset the CPU module or restore the CPU module to its factory settings, and then download the program and the parameters again. 2. If the error still occurs, please contact the factory.	SM6	V
0054	The latched counters are abnormal.	1. Reset the CPU module or restore the CPU module to its factory settings, and then download the program and the parameters again. 2. If the error still occurs, please contact the factory.	SM6	V
0055	The latched 32-bit counters are abnormal.	1. Reset the CPU module or restore the CPU module to its factory settings, and then download the program and the parameters again. 2. If the error still occurs, please contact the factory.	SM6	V
0056	The latched special auxiliary relay is abnormal.	1. Reset the CPU module or restore the CPU module to its factory settings, and then download the program and the parameters again. 2. If the error still occurs, please contact the factory.	SM6	V
0059	The latched data registers are abnormal.	1. Reset the CPU module or restore the CPU module to its factory settings, and then download the program and the parameters again. 2. If the error still occurs, contact the factory.	SM6	V
005D	The CPU module does not detect a memory card.	Check whether a memory card is inserted into the CPU module correctly.	SM453	V
005E	The memory card is initialized incorrectly.	Check whether the memory card is broken.	SM453	V
0063	An error occurs when data is written to the memory card.	Check whether the file path is correct, or whether the memory card breaks down.	SM453	V

0064	A file in the memory card cannot be read.	Check whether the file path is correct, or whether the file is damaged.	SM453	V
1950	The initialization of Delta ASD-A2 control has not yet been completed, the CANopen instructions cannot be executed.	1. Check the CANopen connection cable. 2. Check if the specific salve is working properly. 3. If nothing is wrong, initialize Delta ASD-A2 again.	-	V
2001	Without using the FCOMP card or not in the right mode for the ASDA-A2 while using the CANopen communication instruction.	Make sure to use the FCOMP card in the function card 2 and check if the operation mode is correct.	SM0	V
2003	The device used in the program exceeds the device range.	Check the program, compile the program again, and download the program again.	SM0	V
200B	The operand n or the other constant operands K/H exceed the range.	Check the program, compile the program again, and download the program again.	SM0	V
200C	The operands overlap.	Check the program, compile the program again, and download the program again.	SM0	V
200D	The binary to the binary-coded decimal conversion is incorrect.	Check the program, compile the program again, and download the program again.	SM0	V
200E	The string does not end with 00.	Check the program, compile the program again, and download the program again.	SM0	V
2012	Incorrect division operation	Check the program, compile the program again, and download the program again.	SM0	V
2013	The value exceeds the range of values which can be represented by the floating-point numbers.	Check the program, compile the program again, and download the program again.	SM0	V
2014	The task designated by TKON/YKOFF is incorrect, or exceeds the range.	Check the program, compile the program again, and download the program again.	SM0	V
2017	The instruction BREAK is written outside of the FOR-NEXT.	Check the program, compile the program again, and download the program again.	SM0	V
2027	No such position planning table number or the format is incorrect.	1. Check the program, compile the program again, and download the program again. 2. Check the settings of the position planning table.	SM0	V
2028	The high speed output instruction is being executed. Only one instruction can be executed at a time.	Refer to SR28 for the record of the axis number and rearrange the output control procedures.	-	V
6004	The IP address filter is set incorrectly.	Set the Ethernet parameter for the CPU module in HWCONFIG again.	SM1108	X
600D	RJ45 port is not connected.	Check the connection.	SM1100	X
6012	There are devices using the same IP address.	1. Check if there are devices using the same IP address. 2. Check if there is more than 1 DHCP or BOOTP server on the network.	SM1101	V
6100	The email connection is busy.	Retry the email connection later. (This error does not cause the PLC to stop running. Users can perform the corresponding solution by means of the related flag in the program.)	SM1113	X
6103	The trigger attachment mode in the email is set incorrectly.	Set up the trigger attachment mode in HWCONFIG > CPU Module > Device Setting > Options > Ethernet Port Advanced > Email > Trigger Setting > Trigger Attachment Mode.	SM1113	X

6104	The attachment in the email does not exist.	Check whether the attachment exists in the memory card.	SM1113	X
6105	The attachment in the email is oversized.	Check the size of the attachment. If the size is over 2 MB, the file cannot be sent as an attachment.	SM1113	X
6106	There is an SMTP server response timeout.	Check for the correct address and set up the SMTP server in HWCONFIG > CPU Module > Device Setting > Options > Ethernet Port Advanced > Email again.	SM1113	X
6107	There is an SMTP server response timeout.	1. Check whether the status of the SMTP server is normal. 2. Retry the sending of the email later. (This error does not cause the PLC to stop running. Users can perform the corresponding solution by means of the related flag in the program.)	SM1113	X
6108	SMTP verification failed	Check for the correct ID/Password and set up in HWCONFIG > CPU Module > Device Setting > Options > Ethernet Port Advanced > Email again.	SM1113	X
6200	The remote communication IP address set in the TCP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > TCP Socket.	-	X
6201	The local communication port set in the TCP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > TCP Socket.	-	X
6202	The remote communication port set in the TCP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > TCP Socket.	-	X
6203	The device from which the data is sent in the TCP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > TCP Socket.	-	X
6206	The device which receives the data in the TCP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > TCP Socket.	-	X
6208	The data which is received through the TCP socket exceeds the device range.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > TCP Socket.	-	X

6209	The remote communication IP address set in the UDP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > UDP Socket.	-	X
620A	The local communication port set in the UDP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > UDP Socket.	-	X
620C	The device from which the data is sent in the UDP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > UDP Socket.	-	X
620F	The device which receives the data in the UDP socket function is illegal.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > UDP Socket.	-	X
6210	The data which is received through the UDP socket exceeds the device range.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > UDP Socket.	-	X
6212	There is no response from the remote device after the timeout period.	Make sure that the remote device is connected.	-	X
6213	The data received exceeds the limit.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG CPU Module > Device Setting > Options > Ethernet Port Advanced > UDP Socket.	-	X
6214	The remote device refuses the connection.	Make sure that the remote device operates normally.	-	X
6215	The socket is not opened.	Check whether operational sequence in the program is correct.	-	X
6217	The socket is opened.	Check whether operational sequence in the program is correct.	-	X
6218	The data has been sent through the socket.	Check whether operational sequence in the program is correct.	-	X
6219	The data has been received through the socket.	Check whether operational sequence in the program is correct.	-	X
621A	The socket is closed.	Check whether operational sequence in the program is correct.	-	X
7011	The device communication function code in COM1 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H

7012	The device communication address used in COM1 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7013	The device used in COM1 exceeds the device range.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7014	The device length of the communication data in COM1 exceeds the limit.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7017	The device checksum for the communication serial port of COM1 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7021	The device communication function code in COM2 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7022	The device communication address used in COM2 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7023	The device used in COM2 exceeds the device range.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7024	The device length of the communication data in COM2 exceeds the limit.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7027	The device checksum for the communication serial port of COM2 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7031	The device communication function code in the Ethernet is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7032	The device communication address used in the Ethernet is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7033	The device used in the Ethernet exceeds the device range.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7034	The device length of the communication data in the Ethernet exceeds the limit.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7037	The device checksum for the communication serial port of the Ethernet is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7041	The device communication function code in the USB is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7042	The device communication address used in the USB is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7043	The device used in the USB exceeds the device range.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H

7044	The device length of the communication data in the USB exceeds the limit.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7047	The device checksum for the communication serial port of the USB is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70B1	The device communication function code in the function card 1 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70B2	The device communication address used in the function card 1 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70B3	The device used in the function card 1 exceeds the device range.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70B4	The device length of the communication data in the function card 1 exceeds the limit.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70B7	The device checksum for the communication serial port of the function card 1 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70C1	The device communication function code in the function card 2 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70C2	The device communication address used in the function card 2 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70C3	The device used in the function card 2 exceeds the device range.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70C4	The device length of the communication data in the function card 2 exceeds the limit.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
70C7	The device checksum for the communication serial port of the function card 2 is incorrect.	1. Check the communication setting in the master, and the communication setting in slave. 2. Check the communication cable.	-	H
7203	Invalid communication function code	Refer to the function codes defined by the communication protocols	-	H
8105	The contents of the program downloaded are incorrect. The program syntax is incorrect.	Download the program and the parameters again.	-	H
8106	The contents of the program downloaded are incorrect. The length of the execution code exceeds the limit.	Download the program and the parameters again.	-	H
8107	The contents of the program downloaded are incorrect. The length of the source code exceeds the limit.	Download the program and the parameters again.	-	H

9.3 Troubleshooting for I/O Modules

- **Introduction of modules**

  Digital I/O modules, analog I/O modules, temperature measurement modules, load cell modules, and network modules can be installed in an AS series system. There are 2 types of error codes, for errors and for warning. The CPU module and its modules will stop operating when errors occurred. The CPU modules and its modules will not stop operating when warnings triggered.

9.3.1 Troubleshooting for Analog Modules (AD/DA/XA) and Temperature Modules (RTD/TC)

9.3.1.1 ERROR LED Indicator's Being ON

The Following errors will be specified as warnings. Users need to set up in HWCONFIG to have them shown as errors when the following errors occurred.

Error Code	Description	Solution
16#1605	Hardware failure	Please contact the factory.
16#1607	The external voltage is abnormal.	Check the power supply.
16#1608	The factory calibration or the CJC is abnormal.	Please contact the factory.

9.3.1.2 ERROR LED Indicator's Blinking Every 0.5 Seconds

The following errors are specified as warnings to ensure the CPU module can still run even when the warnings are triggered by its AIO modules. Users can set up in HWCONFIG to have them shown as errors when the first 4 errors occurred.

Error Code	Description	Solution
16#1801	The external voltage is abnormal.	Check the power supply.
16#1802	Hardware failure	Please contact the factory.
16#1804	The factory calibration is abnormal.	Please contact the factory.
16#1807	The CJC is abnormal.	Please contact the factory.
16#1808	The signal received by channel 1 exceeds the range of analog inputs (temperature).	Check the signal received by channel 1
16#1809	The signal received by channel 2 exceeds the range of analog inputs (temperature).	Check the signal received by channel 2
16#180A	The signal received by channel 3 exceeds the range of analog inputs (temperature).	Check the signal received by channel 3
16#180B	The signal received by channel 4 exceeds the range of analog inputs (temperature).	Check the signal received by channel 4

9.3.2 Troubleshooting for Load Cell Module AS02LC

9.3.2.1 ERROR LED Indicator's Being ON

Users can set up in HWCONFIG to have them shown as errors when the following errors occurred.

Error Code	Description	Solution
16#1605	Hardware failure (e.g. the diver board)	Please contact the factory.
16#1607	The external voltage is abnormal.	Check the power supply.

9.3.2.2 ERROR LED Indicator's Blinking Every 0.5 Seconds

The following errors are specified as warnings to ensure the CPU module can still run even when the warnings are triggered by its AIO modules. Users can set up in HWCONFIG to have them shown as errors when the first 3 errors occurred.

Error Code	Description	Solution
16#1801	The external voltage is abnormal.	Check the power supply.
16#1802	Hardware failure	Please contact the factory.
16#1807	Diver board failure	Please contact the factory.
16#1808	The signal received by channel 1 exceeds the range of analog inputs or the SEN voltage is abnormal.	Check the signal received by channel 1 and the cable connections.
16#1809	The signal received by channel 1 exceeds the weight limit.	Check the value inputted in channel 1 and the setting of the maximum weight.
16#180A	The factory calibration in channel 1 is incorrect.	Check the weight calibration in channel 1.
16#180B	The signal received by channel 2 exceeds the range of analog inputs or the SEN voltage is abnormal.	Check the signal received by channel 2 and the cable connections.
16#180C	The signal received by channel 2 exceeds the weight limit.	Check the value inputted in channel 2 and the setting of the maximum weight.
16#180D	The factory calibration in channel 2 is incorrect.	Check the weight calibration in channel 1.

9.3.3 Troubleshooting for Module AS00SCM as a Communication Module

9.3.3.1 ERROR LED Indicator's Being ON

The following error codes are for users to identify possible errors occurred when the AS00SCM module is installed on the right side of the CPU module and acts as a communication module.

Error Code	Description	Solution
16#1605	Hardware failure	1. Check if the module is securely installed. 2. Change and install a new AS00SCM or contact the factory.

Error Code	Description	Solution
16#1606	The setting of the function card is incorrect.	1. Check if the function card is securely installed. 2. Change and install a new function card or contact the factory. 3. Check if the setting in HWCONFIG is consistent with the actual setting in the function card. 4. Change and install a new AS00SCM or contact the factory.

9.3.3.2 ERROR LED Indicator's Blinking Every 0.5 Seconds

The following error codes are for users to identify possible errors occurred when the AS00SCM module is installed on the right side of the CPU module and acts as a communication module.

Error Code	Description	Solution
16#1802	Incorrect parameters	Check the parameter in HWCONFIG, and the parameter. Download the parameter again.
16#1803	Communication timeout	1. Check whether the communication cable is connected well. 2. Check if the station number and the communication format are correctly set. 3. Check if the connection with the function card is working fine.
16#1804	The setting of the UD Link is incorrect.	1. Check the settings of the UD Link. 2. Check the settings to trigger warnings in the PLC.

The following error codes can only be viewed via SCMSoft; when the following errors occurred, they will not be shown on the LED indicators and the system will not send the error messages to the CPU module.

Error Code	Description	Solution
16#0107	The settings in HWCONFIG and actual manual settings are not consistent for the function card 1.	Check the settings in HWCONFIG and actual manual settings for the function card 1.
16#0108	The settings in HWCONFIG and actual manual settings are not consistent for the function card 2.	Check the settings in HWCONFIG and actual manual settings for the function card 2.
16#0201	Incorrect parameters	Check the parameter in HWCONFIG, and the parameter. Download the parameter again.
16#0301	Function card 1 communication timeout	1. Check if the station number and the communication format are correctly set. 2. Check if the connection with the function card is working fine.
16#0302	Function card 2 communication timeout	1. Check if the station number and the communication format are correctly set. 2. Check if the connection with the function card is working fine.
16#0400	Invalid UD Link Group ID for the function card 1	1. Check the settings of the UD Link. 2. Check the settings to trigger warnings in the PLC.
16#0401	Invalid UD Link Group ID for the function card 2	1. Check the settings of the UD Link. 2. Check the settings to trigger warnings in the PLC.

Error Code	Description	Solution
16#0402	Invalid UD Link Command for the function card 1	1. Check the settings of the UD Link. 2. Check the settings to trigger warnings in the PLC.
16#0403	Invalid UD Link Command for the function card 1	1. Check the settings of the UD Link. 2. Check the settings to trigger warnings in the PLC.

9.3.4 Troubleshooting for Module AS00SCM as a Remote Module

Errors from the remote modules are regarded as warnings for AS CPU modules. The LED indicator of the CPU module will blink and the CPU module can still operate. Users can use the flag SM30 to work with the programs in the PLC to manage the ways to present the errors from the remote modules.

9.3.4.1 Error LED Indicator's Being ON

Error codes for the error type

Error Code	Description	Solution
16#1301	Hardware failure	1. Check if the module is securely installed. 2. Change and install a new AS00SCM or contact the factory.
16#1302	The setting of the function card is incorrect.	1. Check if the function card is securely installed with the AS-FCOPM card. 2. Change and install a new function card or contact the factory. 3. Check if the setting in HWCONFIG is consistent with the actual setting in the function card. 4. Change and install a new AS00SCM or contact the factory.

9.3.4.2 ERROR LED Indicator's Blinking Every 0.5 Seconds

Error codes for the warning type

Error Code	Description	Solution
16#1502	Incorrect parameters	Check the parameter in HWCONFIG, and the parameter. Download the parameter again.
16#1503	Extension module communication timeout	Make sure the module is well-connected to the CPU module and turn-on the modules again.

9.3.4.3 ERROR LED Indicator's Blinking Every 0.2 Seconds

This happens when the power supply of 24VDC for the remote module is not sufficient. Please check the power supply. If the power supply is normal, remove the extension module from the CPU module and then check if the SCM remote module is out of order. The error codes below are of the warning types.

Error Code	Description	Solution
16#1303	24VDC power supply is not sufficient and then is recovered from a low-voltage less than 10ms situation.	Check whether the 24 V power supply to the module is normal.

9.4 Error Codes and LED Indicators for CPU Modules

A. Columns

a. Error code: If the error occurs in the system, the error code is generated.

b. Description: The description of the error

c. CPU status: If the error occurs, the CPU stops running, keeps running, or in the status defined by users.

- Stop: The CPU stops running when the error occurs.
- Continue: The CPU keeps running when the error occurs.

d. LED indicator status: If the error occurs, the LED indicator is ON, OFF, or blinks.

- ERROR: The system error

- **Descriptions**

Module Type	LED indicator	Descriptions
CPU	Error LED	There are 5 types of error indicator status for the errors of the CPU module, including LED indicator ON, OFF, blinking fast, blinking normally, and blinking slowly. When the LED indicator is ON, blinking fast/normally, users need to clear the problems first in order to run the CPU module. When the LED indicator is blinking slowly, indicating a warning type of error codes, it does not require immediate action. It is suggested to clear the problems when the module is power-off. Error type: ON: A serious error occurs in the module. Blinking fast (every 0.2 seconds): unstable power supply or hardware failure Blinking normally (every 0.5 second): system program errors or system cannot run. Warning type: Blinking slowly (every 1 second and stop for 3 seconds): a warning is triggered, but the system can still run. OFF: a warning is triggered, but the system can still run. Users can modify the rules of how a warning is triggered or use the SM/SR to show the warnings.

9.4.1 Error Codes and LED Indicators for CPU Modules

Note: refer to the section 12.3 for the status descriptions of the Error LED indicators.

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
000A	Scan timeout	Stop	V				
000C	The program in the PLC is damaged.	Stop			V		
0010	The access to the memory in the CPU is denied.	Stop			V		
0011	The PLC ID is incorrect.	Continue					V

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
0012	The PLC password is incorrect.	Continue					V
0026	RTC cannot keep track of the current time (The battery LED is blinking.)	Continue					
0027	Battery low (The battery LED is ON.)	Continue					
002A	24VDC power supply is not sufficient and then is recovered from a low-voltage less than 10ms situation.	Continue		V			
002D	The PLC maximum password attempts exceeded.	Continue					V
002E	The access to the external memory of the CPU is denied.	Stop			V		
002F	PLC programs are not consistent with the system logs.	Stop			V		
0050	The memories in the latched special auxiliary relays are abnormal.	Continue					V
0051	The latched special data registers are abnormal.	Continue					V
0052	The memories in the latched auxiliary relays are abnormal.	Continue					V
0054	The latched counters are abnormal.	Continue					V
0055	The latched 32-bit counters are abnormal.	Continue					V
0056	The latched special auxiliary relay is abnormal.	Continue					V
0059	The latched data registers are abnormal.	Continue					V
005D	The CPU module does not detect a memory card.	Continue					V
005E	The memory card is initialized incorrectly.	Continue					V
0063	An error occurs when data is written to the memory card.	Continue					V
0064	A file in the memory card cannot be read.	Continue					V
0070	The actual arrangement of the function cards is not consistent with the settings.	Stop			V		
0102	The interrupt number exceeds the range.	Stop			V		
0202	The MC instruction exceeds the range.	Stop			V		
0302	The MCR instruction exceeds the range.	Stop			V		
0D03	The operands used in DHSCS are not used properly.	Stop			V		
0E05	The operands HCXXX used in DCNT are not used properly.	Stop			V		
1300 ~ 130F	Errors occurred in the remote modules	Continue				V	
1402	The actual arrangement of the I/O modules is not consistent with the settings.	Stop			V		
140B	The communication modules exceed the limit of 4.	Stop			V		
140D	The extension modules exceed the limit of 32.	Stop			V		
140E	The remote modules exceed the limit of 8 on the right side of the CPU module.	Stop			V		

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
1500	Connection lost in the remote modules	Continue				V	
1502 ~ 150F	Errors occurred in the remote modules	Continue				V	
1600	The ID of the extension module exceeds the range.	Stop			V		
1601	The ID of the extension module cannot be set.	Stop			V		
1602	The ID of the extension module is duplicated.	Stop			V		
1603	The extension module cannot be operated.	Stop			V		
1604	Extension module communication timeout	Stop			V		
1605	Hardware failure	Stop			V		
1606	Errors on the function card of the communication module	Stop			V		
1607	The external voltage is abnormal.	Stop			V		
1608	The Internal factory calibration or the CJC is abnormal.	Stop			V		
1609 ~ 160F	Reserved (Error codes for the extension modules)	Stop			V		
1800 ~ 180F	Errors occurred in the extension modules	Continue				V	
1900 ~ 191C	Heartbeat errors occurred in the slave of Delta ASD-A2 control.	Continue				V	
1950	The initialization of Delta ASD-A2 control has not yet been completed, the CANopen instructions cannot be executed.	Continue					V
2001	Without using the FCOMP card or not in the right mode for the ASDA-A2 while using the CANopen communication instruction.	Continue					V
2003	The device used in the program exceeds the device range.	Continue					V
200A	Invalid instruction	Stop			V		
200B	The operand n or the other constant operands K/H exceed the range.	Continue					V
200C	The operands overlap.	Continue					V
200D	The binary to the binary-coded decimal conversion is incorrect.	Continue					V
200E	The string does not end with 00.	Continue					V
2012	Incorrect division operation	Continue					V
2013	The value exceeds the range of values which can be represented by the floating-point numbers.	Continue					V

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
2014	The task designated by TKON/YKOFF is incorrect, or exceeds the range.	Continue					V
2017	The instruction BREAK is written outside of the FOR-NEXT.	Continue					V
2027	No such position planning table number or the format is incorrect.	Continue					V
2028	The high speed output instruction is being executed. Only one instruction can be executed at a time.	Continue					V
6004	The IP address filter is set incorrectly.	Continue					V
600D	RJ45 port is not connected.	Continue					V
6010	The number of the MODBUS TCP connections exceeds the range.	Continue			V		
6011	The number of the EtherNet/IP connections exceeds the range.	Continue			V		
6012	There are devices using the same IP address.	Continue					V
6100	The email connection is busy.	Continue					V
6103	The trigger attachment mode in the email is set incorrectly.	Continue					V
6104	The attachment in the email does not exist.	Continue					V
6105	The attachment in the email is oversized.	Continue					V
6106	There is an SMTP server response timeout.	Continue					V
6107	There is an SMTP server response timeout.	Continue					V
6108	SMTP verification failed	Continue					V
6200	The remote communication IP address set in the TCP socket function is illegal.	Continue					V
6201	The local communication port set in the TCP socket function is illegal.	Continue					V
6202	The remote communication port set in the TCP socket function is illegal.	Continue					V
6203	The device from which the data is sent in the TCP socket function is illegal.	Continue					V
6206	The device which receives the data in the TCP socket function is illegal.	Continue					V
6208	The data which is received through the TCP socket exceeds the device range.	Continue					V
6209	The remote communication IP address set in the UDP socket function is illegal.	Continue					V
620A	The local communication port set in the UDP socket function is illegal.	Continue					V
620C	The device from which the data is sent in the UDP socket function is illegal.	Continue					V
620F	The device which receives the data in the UDP socket function is illegal.	Continue					V

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
6210	The data which is received through the UDP socket exceeds the device range.	Continue					V
6212	There is no response from the remote device after the timeout period.	Continue					V
6213	The data received exceeds the limit.	Continue					V
6214	The remote device refuses the connection.	Continue					V
6215	The socket is not opened.	Continue					V
6217	The socket is opened.	Continue					V
6218	The data has been sent through the socket.	Continue					V
6219	The data has been received through the socket.	Continue					V
621A	The socket is closed.	Continue					V
7011	The device communication function code in COM1 is incorrect.	Continue					V
7012	The device communication address used in COM1 is incorrect.	Continue					V
7013	The device used in COM1 exceeds the device range.	Continue					V
7014	The device length of the communication data in COM1 exceeds the limit.	Continue					V
7017	The device checksum for the communication serial port of COM1 is incorrect.	Continue					V
7021	The device communication function code in COM2 is incorrect.	Continue					V
7022	The device communication address used in COM2 is incorrect.	Continue					V
7023	The device used in COM2 exceeds the device range.	Continue					V
7024	The device length of the communication data in COM2 exceeds the limit.	Continue					V
7027	The device checksum for the communication serial port of COM2 is incorrect.	Continue					V
7031	The device communication function code in the Ethernet is incorrect.	Continue					V
7032	The device communication address used in the Ethernet is incorrect.	Continue					V
7033	The device used in the Ethernet exceeds the device range.	Continue					V
7034	The device length of the communication data in the Ethernet exceeds the limit.	Continue					V
7037	The device checksum for the communication serial port of the Ethernet is incorrect.	Continue					V
7041	The device communication function code in the USB is incorrect.	Continue					V
7042	The device communication address used in the USB is incorrect.	Continue					V

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
7043	The device used in the USB exceeds the device range.	Continue					V
7044	The device length of the communication data in the USB exceeds the limit.	Continue					V
7047	The device checksum for the communication serial port of the USB is incorrect.	Continue					V
70B1	The device communication function code in the function card 1 is incorrect.	Continue					V
70B2	The device communication address used in the function card 1 is incorrect.	Continue					V
70B3	The device used in the function card 1 exceeds the device range.	Continue					V
70B4	The device length of the communication data in the function card 1 exceeds the limit.	Continue					V
70B7	The device checksum for the communication serial port of the function card 1 is incorrect.	Continue					V
70C1	The device communication function code in the function card 2 is incorrect.	Continue					V
70C2	The device communication address used in the function card 2 is incorrect.	Continue					V
70C3	The device used in the function card 2 exceeds the device range.	Continue					V
70C4	The device length of the communication data in the function card 2 exceeds the limit.	Continue					V
70C7	The device checksum for the communication serial port of the function card 2 is incorrect.	Continue					V
7203	Invalid communication function code	Continue					V
8105	The contents of the program downloaded are incorrect. The program syntax is incorrect.	Continue					V
8106	The contents of the program downloaded are incorrect. The length of the execution code exceeds the limit.	Continue					V
8107	The contents of the program downloaded are incorrect. The length of the source code exceeds the limit.	Continue					V

9.4.2 Error Codes and LED Indicators for Analog / Temperature Modules

Error code	Description	ERROR LED indicator status	
		A → D / D → A / A ↔ D	ERROR
16#1605	Hardware failure	OFF	ON
16#1607	The external voltage is abnormal.	OFF	ON

Error code	Description	ERROR LED indicator status	
		A → D / D → A / A ↔D	ERROR
16#1608	The factory calibration or the CJC is abnormal.	OFF	ON
16#1801*1	The external voltage is abnormal.	OFF	Blinking
16#1802*1	Hardware failure	OFF	Blinking
16#1804*1	The factory calibration is abnormal.	RUN: Blinking STOP: OFF	Blinking
16#1807*1	The CJC is abnormal.	OFF	Blinking
16#1808	The signal received by channel 1 exceeds the range of analog inputs (temperature).	RUN: Blinking STOP: OFF	Blinking
16#1809	The signal received by channel 2 exceeds the range of analog inputs (temperature).		
16#180A	The signal received by channel 3 exceeds the range of analog inputs (temperature).		
16#180B	The signal received by channel 4 exceeds the range of analog inputs (temperature).		

*1: The following errors are specified as warnings to ensure the CPU module can still run even when the warnings are triggered by its AIO modules. Users can set up in HWCONFIG to have them shown as errors when the first 4 errors occurred.

9.4.3 Error Codes and LED Indicators for Load Cell Module AS02LC

Error code	Description	ERROR LED indicator status	
		A → D	ERROR
16#1605	Hardware failure (the diver board included)	OFF	ON
16#1607	The external voltage is abnormal.	OFF	ON
16#1801*1	The external voltage is abnormal.	OFF	Blinking
16#1802*1	Hardware failure	OFF	Blinking
16#1807*1	Diver board failure	OFF	Blinking
16#1808	The signal received by channel 1 exceeds the range of analog inputs or the SEN voltage is abnormal.	RUN: Blinking STOP: OFF	Blinking
16#1809	The signal received by channel 1 exceeds the weight limit.		
16#180A	The factory calibration in channel 1 is incorrect.		
16#180B	The signal received by channel 2 exceeds the range of analog inputs or the SEN voltage is abnormal.		
16#180C	The signal received by channel 2 exceeds the weight limit.		
16#180D	The factory calibration in channel 2 is incorrect.		

*1: The following errors are specified as warnings to ensure the CPU module can still run even when the warnings are triggered by its AIO modules. Users can set up in HWCONFIG to have them shown as errors when the 3 errors occurred.

9.4.4 Error Codes and LED Indicators for Module AS00SCM as a Communication Module

Error Code	Description	ERROR LED indicator status	
		ON	Blinking
16#1605	Hardware failure	V	
16#1606	The setting of the function card is incorrect.	V	
16#1802	Incorrect parameters		V
16#1803	Communication timeout		V
16#1804	The setting of the UD Link is incorrect.		V

9.4.5 Error Codes and LED Indicators for Module AS00SCM as a Remote Module

Error Code	Description	ERROR LED indicator status		
		ON	Blinking	Blinking fast
16#1301	Hardware failure	V		
16#1302	The setting of the function card is incorrect.	V		
16#1303	24VDC power supply is not sufficient and then is recovered from a low-voltage less than 10ms situation.			V
16#1502	Incorrect parameters		V	
16#1503	Extension module communication timeout		V	

MEMO