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AS Series Hardware Manual

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Revision History

Version	Revision	Date
1st	The first version was published.	2016/11/30
2nd	1. Add information on new modules AS08AD-B/C, AS02/04PU-A, AS320T/P-B, AS300N-A, AS228R/T/P-A, AS218RX/TX/PX-A, AS06RTD-A, AS08TC-A, AS-FEN02, and AS01DNET-A 2. Update Chapter 9	2018/02/09

AS Series Hardware Manual

Table of Contents

Chapter 5 Wiring

Chapter 6 Memory Card

Chapter 7 EMC Standards

Chapter 8 Maintenance and Inspection

1

Chapter 1   Product Introduction

Table of Contents

1

1.1 Overview

This manual introduces programming for AS Series programmable logic controllers, basic instructions, and applied instructions. This manual introduces electrical specifications for AS Series programmable logic controllers, as well as appearances, dimensions, and so forth.

1.1.1 Related Manuals

The related manuals for AS Series programmable logic controllers are listed below.
- AS Series Quick Start

  This guides you in how to use the system before reading the related manuals.
- AS Series Programming Manual AS Series Programming Manual

  This introduces programming for the AS Series programmable logic controllers, basic instructions, and applied instructions.
- ISPSoft User Manual

  This introduces the use of the ISPSoft software, programming language (Ladder, IL, SFC, FBD, and ST), POUs, and tasks.
- AS Series Hardware Manual

  This introduces electrical specifications, appearances, dimensions, and so forth.
- AS Series Operation Manual

  This introduces CPU functions, devices, module tables, troubleshooting, and so forth.
- AS Series Module Manual

  This introduces special I/O modules such as network modules, analog I/O modules, temperature measurement modules, motion control modules, and so forth.

1.1.2 Models Descriptions

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)
AS300 Series CPU module	AS332P-A	CPU module, PNP 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. Program capacity:128K steps, high-density terminal blocks
	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. Program capacity:128K steps, high-density terminal blocks
	AS324MT-A	CPU module, NPN differential output, 1x Ethernet port, 2x RS-485 ports, 1x USB port, 1x Micro SD interface, 2x

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Classification	Model Name	Description
		function cards (optional), supporting 24 I/Os (12DI+12DO) and up to 1016 I/Os. Program capacity:128K steps, high-density terminal blocks
	AS320P-B	CPU module, PNP output, 1x Ethernet port , 2x RS-485 ports, 1x USB port, 1x Micro SD interface, 2x function cards (optional), supporting 20 I/Os (8DI+12DO) and up to 1024 I/Os. Program capacity:128K steps, removable terminal blocks
	AS320T-B	CPU module, NPN output, 1x Ethernet port, 2x RS-485 ports, 1x USB port, 1x Micro SD interface, 2x function cards (optional), supporting 20 I/Os (8DI+12DO) and up to 1024 I/Os. Program capacity:128K steps, removable terminal blocks
	AS300N-A	CPU module, no I/Os, 1x Ethernet port, 2x RS-485 ports, 1x USB port, 1x Micro SD interface, 2x function cards (optional), and supporting up to 1024 I/Os. Program capacity:128K steps
AS200 Series CPU module	AS228P-A	CPU module, PNP output, 1x Ethernet port , 2x RS-485 ports, 1x USB port, 1x Micro SD interface, CAN communication port, supporting 28 I/Os (16DI+12DO) and up to 1024 I/Os. Program capacity: 64K steps, removable terminal blocks
	AS228T-A	CPU module, NPN output, 1x Ethernet port , 2x RS-485 ports, 1x USB port, 1x Micro SD interface, CAN communication port, supporting 28 I/Os (16DI+12DO) and up to 1024 I/Os. Program capacity: 64K steps, removable terminal blocks
	AS228R-A	CPU module, Relay output, 1x Ethernet port , 2x RS-485 ports, 1x USB port, 1x Micro SD interface, CAN communication port, supporting 28 I/Os (16DI+12DO) and up to 1024 I/Os. Program capacity: 64K steps, removable terminal blocks
	AS218PX-A	CPU module, PNP output, 1x Ethernet port , 2x RS-485 ports, 1x USB port, 1x Micro SD interface, CAN communication port, supporting 18 I/Os (8DI+6DO+2AI+2AO) and up to 1024 I/Os. Program

Classification	Model Name	Description
		capacity: 64K steps, removable terminal blocks
	AS218TX-A	CPU module, NPN output, 1x Ethernet port , 2x RS-485 ports, 1x USB port, 1x Micro SD interface, CAN communication port, supporting 18 I/Os (8DI+6DO+2AI+2AO) and up to 1024 I/Os. Program capacity: 64K steps, removable terminal blocks
	AS218RX-A	CPU module, Relay output, 1x Ethernet port , 2x RS-485 ports, 1x USB port, 1x Micro SD interface, CAN communication port, supporting 18 I/Os (8DI+6DO+2AI+2AO) and up to 1024 I/Os. Program capacity: 64K steps, removable terminal blocks
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

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Classification	Model Name	Description
		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

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Classification	Model Name	Description
		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 module	AS04AD-A	4-channel analog input module Hardware resolution: 16 bits 0–10V, 0/1–5V, -5 to +5V, -10 to +10V, 0/4–20mA, -20–+20mA Conversion time: 2 ms/channel
	AS08AD-B	8-channel analog input module Hardware resolution: 16 bits 0 to +10V, 0/1–5V, -5V to +5V, -10V to +10V Conversion time: 2 ms/channel
	AS08AD-C	8-channel analog input module Hardware resolution: 16 bits 0/4–20mA, -20mA–+20mA Conversion time: 2 ms/channel
	AS04DA-A	4-channel analog input module Hardware resolution: 12 bits -10 to +10V, 0–20mA, 4–20mA Conversion time: 2 ms/channel

Classification	Model Name	Description
	AS06XA-A	4-channel analog input module Hardware resolution: 16 bits 0–10V, 0/1–5V, -5 to +5V, -10 to +10V, 0/4–20mA, -20 to +20mA Conversion time: 2 ms/channel 2-channel analog input module Hardware resolution: 12 bits -10 to +10V, 0–20mA, 4–20mA Conversion time: 2 ms/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
	AS06RTD-A	6-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-channel thermocouple Sensor type: J, K, R, S, T, E, N, B and -100 to +100 mV Resolution: 0.1°C/0.1°F (24 bits) Conversion time: 200ms/channel
	AS08TC-A	8-channel thermocouple Sensor type: J, K, R, S, T, E, N, B and -100 to +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 Eigenvalues for a load cell: 1, 2, 4, 6, 20, 40, 80 mV/V Highest precision 1/10000 @ 50ms of conversion time ADC Resolution : 4 bits Conversion time: 2.5–400ms (nine options to choose from)
Positioning module	AS02PU-A	2-axis motion control, 5-24 VDC, 1 differential input, maximum high-speed frequency at 200 k Hz

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Classification	Model Name	Description
		24 VDC, 5 mA, 5 inputs
		5 VDC, 2-axis, 4 differential outputs,
		maximum high-speed frequency at 200 k Hz
	AS04PU-A	4-axis motion control
		24 VDC, 5mA, 6 outputs
		5-30 VDC, 0.1A, 4-axis, 8 outputs, maximum high-speed frequency at 100 kHz
Network module	AS00SCM-A	Serial communication module, 2x communication ports for communication cards, supporting MODBUS protocols
	AS01DNET-A	DeviceNet communication port, functioning as master or slave
Remote I/O module	AS00SCM-A + AS-FCOPM	For AS-FCOPM function cards
	AS00SCM-A + AS-FEN02	For AS-FEN02 function cards
	AS01DNET-A (RTU)	DeviceNet remote IO slave, its right side connectswith AS Series extension modules, including digital modules, analog modules, temperature modules, etc.
Function cards	AS-F232	Serial communication port, RS232, functioning as master or slave
	AS-F422	Serial communication port, RS422, functioning as master or slave
	AS-F485	Serial communication port, RS485, functioning as 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
	AS-FEN02	2x Ethernet ports, supporting MODBUS TCP, EtherNet/IP Adapter, AS Series remote control, and DLR function

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Classification	Model Name	Description
Programming cable	UC-PRG015-01A (1.5M)	Used for the connection between a PLC and a PC via a mini USB port, use for AS332T-A, AS332P-A, and AS324MT-A
	UC-PRG030-01A (3M)	Use for the connection between a PLC and a PC with a mini USB port, use for AS332T-A, AS332P-A, and AS324MT-A
	UC-PRG030-20A (3M)	Use for the connection between a PLC and a PC with a RJ45 port, use for AS332T-A, AS332P-A and AS324MT-A
I/O extension cable	UC-ET010-24B (1M) UC-ET020-24B (2M) UC-ET030-24B (3M)	MIL connector, 40Pin ↔ 40Pin, shielded, use for AS32AM10N-A, AS32AN02T-A, AS64AM10N-A and AS64AN02T-A
	UC-ET010-24D (1M) UC-ET020-24D (2M) UC-ET030-24D (3M)	MIL connector, 40Pin↔ 2x 20Pin, shielded, use for AS332T-A, AS332P-A, AS324MT-A, AS32AM10N-A, AS32AN02T-A, AS64AM10N-A, and AS64AN02T-A
External terminal module	UB-10-ID16A	16 inputs/outputs, 20-Pin MIL connector, use for AS332T-A, AS332P-A, AS324MT-A, AS32AM10N-A, AS32AN02T-A, AS64AM10N-A and AS64AN02T-A
	UB-10-ID32A	32 inputs, 40-Pin MIL connector, use for AS32AM10N-A and AS64AM10N-A
	UB-10-IO32D	Terminal block (spring clamp/MIL connector), MIL connector to 40-Pin spring clamp terminal block, use for AS332T-A, AS332P-A, AS324MT-A, AS32AM10N-A, AS32AN02T-A
	UB-10-OR16A	16 relay outputs, 20-Pin MIL connector, NPN, use for AS332T-A, AS32AN02T-A and AS64AN02T-A
	UB-10-OR16B	16 relay outputs, 20-Pin MIL connector, PNP, use for AS332P-A
	UB-10-OT32A	32 transistor outputs, 40-Pin MIL connector, NPN, use for AS32AN02T-A and AS64AN02T-A
Network cables	UC-CMC003-01A (0.3M)	CANopen communication cable, use for AS-FCOPM series
	UC-CMC005-01A (0.5M)	CANopen communication cable, use for AS-FCOPM series
	UC-CMC010-01A (1M)	CANopen communication cable, use for AS-FCOPM series
	UC-CMC015-01A (1.5M)	CANopen communication cable, use for AS-FCOPM series
	UC-CMC020-01A (2M)	CANopen communication cable, use for AS-FCOPM series
	UC-CMC030-01A (3M)	CANopen communication cable, use for AS-FCOPM series
	UC-CMC050-01A (5M)	CANopen communication cable, use for AS-FCOPM series
	UC-CMC100-01A (10M)	CANopen communication cable, use for AS-FCOPM series
	UC-CMC200-01A (20M)	CANopen communication cable, use for AS-FCOPM series

Classification	Model Name	Description
	UC-EMC003-02A (0.3M)	Ethernet communication cable, use for AS Series, CPU and AS-FEN02 Series.
	UC-EMC005-02A (0.5M)	Ethernet communication cable, use for AS Series, CPU and AS-FEN02 Series.
	UC-EMC010-02A (1M)	Ethernet communication cable, use for AS Series, CPU and AS-FEN02 Series.
	UC-EMC020-02A (2M)	Ethernet communication cable, use for AS Series, CPU and AS-FEN02 Series.
	UC-EMC050-02A (5M)	Ethernet communication cable, use for AS Series, CPU and AS-FEN02 Series.
	UC-EMC100-02A (10M)	Ethernet communication cable, use for AS Series, CPU and AS-FEN02 Series.
	UC-EMC200-02A (20M)	Ethernet communication cable, use for AS Series, CPU and AS-FEN02 Series.

1.2 Characteristics

Characteristics of the AS series CPU module:

(1) High efficiency

- The AS Series CPU module uses a 32-bit high-speed processor. The module executes basic instructions at 25 ns each and moving instructions at 150ns each. The module executes instructions 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 AS Series uses the Soc architecture, built with six (or 3) high speed counters. The maximum frequency is 200 kHz for each counter (differential output models can reach 4 MHz); six-axis high speed position output at 200 kHz (differential output models can reach 4 MHz).

(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 works with SCM/DNETcommunication modules (AS-FCOPM, and AS-FEN02 included) to create a remote connection, and you can connect up to 15 remote modules.

  Note: For the connections between the CPU modules and the remote modules, the I/O points cannot exceed 1024 I/Os, 32 I/O modules (any type), or 16 analog I/O modules.

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(3) Multiple I/O modules

- The AS series CPU module supports the following I/O modules: 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, AS08AD-B, AS08AD-C, AS04DA-A, AS06XA-A, AS04RTD-A, AS06RTD-A, AS04TC-A, AS08TC-A
Positioning module	AS02PU-A, AS04PU-A
Network module	AS00SCM-A, AS01DNET-A
Communication card	AS-F232, AS-F422, AS-F485, AS-FCOPM, AS-FEN02
Function card	AS-F2AD, AS-F2DA

(4) Larger program capacity and memory

- The AS300 Series advanced CPU modules have 128k steps of program capacity. 60000 general registers (30000 for specific use and 30000 for programming editing), and 64k words of memory (that can be used for storing parameters).

- The AS200 Series advanced CPU modules have 64k steps of program capacity. 60000 general registers (30000 for specific use and 30000 for programming editing), and 64k words of memory (that can be used for storing parameters).

(5) Supporting IEC 61131-3

- The AS series CPU module supports IEC 61131-3.

- Supported programming languages are ladder diagrams (LD), sequential function chart (SFC), structured text (ST), and continuous function chart (CFC).
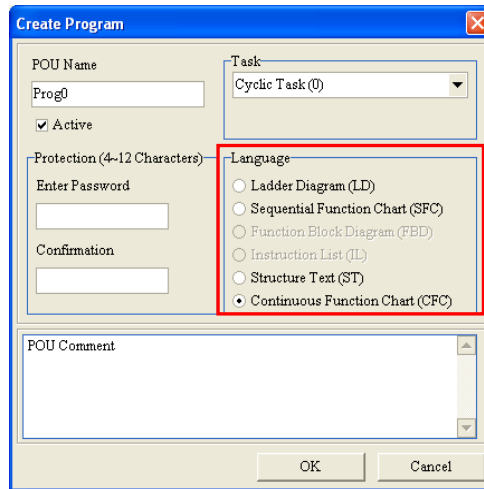
- You can select a programming language according to your preference. Programming languages support one another so that programs written by different users are compatible.

(6)   Strong function block

- Both standard IEC61131-3 function blocks and convenient functions blocks provided by Delta Electronics, Inc. are supported. You can use function blocks for frequently used programs for greater structure and convenience.

- The symbol for a function block in a ladder diagram is similar to an integrated circuit (IC) in a circuit diagram. Because the ladder diagram is based on the traditional circuit diagram, the operation of a function block is similar to the function of an integrated circuit. You only need to send the signal to the corresponding input of the function block.   You do not need to consider the processing procedure inside the function block.
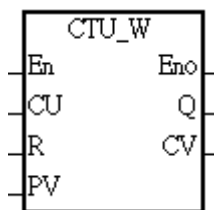
- A function block is a program element equipped with the operation function. It is similar to a subroutine, and is a type of POU (Program Organization Unit). It cannot operate by itself, and must be called through the main program POU. The function defined by the function block is executed after being called with the related parameters. The final result can be sent to the device or variable in the superior POU after the function block completes.

- You can set passwords in ISPSoft to provide function block security. The program inside a function block cannot be read, and business patents cannot be compromised.

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(7) Task
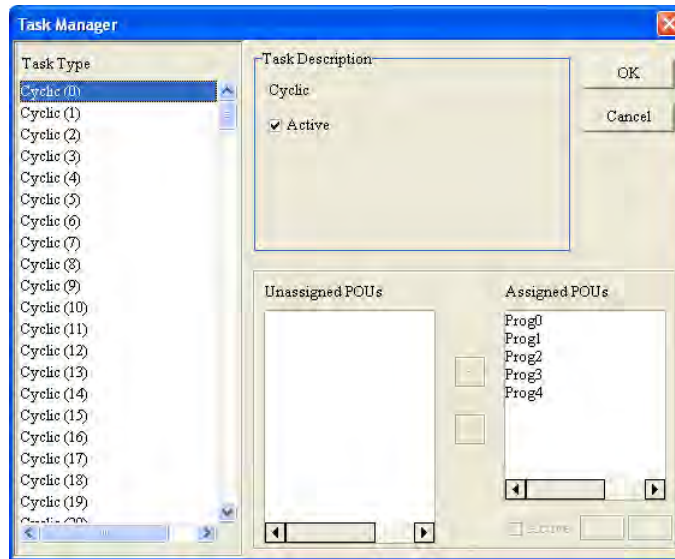
- You can assign 283 tasks at most to a program. Among these tasks, 32 are cyclic, 32 are I/O interrupts, 4 are timer interrupts, two are communication interrupts, one is an external 24 V low-voltage interrupt, and 212 are user-defined tasks.

- You can enable and disable a task when running a program by using the TKON and TKOFF instructions.

(8) Increasing hardware configuration efficiency through a USB cable and ISPSoft

- The AS 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. You do not need to buy a special communication cable for the CPU module. You can use a general USB cable to connect to the AS Series CPU module.

(9) Serial control interface with multiple functions

- AS Series CPU modules provide two RS-485 serial control interfaces, COM1 and COM2, which can be set as a either master or slave.

- You use the communication cards to work with two extension serial communication ports and to set the port as a master or slave.

(10) High-speed Ethernet communication interface

- AS Series CPU modules are equipped with a 10/100 M Ethernet communication interface and support email, web, and socket services.

- System error messages can be sent to your email immediately. You do not need to be on location to understand the problem.

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(11) Memory card

● The memory card has the following functions.

System backup: user program, CPU parameters, module table, and the device setting values

System recovery: user program, CPU parameters, module table, and device setting values

Parameter storage: device value

Log storage: system error log and system status log

(12) I/O module installation

● The AS Series PLC supports slide-and-lock installation on I/O modules when the power is off. After the PLC is powered off, you can remove the defective module and replace it with a new one without removing other modules.
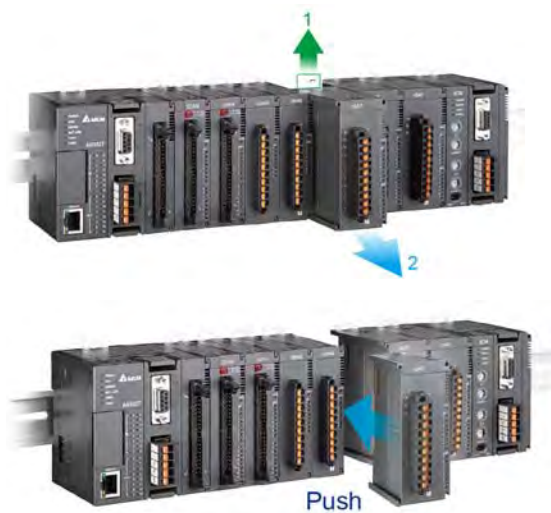
(13) Supporting on-line debugging mode

● You can use the on-line debugging mode in the AS series CPU module after a single instruction step completes, or after a breakpoint is specified, to find bugs in the program.

● The CPU module must be running to enter the debugging mode. After enabling the on-line monitoring function, 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 text does not support debugging mode, and sequential function charts supports debugging mode during the action and the transition.

Step 1: Set the PLC to RUN
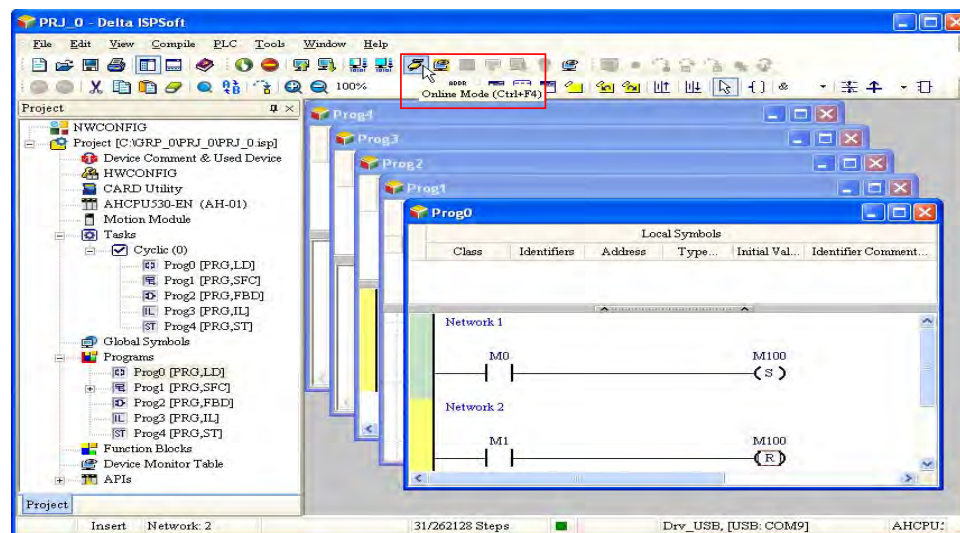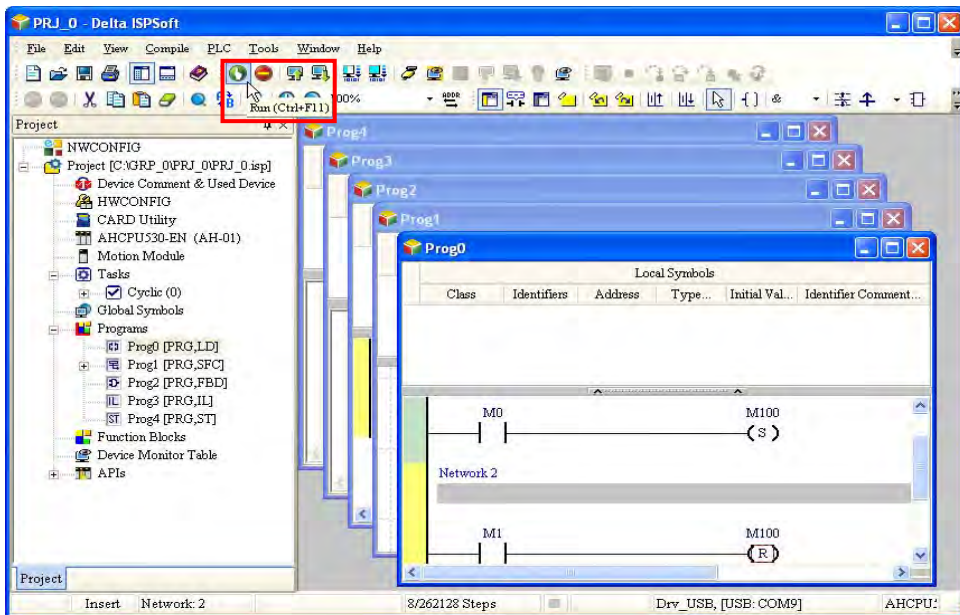
Step 3: Enter debugging mode
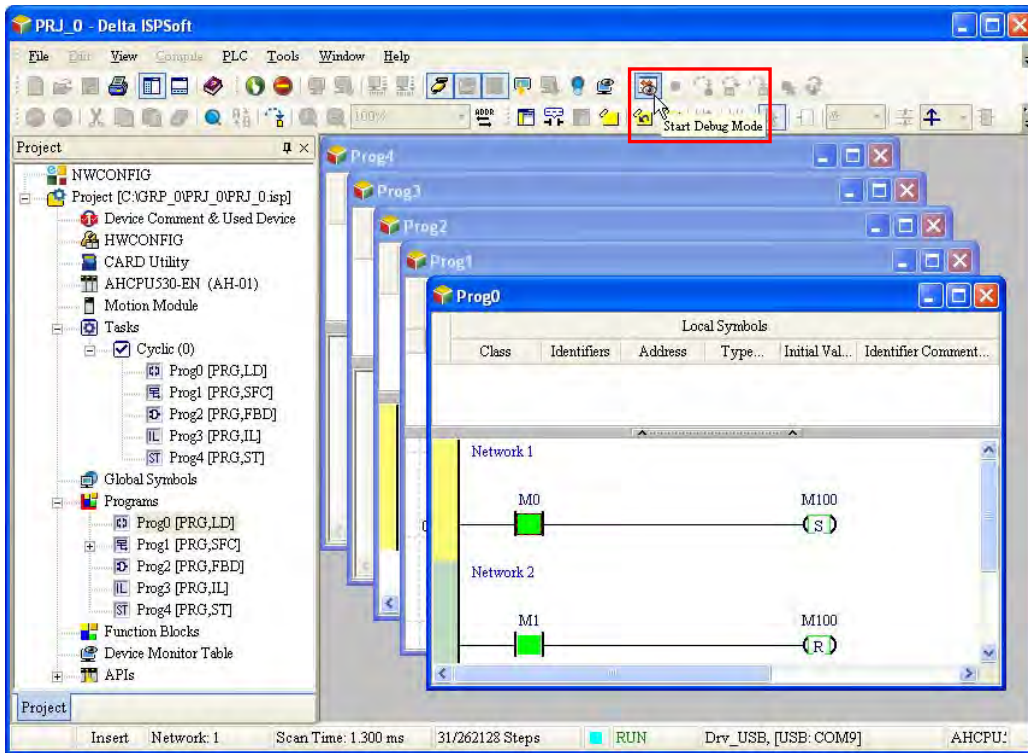
(14) On-line editing mode

- You can use the on-line editing mode when the system is running to update the program without affecting the system operation.

- When the system is in the on-line monitoring mode, enter the on-line editing mode by clicking [icon].
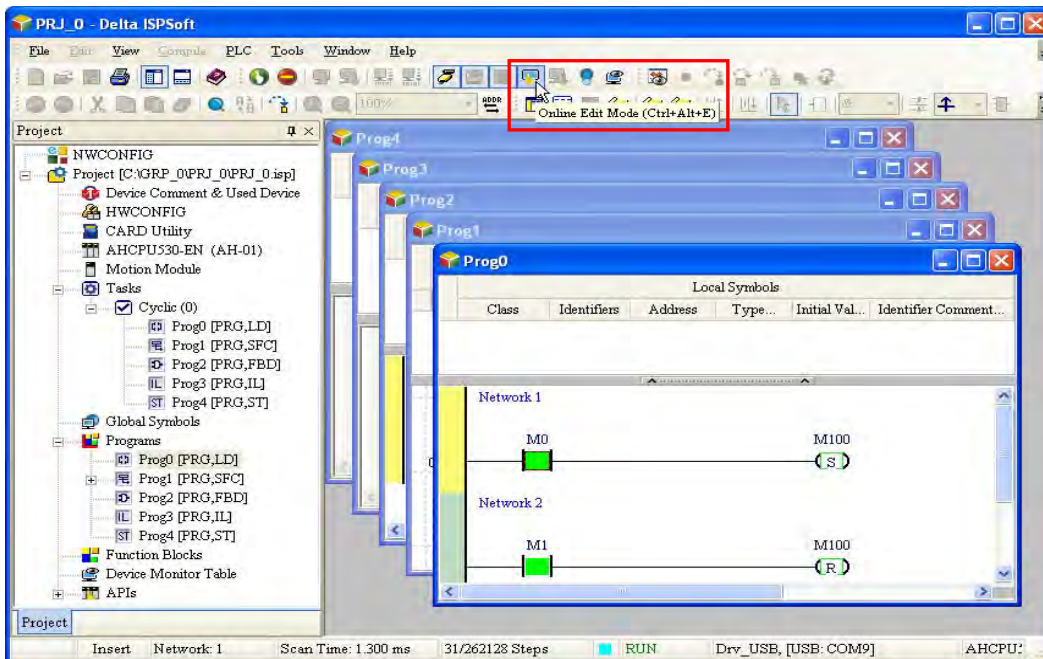
● After the program is modified and compiled, you can update the program in the CPU module by

clicking [icon] to download it to the CPU.
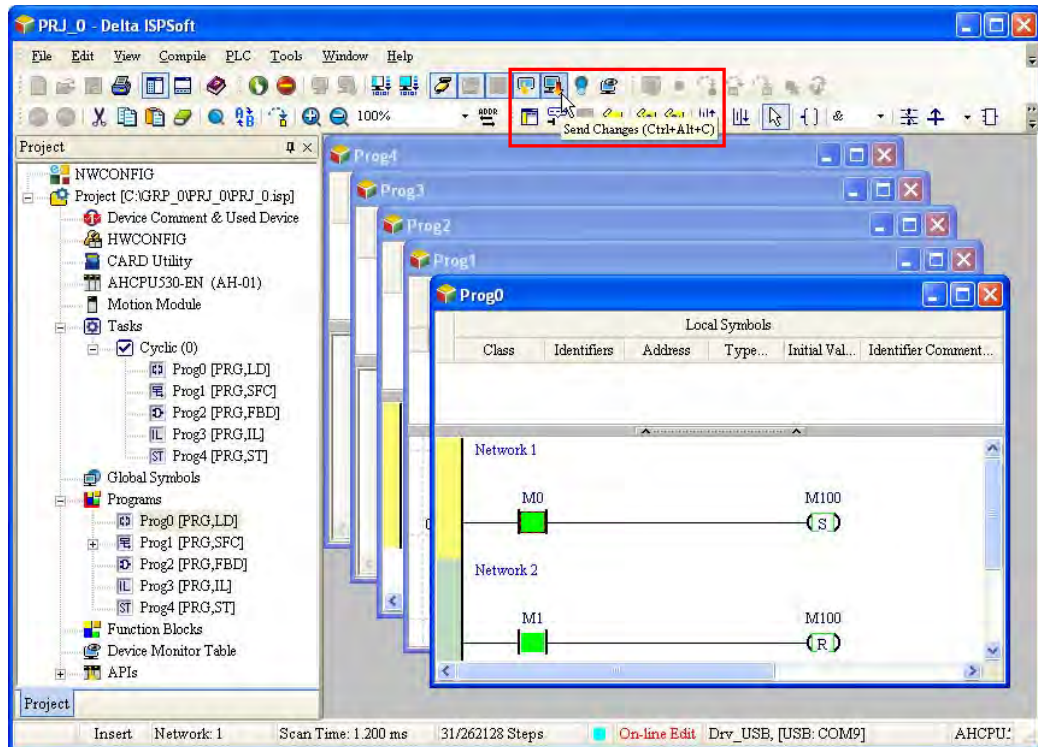
Chapter 2 Installing Hardware

Table of Contents

2.1　AS Series Hardware Framework

2.1.1　AS Series Hardware Component

The AS series programmable logic controller is a medium-to-small programmable logic control (PLC). The execution speed and   memory capacity are increased. Use of function blocks is also supported. In order to meet your more advanced application requirements, the AS series programmable logic controllers provide more flexible system extension frameworks. Under such system frameworks, you do not need to use several CPU modules to control the system because there are too many I/O points or the equipment is too far away. This retains system completeness, and you can be more efficient in developing projects.

The minimum framework requirement for the AS series system is one CPU module and one power supply module to operate the CPU module.

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

The following lists the limits for setting up a common framework of the AS PLC system. Exceeding any one of the limits causes the PLC to send an error message.

Limit 1: You can connect up to 32 extension modules to the PLC, not including the power module, CPU module, and remote module.

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

Limit 3: You can connect up to 16 analog modules to the PLC, including AD, DA, XA, RTD, TC and LC.

Limit 4: You can connect up to four communication modules (AS00SCM/AS01DNET-A) in total to the PLC.

Limit 5: You can connect up to 15 remote modules (AS00SCM+AS-FCOPM) to the PLC. The remote modules can work with up to eight digital/analog modules.

Limit 6: You can connect up to 15 remote modules (AS00SCM+AS-FEN02) to the PLC. The remote modules can work with up to eight digital/analog modules.

Limit 7: You can connect up to 8 remote modules (digital modules, analog modules, temperature module, etc.) to AS01DNET-A (RTU). The remote modules can work with up to eight digital/analog modules.

Limit 8: You can only connect remote modules to digital/analog modules, 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 converts alternating current to direct current or directly provides direct current. It provides power to the modules connected to it.

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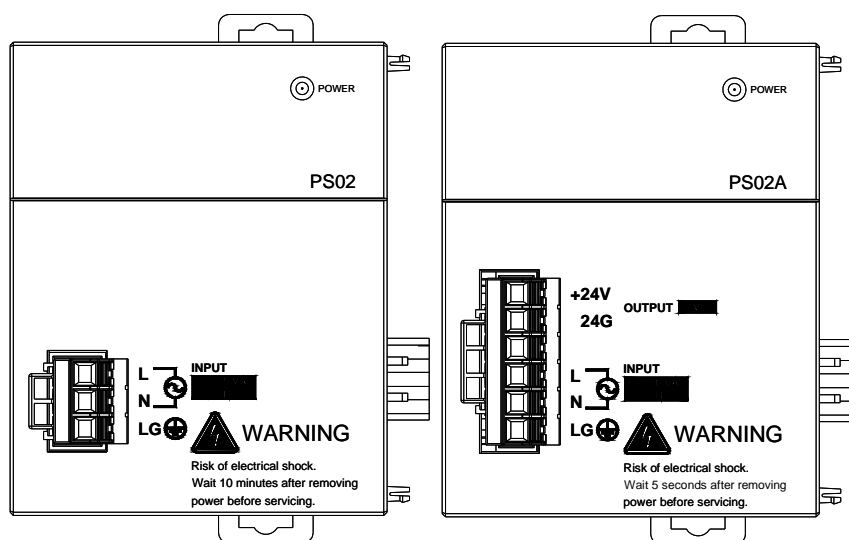
● **CPU module**

A CPU module is the nucleus of a complete AS Series system. It is responsible for controlling and managing the whole system. Delta Electronics, Inc. provides businesses with several types of CPU modules. You can select a CPU module according to your needs.
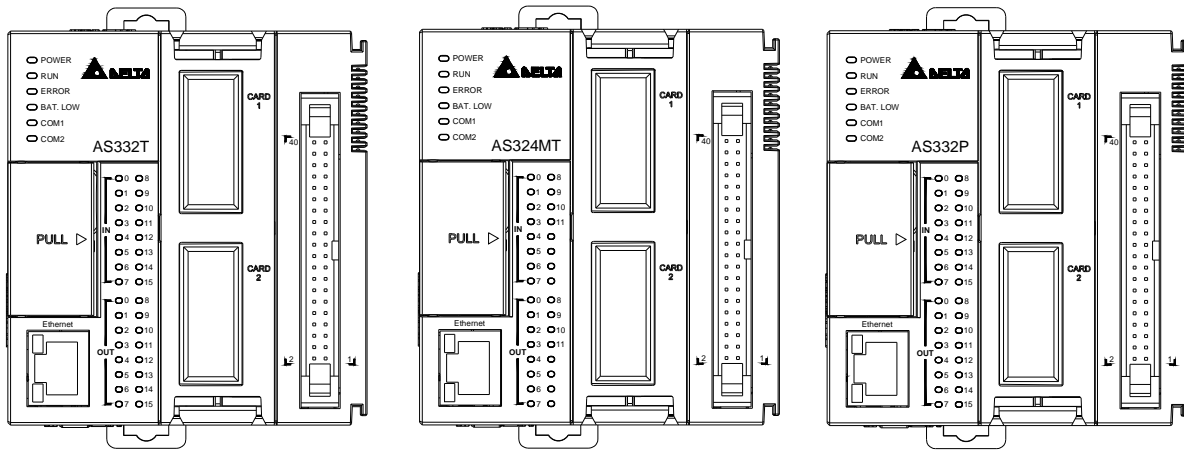
● **Communication cable**

Several communication interfaces are included in a CPU module, and many types of network modules are available. You can select a suitable communication cable according to the actual situation.

The following table lists information about communication interfaces and main applications.

Interface	Connector	Application
Communication port	Five-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. You can select them according to your needs.

- **Extension module**

    Apart from the standard communication ports on a CPU module, the CPU module is not equipped with other I/O functions. If you want to use I/O functions, you can select suitable modules according to the actual situation. The following table lists the modules that you can use with an AS Series system.

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 to +5V, -10 to +10V, 0/4–20mA, -20 to +20mA Conversion time: 2ms/channel
AS08AD-B	8-channel analog input module Hardware resolution: 16 bits 0–10V, 0/1–5V, -5 to +5V, -10 to +10V Conversion time: 2ms/channel
AS08AD-C	8-channel analog input module Hardware resolution: 16 bits

	0/4–20mA, -20 to +20mA
	Conversion time: 2ms/channel
AS04DA-A	4-channel analog input module
	Hardware resolution: 12 bits
	-10 to +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 to +5V, -10 to +10V, 0/4–20mA, -20 to +20mA
	Conversion time: 2 ms/channel
	2-channel analog input module
	Hardware resolution: 12 bits
	-10 to +10V, 0–20mA, 4–20mA
	Conversion time: 2ms/channel

Temperature measurement modules:

AS04RTD-A	4-channel, 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
AS06RTD-A	6-channel, 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 (24 bits)
	Conversion time: 200ms/channel
AS04TC-A	4-channel thermocouple
	Sensor type: J, K, R, S, T, E, N, B and -100 to +100 mV
	Resolution: 0.1°C/0.1°F (24 bits)
	Conversion time: 200ms/channel
AS08TC-A	8-channel thermocouple
	Sensor type: J, K, R, S, T, E, N, B and -100 to +100 mV
	Resolution: 0.1°C/0.1°F (24 bits)
	Conversion time: 200ms/channel

2

Positioning modules:

AS02PU-A	2-axis motion control, 5-24 VDC, 1 differential input (A/B/Z phase), maximum hardware input bandwidth at 200 k Hz 24 VDC, 5 mA, 5 inputs, maximum hardware input bandwidth at 10 k Hz 5 VDC, 2-axis, 4 differential outputs, high-speed output frequency at 100 k Hz
AS04PU-A	4-axis motion control 24 VDC, 5mA, 6 outputs, maximum hardware input bandwidth at 10 k Hz 5-30 VDC, 0.1A, 4-axis, 8 NPN outputs, maximum high-speed frequency at 100 kHz

Network modules:

AS00SCM-A	Serial communication module, 2x communication ports, applicable to communication cards, supporting MODBUS protocols and user defined protocols, can be used for a network communication module (when working with a network communication card)
AS01DNET-A	DeviceNet communication port, functioning as master or slave

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 (nine options to choose from)

Function cards:

AS-F232	Serial communication port, RS232, functioning as master or slave
AS-F422	Serial communication port, RS422, functioning as master or slave
AS-F485	Serial communication port, RS485, functioning as 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
AS-FEN02	Ethernet communication card 2x Ethernet ports (RJ45 connector), supporting MODBUS TCP, EtherNet/IP Adapter, acting as a communication card when working with AS300 Series and using for remote control when working with AS00SCM modules

2.2 Warning

● Before a module is installed, please make sure of the size of the module. To ensure sufficient installation space, you must take into account the size of the communication cable connector and the room which needs to be reserved.

● Please make sure that the work environment conforms to the specifications for the products. It is necessary to take into account basic temperature/humidity control and dust/corrosion prevention.

● Electromagnetic interference can result in system malfunction. Therefore, you must design the EMC carefully. Please refer to Chapter 7 in this manual for more information on EMC standards.

● If components such as screws and washers are specified in the manual, please use components conforming to the specifications.

● If a cable is connected to a communication port, please make sure the cable connector is properly joined to the port on the module.

2.3 Installation

2.3.1 Installing 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 must be larger than 50 millimeters.
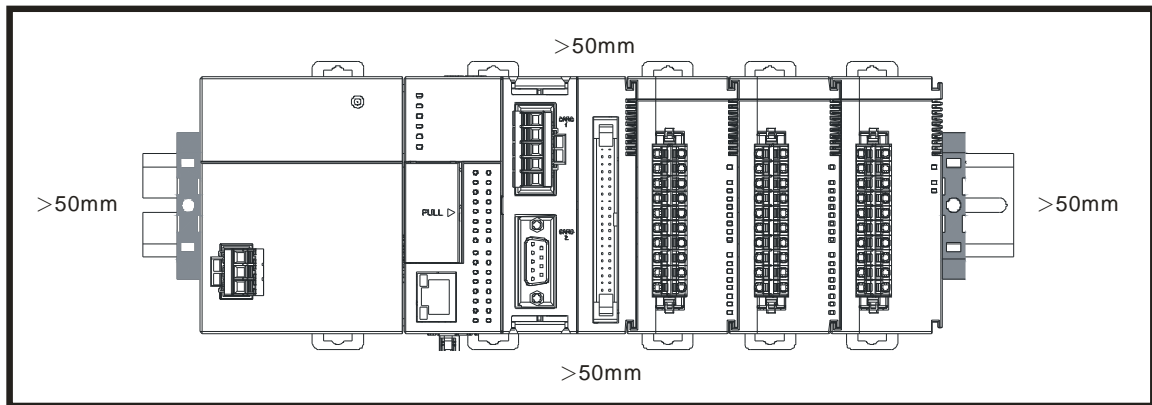
■ Keep the PLC away from high-voltage equipment, high-voltage wires, and high-voltage motors.

■ In order to prevent the PLC from overheating, please do not install the PLC vertically on the bottom or top of the control box.

■ Please install the PLC horizontally in the control box, as shown above.

■ If you intend to increase the number of modules, you must leave some space for installing the modules in the control box.

2.3.2 Installing a Module

1. Press the clip rings if they are out as the image 1 shown. Push the module to the desire position until you hear a click to finish installation.

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 you hear a click.

3. After you installed the module, fasten the screws on the modules to secure the module on the DIN rail.
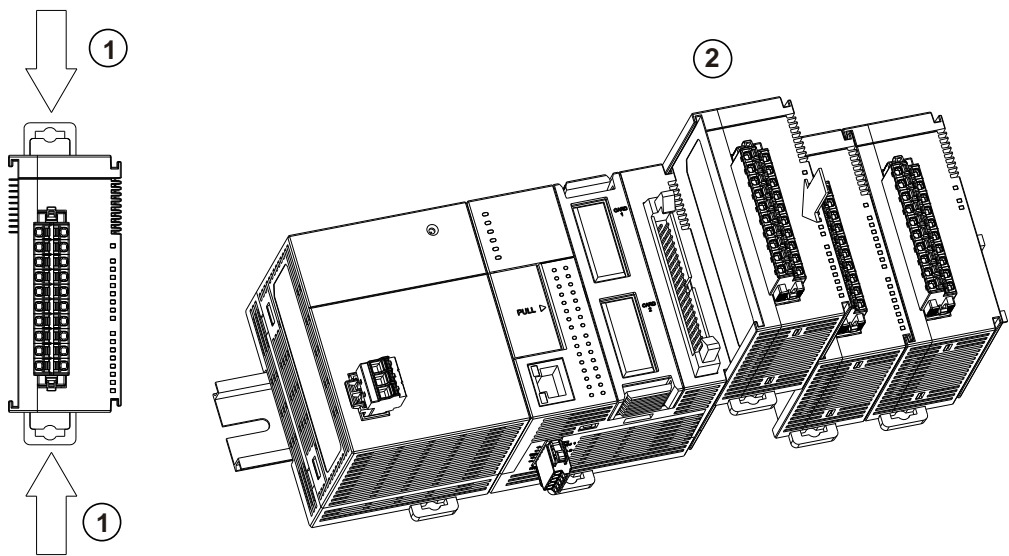
If there is a vibration source near the installation site, install anti-vibration baffles on the sides of the AS Series modules for better stabilization, such as the gray baffles show below.
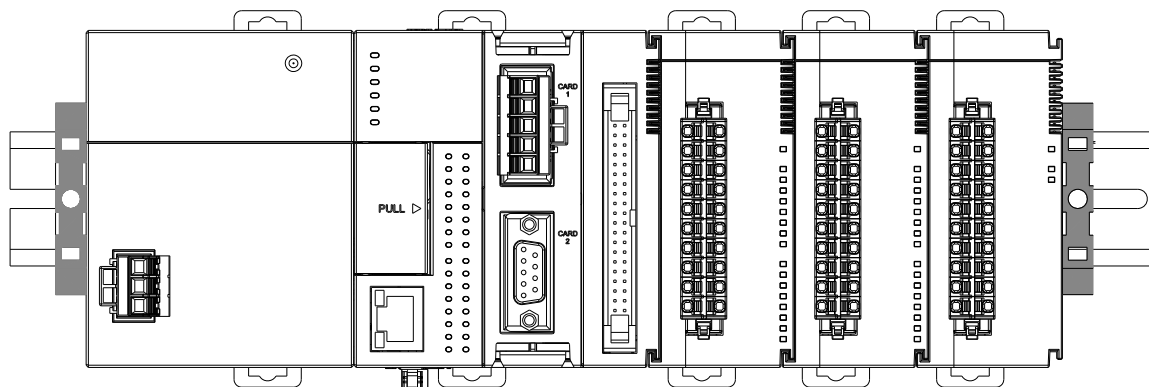
● **Install the baffles:**

1. Hook the baffle onto the DIN rail and press it down as the directional arrow shows below. 2-13
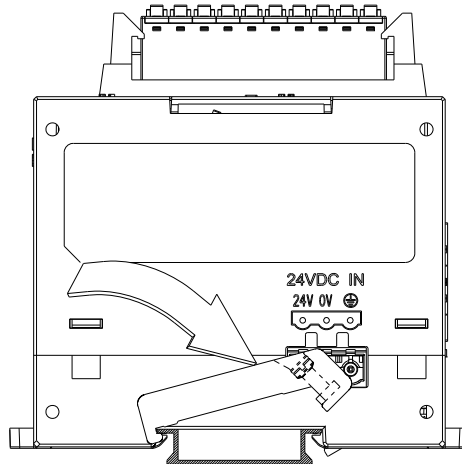
2. Use screws to secure the baffle.
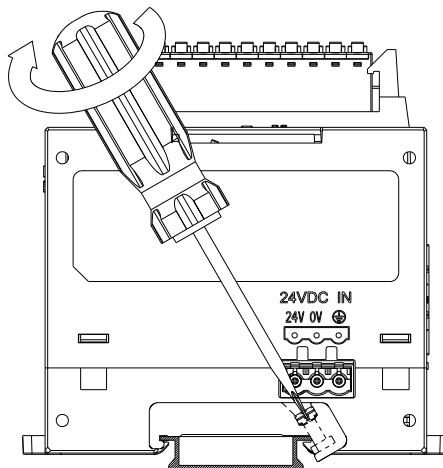
3.   The completed baffle installation is shown below.
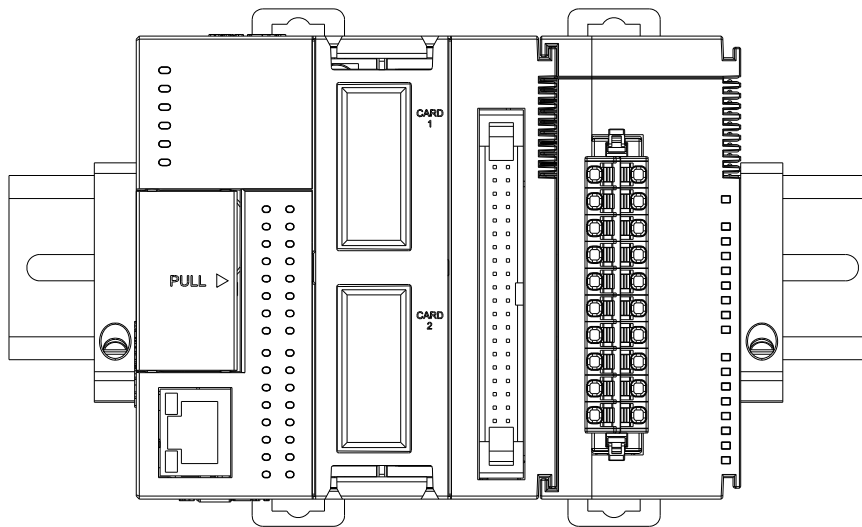
2.3.3   Installing a Removable Terminal Block

Install the removable terminal block on the module as shown below.

● **Installation**

1.   Align the terminal block at the printed circuit board, and press it into the module.
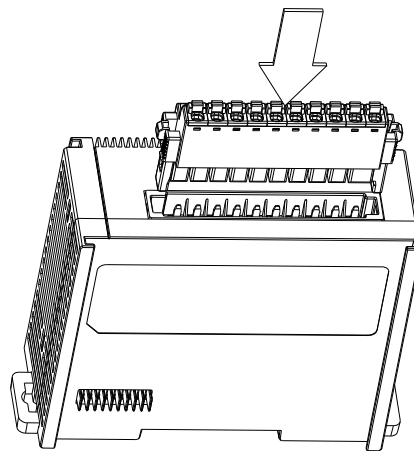
● **Removal**

1. Pull the clips down in the direction shown by the arrow, and then pull the terminal block up
    as shown below.
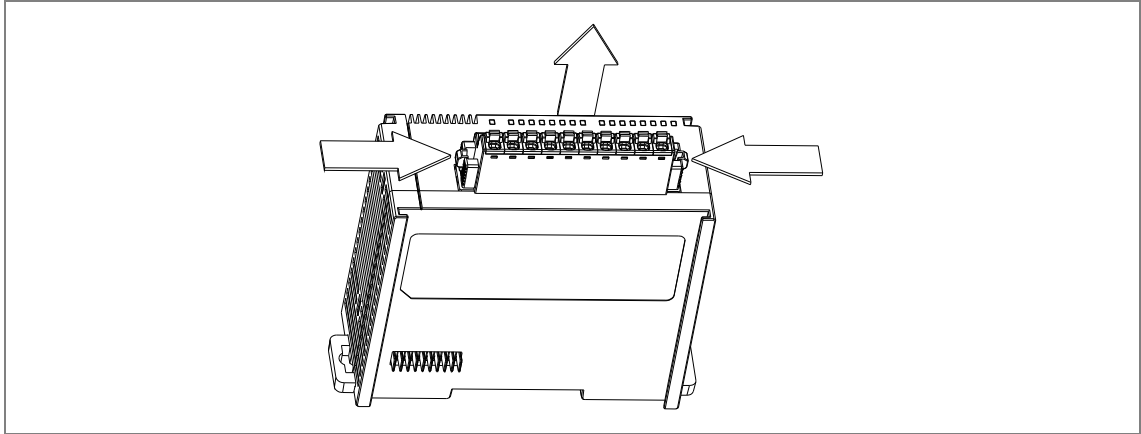
2.3.4   Changing a Module

1. Take the removable terminal block out of the module and pull the clip out from the DIN rail as the image
    shown below.
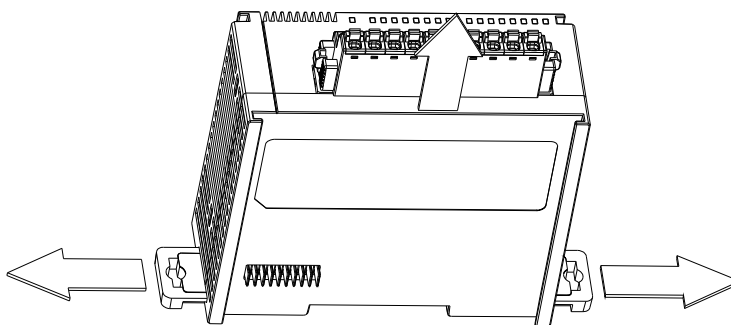
2. Remove the module to be changed out.

3. Slide the new module in as the image shows below.
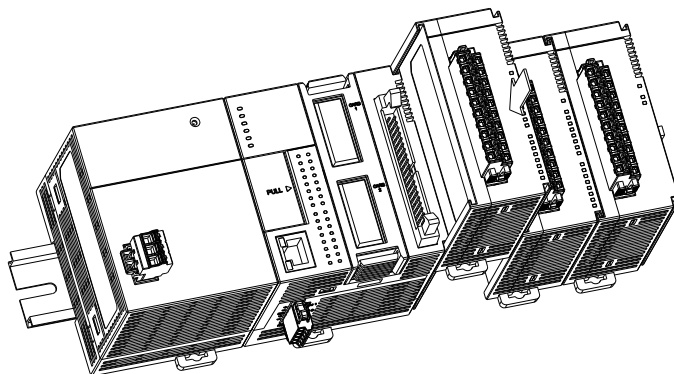
2.3.5　Installing and Removing an Extension Card

A.　AS-F232/AS-F422/AS-F485/AS-F2AD/AS-F2DA/AS-FCOPM

● **Installation**

Push the extension card into the extension card slot until you hear a click.

● **Removal**

Press the PUSH button to release the extension card and then take the extension card out.
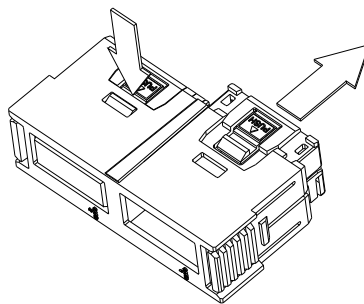
B.　AS-FEN02

● **Installation**

Push the extension card into the extension card slot until you hear a click.
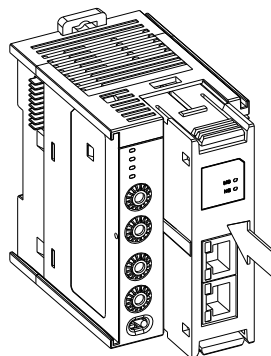
● **Removal**

Press the buttons on the upper and lower ends to release the extension card and then take the extension card out.
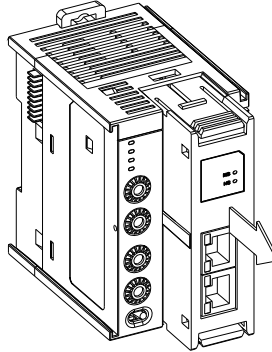
2.3.6 Installing a Wiring Module

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

● **Installation**

1. One side of the wiring module has to be fixed first.

2. Press the driver board in the direction indicated by arrow 1, and make sure the groove is aligned with the DIN rail.
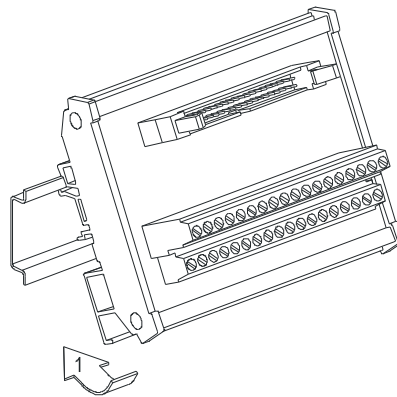
● **Removal**

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
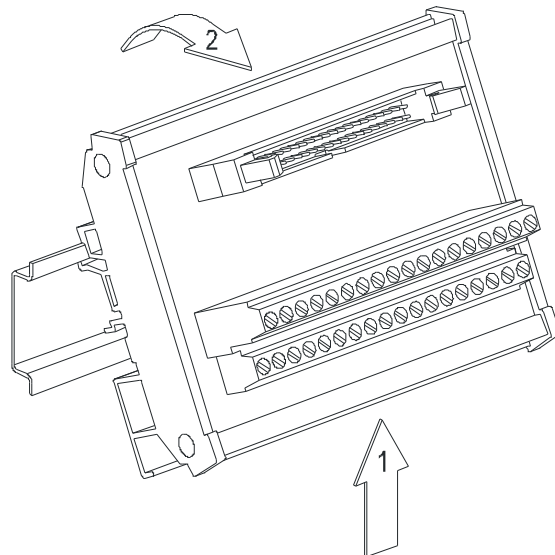
Chapter 3 Product Specifications

Table of Contents

3.1 General Specifications

Item	Specifications
Operating temperature	-20 to 60°C
Storage temperature	-40 to 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 $\leqq$ f $\leqq$ 8.4 Hz, constant amplitude 3.5 mm; 8.4 Hz $\leqq$ f $\leqq$ 150 Hz, constant acceleration 1g Duration of oscillation: 10 sweep cycles per axis on each direction of the three 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 three 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 CPU Module Specifications

3.2.1 Functional specifications

Item	AS324MT-A / AS332T-A / AS332P-A	AS228T-A / AS228P-A AS228R-A / AS218TX-A AS218PX-A / AS218RX-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 text, 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

3

Item	AS324MT-A / AS332T-A / AS332P-A	AS228T-A / AS228P-A AS228R-A / AS218TX-A AS218PX-A / AS218RX-A	Remark
Program capacity (step)	128K steps	64K steps	
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; four timed interrupts, etc.)		Refer to the AS Series 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]	30000 (D0–D29999)		
Data register [W]	30000 (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	None	
CANopen DS301 (Master)	Maximum node: 64; maximum bytes: 2000		*A function card AS-FCOPM is required for AS300 Series.
CANopen DS301 (Slave)	Maximum PDO: 8; maximum bytes: 8		

3.2.2 Electrical specifications

Item \ Model	AS332T-A/ AS332P-A/ AS324MT-A	AS320T-B/ AS320P-B	AS300N-A	AS228T-A/ AS228P-A	AS218TX-A/ AS218PX-A	AS228R-A/ AS218RX-A
Supply voltage	24 VDC (20.4 VDC–28.8 VDC) (-15% to +20%)					
Power consumption (W)	3.6	3.6	3	3.4	4.9	4.3 / 5.3
Weight (g)	260	285	235	285	290	325 / 310

● **Electrical specifications for the inputs on AS300 Series. The signals passing through the inputs are 24 VDC signals.**

Item \ Model	AS332T-A AS332P-A	AS320T-B AS320P-B	AS324MT-A
Number of inputs	16 (X0.0-X0.15)	8 (X0.0-X0.7)	12 (X0.0-X0.11)
Connector type	MIL connector	Removable terminal blocks	MIL connector
Input type	Digital input		
Input form	Direct current (sinking or sourcing)		X0.0+–X0.3+/X0.0- to 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- to 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- to X0.3-: >0.2VDC X0.4–X0.11: >15VDC
Action level — ON→OFF	<5 VDC		X0.0+–X0.3+/X0.0- to X0.3-: <-0.2VDC X0.4–X0.11: <5VDC
Response time — OFF→ON	10 ms±10%		X0.0+–X0.3+/X0.0- to X0.3- : < 0.125 µs X0.4–X0.11: < 2.5µs
Response time — ON→OFF	15 ms±10%		X0.0+–X0.3+/X0.0- to X0.3- : < 0.125 µs X0.4–X0.11: < 2.5µs
Maximum input frequency	50 Hz		X0.0+–X0.3+/X0.0- to X0.3-: < 4 MHz X0.4–X0.11: < 200 kHz
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.		

Note: AS300N-A does not come with inputs/outputs.

● **Electrical specifications for the outputs on AS300 Series.**

Item \ Model	AS332T-A AS332P-A	AS320T-B AS320P-B	AS324MT-A
Number of inputs	16 (Y0.0-Y0.15)	12 (Y0.0-Y0.11)	12 (Y0.0-Y0.11)
Connector type	MIL connector	Removable terminal blocks	MIL connector
Output form	Transistor-T (sinking) Transistor-P (sourcing)		Y0.0+–Y0.3+/Y0.0- to Y0.3-: differential input Y0.4–Y0.11: Transistor-T (sinking)
Output current	5-30 VDC, 0.1A		Y0.0+–Y0.3+/Y0.0- to Y0.3- : 5 VDC, 20 mA 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
Maximum load — Inductance	N/A		
Maximum load — Bulb	N/A		
Maximum output frequency [*1] — Resistance	Y0.0-Y0.11: 200 KHz Y0.12-Y0.15: 100 Hz		Y0.0+–Y0.3+/Y0.0- to Y0.3- : 4 MHz Y0.4–Y0.11: 200 KHz
Maximum output frequency [*1] — Inductance	N/A		
Maximum output frequency [*1] — 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- to Y0.3-: 0.125 μs Y0.4–Y0.11: 2.5 μs

● **Electrical specifications for the inputs on AS200 Series. The signals passing through the inputs are 24 VDC signals.**

Item \ Model	AS228P-A / AS228R-A / AS228T-A	AS218PX-A / AS218RX-A / AS218TX-A
Number of inputs	16 (X0.0-X0.15)	8 (X0.0-X0.7)
Connector type	Removable terminal blocks	
Input type	Digital input	
Input form	Direct current (sinking or sourcing)	
Input voltage/ current	24 VDC 5 mA	
Action level OFF→ON	>15 VDC	
Action level ON→OFF	<5 VDC	
Response time OFF→ON	X0.0–X0.7: < 2.5μs X0.8–X0.15: < 50μs	
Response time ON→OFF	X0.0–X0.7: < 2.5μs X0.8–X0.15: < 50μs	
Maximum input frequency	X0.0–X0.7: 200 KHz X0.8–X0.15: 10 KHz	
Input impedance	3.9 kΩ	
Input signal	Voltage direct input Sinking: The inputs are NPN transistors whose collectors are open collectors. Sourcing: The inputs are PNP transistors whose collectors are open collectors.	

Model Item	AS228P-A / AS228R-A / AS228T-A	AS218PX-A / AS218RX-A / AS218TX-A
Electrical isolation	Optocoupler	
Input display	When the optocoupler is driven, the input LED indicator is ON.	
Analog inputs	N/A	2
Analog input resolution	N/A	12bits
Analog input mode	N/A	-10V~10V (voltage mode) or 20mA~20mA (currentmode)
Analog linearity error	N/A	±1% (full scale)
Analog input impedance	N/A	≧1 MΩ (Voltage mode) 250 Ω (Current mode)

● **Electrical specifications for the outputs on AS200 Series.**

Model Item		AS228R-A AS218RX-A	AS228T-A AS218TX-A	AS228P-A AS218PX-A
Number of outputs		AS228 Series: 12 outputs (Y0.0-Y0.11) AS218 Series 6 outputs (Y0.0-Y0.5)		
Connector type		Removable terminal blocks		
Output form		Relay	Transistor-T (sinking)	Transistor-P (sourcing)
Input voltage/ current		24 VAC / 24 VDC	5-30 VDC	5-30 VDC
Maximum load	Resistance	2A/output, 8A/COM	0.5A	0.5A
	Inductance	Life cycle curve*[1]	N/A	N/A
	Bulb	20W (24VDC) 100W (230VAC)	N/A	N/A
Maximum output frequency	Resistance	1Hz	200kHz	200kHz
	Inductance	0.5Hz	N/A	N/A
	Bulb	1Hz	N/A	N/A
Maximum Response time	OFF→ON	10 µs	2.5 µs	2.5 µs
	ON→OFF			
Analog outputs		AS218 Series: 2 outputs		
Analog output resolution		AS218 Series: 12bits		
Analog output mode		AS218 Series: -10V~10V (voltage mode) or 0mA~20mA (currentmode)		

*1: Life cycle curve
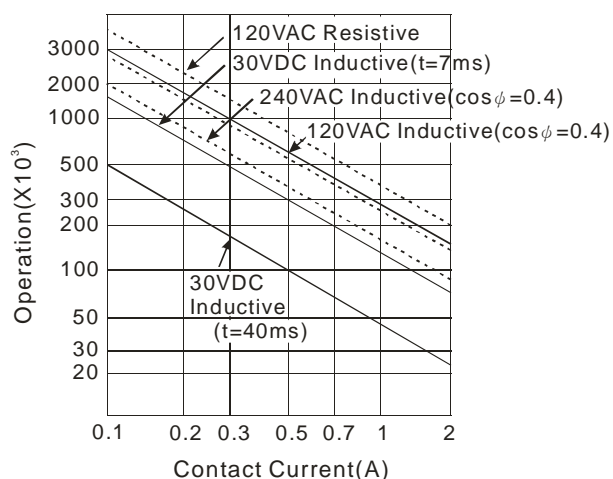
3.2.3 Ethernet Specifications

Item			AS300 Series	AS200 Series	Remarks
Communication Protocol			MODBUS TCP, EtherNet/IP, SMTP, HTTP		Protocols can be used simultaneously
MODBUS TCP	**Server connection number**		32	16	
	Client connection number		32	16	
	RTU Mapping		4	4	
Socket	**TCP connection number**		4	2	
	UDP connection number		4	2	
SMTP	**Email number**		4	2	
EtherNet/IP	**Type**		Scanner, Adapter		
	CIP Network I/O Connection	**CIP connection number**	32 (Clients+Servers)	16 (Clients+Servers)	I/O connections shared
		TCP connection number	16 (Clients+Servers)	8 (Clients+Servers)	I/O connections shared
		Requested Packet Interval (RPI)	5 ms–1000 ms		Default: 20 ms
		Max. Transmission Speed	3000 pps		
		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	Total 16 (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	Total 16 (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. CIP connection number**	32 (Servers)	16 (Servers)	I/O connections shared
		Max. Data Length	400 bytes		
		Requested Packet Interval (RPI)	5 ms–1000 ms		
	CIP Network	**Max. CIP**	32	16	I/O

Item		AS300 Series	AS200 Series	Remarks
Consumed Tag	**Connection Number**	(Clients+Servers)	(Clients+Servers)	connections shared
	Max. Data Length	400 bytes		
	Requested Packet Interval (RPI)	5 ms–1000 ms		
	AS00SCM (RTU) + AS-FEN02 conneciton number	15	8	AS Remote

3.2.4 CPU Module Profiles

● **AS324MT-A/AS332T-A/AS332P-A/AS300N-A**
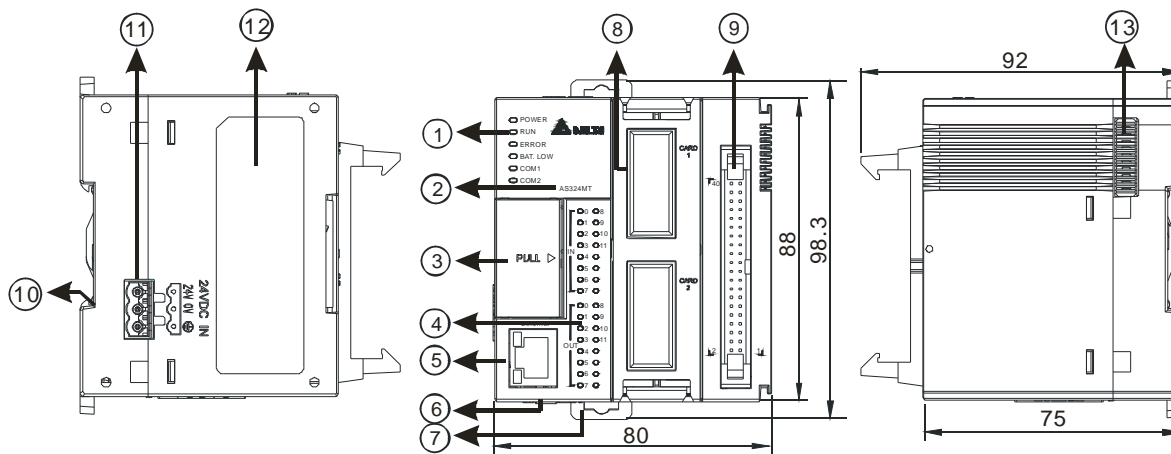
Unit: mm

● **AS320T-B/AS320P-B**

Unit: mm

Number	Name	Description
1	Power LED indicator	Indicates the power status of the CPU module
	Run LED indicator	Operating status of the module ON: the module is running. OFF: the module is stopped.
	Error LED indicator	Error status of the module ON: a serious error occurs in the module. OFF: the module is normal. Blinking: a minor error occurs in the module.
	BAT.LOW LED indicator	Indicates the battery status of the CPU module. (Enable/Disable this display in HWCONFIG in ISPSoft)
	COM1 LED COM2 LED	Indicates the communication status of the COM port. OFF: no communication over the COM port Blinking: communication over the COM port
2	Model name	Shows 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	Provides an interface for an 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	Provides an interface for a n Ethernet communication
6	COM1/COM2	Provides an interface for RS-485 communication
7	DIN rail clip	Secures the DIN rail
8	Extension card slot	Provides an interface for an extension card
9	MIL connector	Connects the module and the wiring module
	Note: AS300N-A does not come with inputs/outputs; there is no MIL connector for AS300N-A.	
10	Grounding clip	For grounding
11	Power supply	For power supply
12	Label	Nameplate
13	External module port	Connects the modules
14	Removable terminal blocks	Connects the module and the wiring module
		Note: AS300N-A does not come with inputs/outputs; there is no MIL connector for AS300N-A.

● **AS200 Series (AS218PX-A/AS218RX-A/AS218TX-A/AS228R-A/AS228T-A/AS228P-A)**

Unit: mm

Number	Name	Description
1	Power LED indicator	Indicates the power status of the CPU module
	Run LED indicator	Operating status of the module ON: the module is running. OFF: the module is stopped. Blinking: the module is detecting an error.
	Error LED indicator	Error status of the module ON: a serious error occurs in the module. OFF: the module is normal. Blinking: a minor error occurs in the module.
	BAT.LOW LED indicator	Indicates the battery status of the CPU module. (Enable/Disable this display in HWCONFIG in ISPSoft)
	COM1 LED COM2 LED CAN LED	Indicates the communication status of the COM/CAN port. OFF: no communication over the COM/CAN port Blinking: communication over the COM/CAN port
2	Model name	Shows 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	Provides an interface for an 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	Provides an interface for a n Ethernet communication
6	COM1/COM2	Provides an interface for RS-485 communication
7	DIN rail clip	Secures the DIN rail
8	CAN port	Provides an interface for CAN communication
9	Removable terminal blocks	Connects the module and the wiring module
10	Grounding clip	For grounding
11	Power supply	For power supply
12	Label	Nameplate
13	External module port	Connects the modules

● **MIL connector, extension cable, and wiring modules (for AS332T-A/AS332P-A/AS324MT-A)**

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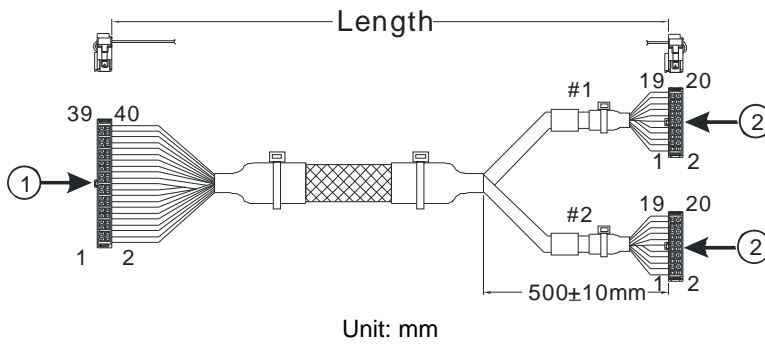
Unit: mm

Number	Name	Description
1	IDC 40-pin terminal	Connects a digital input/output module and an external terminal module.
2	IDC 20-pin terminal	Connects 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
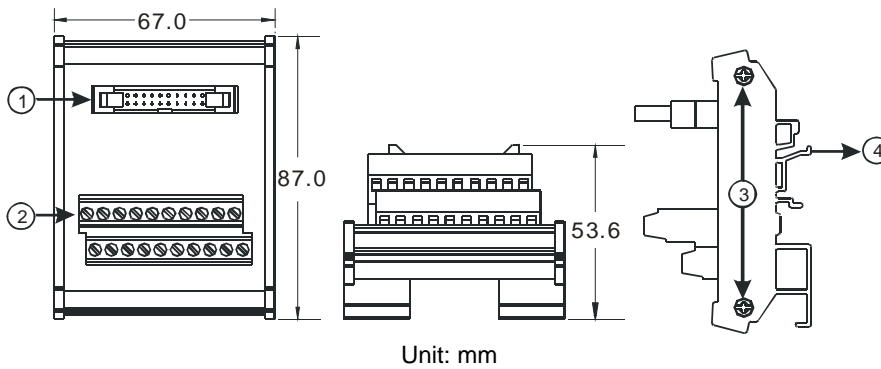
Unit: mm

Number	Name	Description
1	20-pin MIL connector	Connects the external terminal module and a wiring module
2	Terminals	Input/Output terminals for wiring
3	Clip	Hangs the external terminal module on a DIN rail
4	Set screw	Fixes the base

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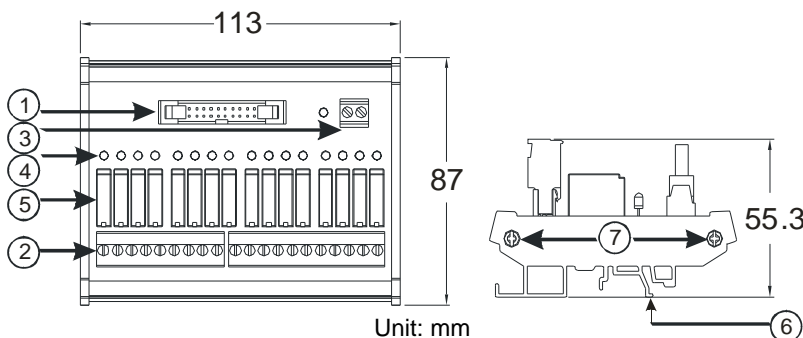
Unit: mm

Number	Name	Description
1	20-pin MIL connector	Connects 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	Hangs the external terminal module on a DIN rail
7	Set screw	Fixes the base

● **Spring clamp/MIL connector terminal block UB-10-IO32D for AS332T-A/AS332P-A/AS324MT-A**

Unit: mm
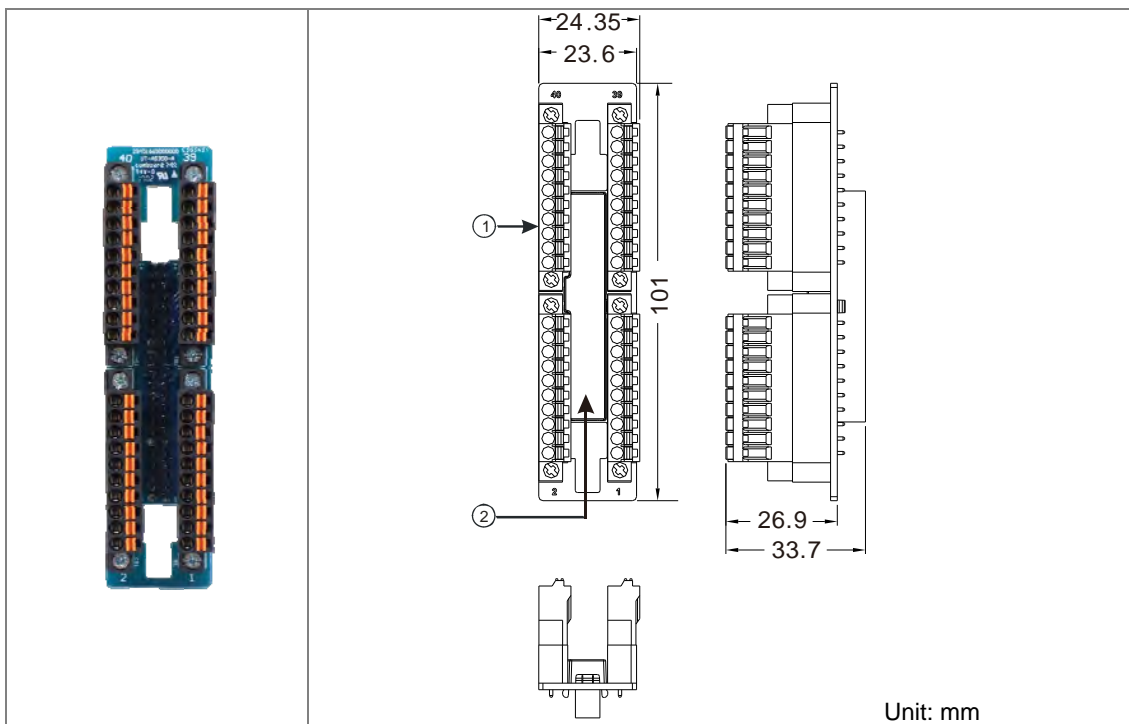
Number	Name	Description
1	Terminal block for output	Terminal block
2	40-pin MIL connector	Connects the module and the wiring module

3.2.6 CPU Module Input/Output Terminals

AS332P-A			AS332T-A		
	-	-		-	-
	S/S	S/S		S/S	S/S
	X0.15	X0.14		X0.15	X0.14
	X0.13	X0.12		X0.13	X0.12
	X0.11	X0.10		X0.11	X0.10
	X0.9	X0.8		X0.9	X0.8
	X0.7	X0.6		X0.7	X0.6
	X0.5	X0.4		X0.5	X0.4
	X0.3	X0.2		X0.3	X0.2
	X0.1	X0.0		X0.1	X0.0
	C0	C0		-	-
	-	-		C0	C0
	Y0.15	Y0.14		Y0.15	Y0.14
	Y0.13	Y0.12		Y0.13	Y0.12
	Y0.11	Y0.10		Y0.11	Y0.10
	Y0.9	Y0.8		Y0.9	Y0.8
	Y0.7	Y0.6		Y0.7	Y0.6
	Y0.5	Y0.4		Y0.5	Y0.4
	Y0.3	Y0.2		Y0.3	Y0.2
	Y0.1	Y0.0		Y0.1	Y0.0

AS324MT-A			AS320T-B/AS320P-B		
	S/S	S/S		S/S	S/S
	X0.11	X0.10		X0	X1
	X0.9	X0.8		X2	X3
	X0.7	X0.6		X4	X5
	X0.5	X0.4		X6	X7
	SG0	SG0		C0	C0
	X0.3-	X0.3+		Y0	Y1
	X0.2-	X0.2+		Y2	Y3
	X0.1-	X0.1+		Y4	Y5
	X0.0-	X0.0+		Y6	Y7
	C0	C0		Y8	Y9
	Y0.11	Y0.10		Y10	Y11
	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+			

AS218RX-A/AS218TX-A/AS218PX-A			
AIO		DIO	
V1+	V2+	S/S	C0
I1+	I2+	X0.0	Y0.0
VI1-	VI2-	X0.1	Y0.1
-	-	X0.2	Y0.2
VO1	VO2	X0.3	-
IO1	IO2	X0.4	C1
AG	AG	X0.5	Y0.3
-	-	X0.6	Y0.4
-	⏚	X0.7	Y0.5

AS228R-A/AS228T-A/AS228P-A			
IN		OUT	
S/S	S/S	C0	C1
X0.0	X0.1	Y0.0	Y0.4
X0.2	X0.3	Y0.1	Y0.5
X0.4	X0.5	Y0.2	Y0.6
X0.6	X0.7	Y0.3	Y0.7
X0.8	X0.9	-	-
X0.10	X0.11	-	C2
X0.12	X0.13	Y0.8	Y0.9
X0.14	X0.15	Y0.10	Y0.11

● **MIL connector and the external terminal module UB-10-ID16A for AS332T-A / AS332P-A / AS324MT-A**
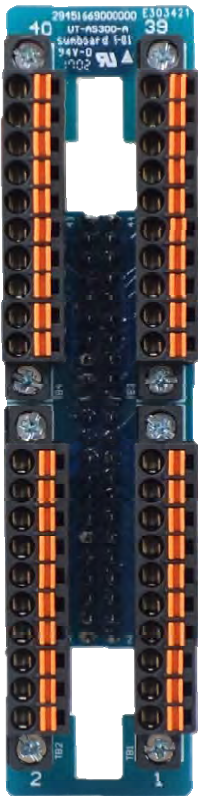
AS332T-A											
#1	TB1	Y0.0	Y0.2	Y0.4	Y0.6	Y0.8	Y0.10	Y0.12	Y0.14	C0	-
	TB2	Y0.1	Y0.3	Y0.5	Y0.7	Y0.9	Y0.11	Y0.13	Y0.15	C0	-
#2	TB1	X0.0	X0.2	X0.4	X0.6	X0.8	X0.10	X0.12	X0.14	S/S	-
	TB2	X0.1	X0.3	X0.5	X0.7	X0.9	X0.11	X0.13	X0.15	S/S	-

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

● **Spring clamp/MIL connector terminal block UB-10-IO32D for AS332T-A/AS332P-A/AS324MT-A**

40		39
38		37
36		35
34		33
32		31
30		29
28		27
26		25
24		23
22		21
20		19
18		17
16		15
14		13
12		11
10		9
8		7
6		5
4		3
2		1

3.3 Power Supply Module Specifications

3.3.1 General Specifications

● **AS-PS02**

Item	Specifications
Supply voltage	100–240 VAC (-15% to +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 less than ten milliseconds, the power supply module keeps running.
Fuse	2.5A/250 VAC
Inrush current	＜70A@115 VAC
24 VDC output	The maximum current is 2 A. 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% to +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 ten milliseconds or less, the power supply module keeps running.
Fuse	2.5 A/250 VAC
Inrush current	＜70 A@115 VAC
24 VDC output	1.5 A for internal use: the CPU and the modules 0.5 A 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 **Power Supply Module Profiles**

● **AS-PS02**
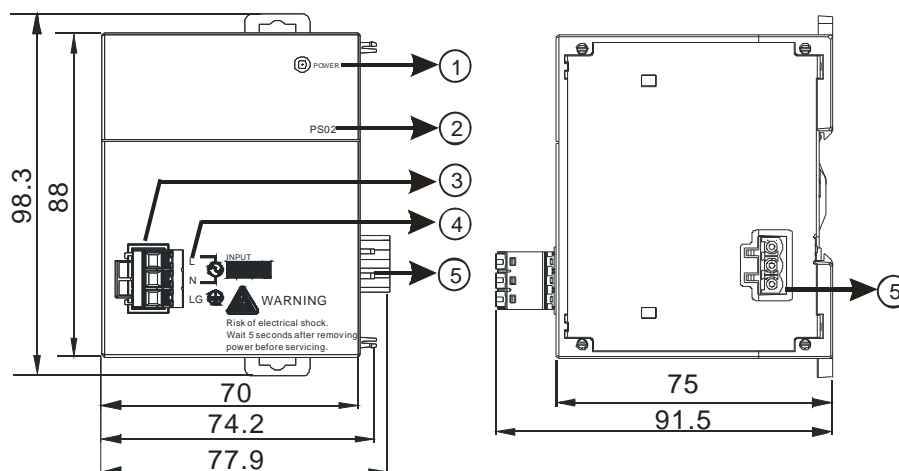
● **AS-PS02A**
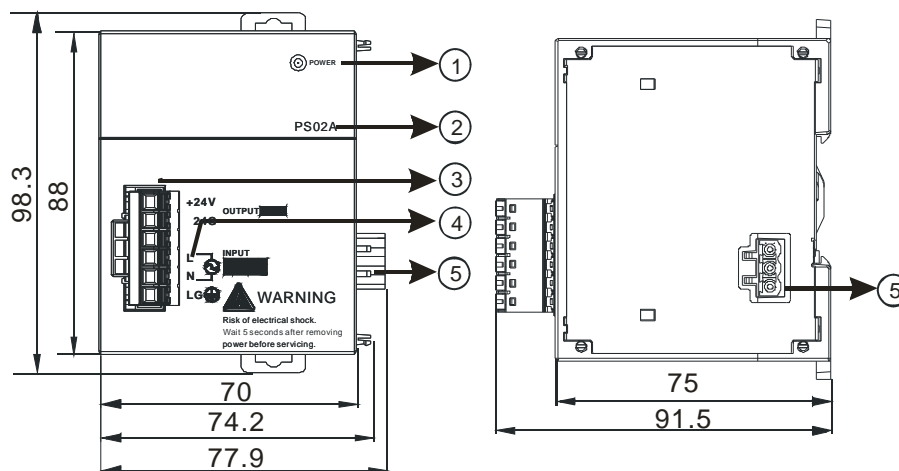
Number	Name	Description
1	POWER LED indicator (green)	Indicates the status of the power supply
2	Model name	Model name of the power supply module
3	Terminal	Terminal for wiring
4	Arrangement of the terminals	24G/+24V: DC power input LG: Line ground L/N: AC power input
5	Power output	Connected with AS series

3.3.3 Power Supply Module Terminals

● **AS-PS02**
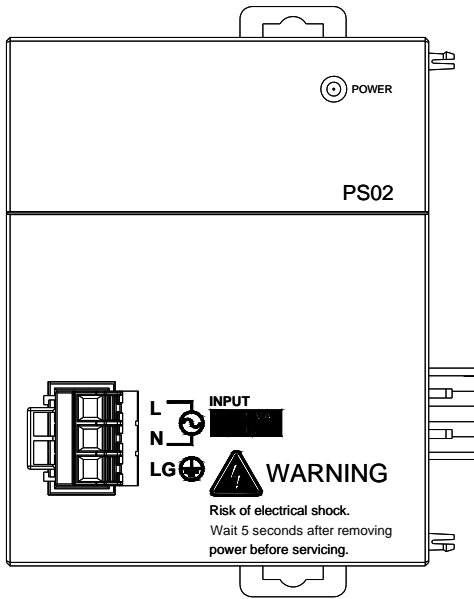
● L/N: AC power input
● LG: Line ground

● **AS-PS02A**
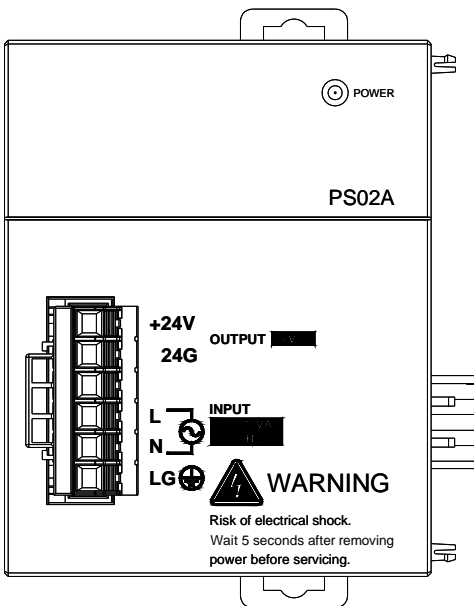
● 24G/+24V: DC power input
● L/N: AC power input
● LG: Line ground

3.4 Digital Input/Output Module Specifications

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	16AP11R A	16AP11T -A	16AP11P -A
Number of inputs		8	16	32	64	8	8	8
Connector type		Removable terminal block		MIL connector		Removable terminal block		
Input type		Digital input						
Input form		Direct current (sinking or sourcing)						
Input voltage/ current		24 VDC · 5 mA		24 VDC 3.2 mA		24 VDC · 5 mA		
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		4.7 kΩ		7.5kΩ		4.7 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		08AN01 R-A	16AN01 R-A	16AP11 R-A	08AN01 T-A	16AN01 T-A	16AP11 T-A	08AN01 P-A	16AN01 P-A	16AP11 P-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		240 VAC/24 VDC			5–30 VDC [2]			5–30 VDC [2]		
Maximum load	Resistance	2A/output, 8A/COM			0.5A			0.5A		
	Inductance	Life cycle curve [2]			12 W (24 VDC)			12 W (24 VDC)		
	Bulb	20 W (24 VDC) 10 0W (230 VAC)			2 W (24 VDC)			2 W (24 VDC)		
Maximum output frequency [1]	Resistance	1 Hz			100 Hz			100 Hz		
	Inductance	0.5 Hz			0.5 Hz			0.5 Hz		
	Bulb	1 Hz			10 Hz			10 Hz		
Maximum Response time	OFF→ON	10 ms			0.5 ms			0.5 ms		
	ON→OFF									

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

*1: The scan cycle affects the frequency.

*2: The life cycle curve is shown below.

3
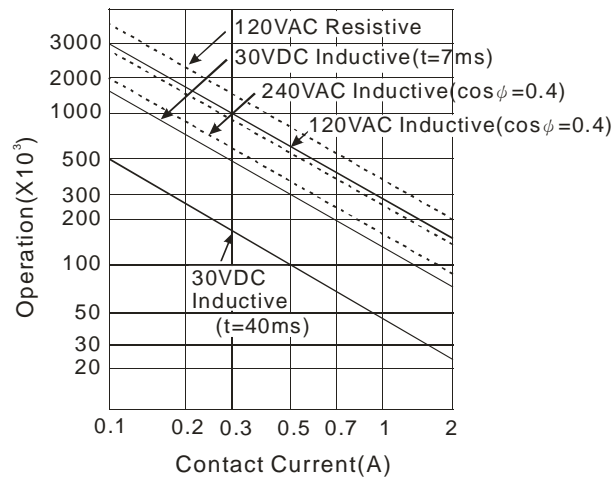
3.4.2 Digital Input/Output Module Profiles

● **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	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 to be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Terminal block clip	Secures the terminal block
6	DIN rail clip	Secures the DIN rail
7	External module port	Connects 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 to be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Terminal block clip	Secures the terminal block
6	DIN rail clip	Secures the DIN rail
7	External module port	Connects 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	Switches the LED indicators to their represented inputs.
3	MIL connector	For the external I/O connecting cables UC-ET010-24B, UC-ET020-24B, UC-ET030-24B
4	Power LED indicator	Indicates the power status of the module
5	Input LED indicator	LED indicator is ON during input.
6	DIN rail clip	Secures the DIN rail
7	External module port	Connects the modules
8	Label	Nameplate

● **AS32AN02T-A**
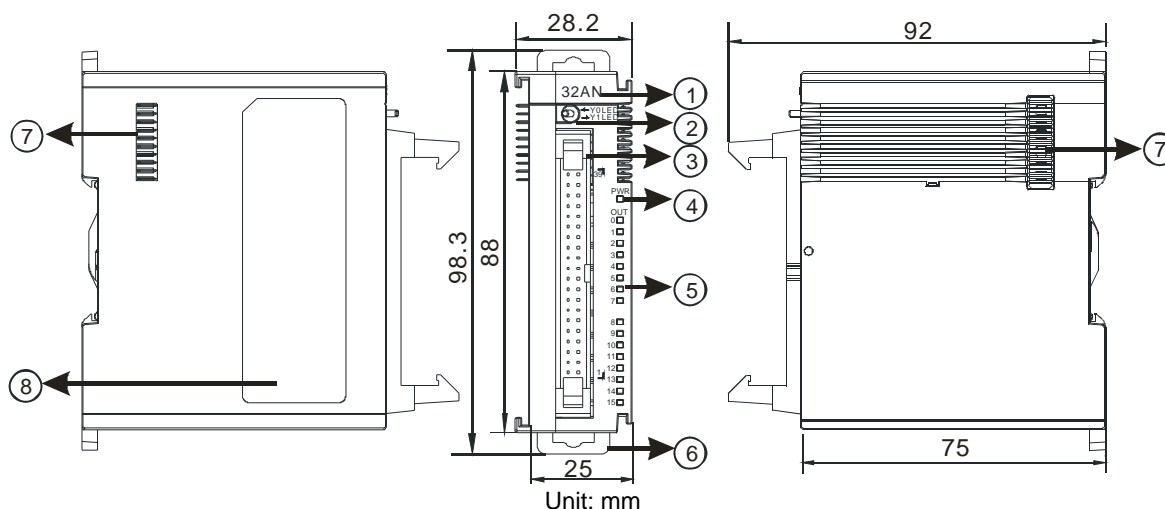
Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	Y0/Y1 LED indicator switch	Switches the LED indicators to their represented outputs.
3	MIL connector	For the external I/O connecting cables UC-ET010-24D, UC-ET020-24D, UC-ET030-24D
4	Power LED indicator	Indicates the power status of the module
5	Output LED indicator	LED indicator is ON during output.
6	DIN rail clip	Secures the DIN rail
7	External module port	Connects the modules
8	Label	Nameplate

- **AS64AM10N-A**
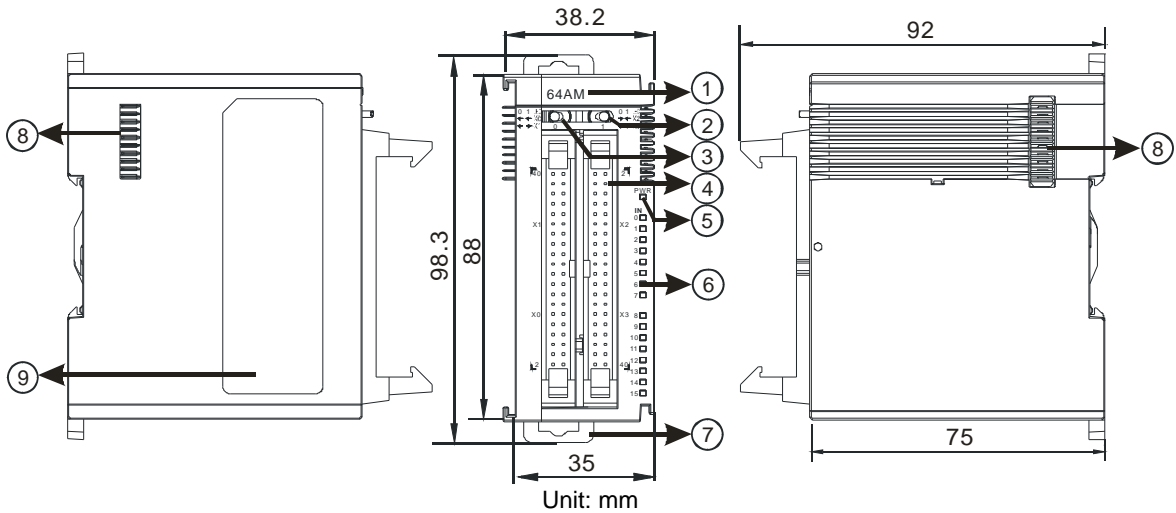
Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	LED indicator switch 1	Switches the LED indicators to their represented inputs.
3	LED indicator switch 2	Switches the LED indicators to their represented inputs.
4	MIL connector	For the external I/O connecting cables UC-ET010-24B, UC-ET020-24B, UC-ET030-24B
5	Power LED indicator	Indicates 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	Secures the DIN rail
8	External module port	Connects the modules
9	Label	Nameplate

● **AS64AN02T-A**
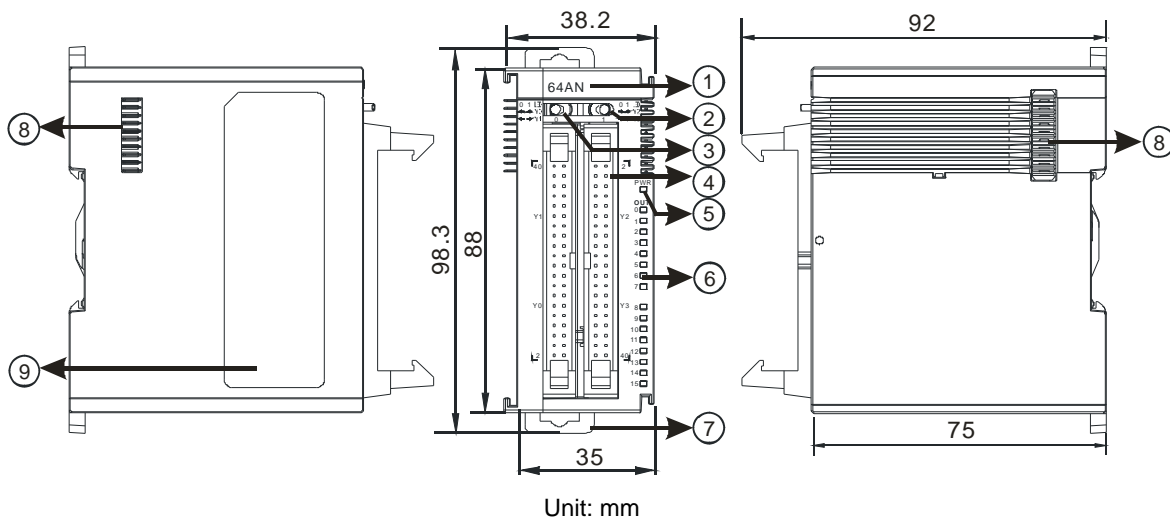
Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	LED indicator switch 1	Switches the LED indicators to their represented outputs.
3	LED indicator switch 2	Switches the LED indicators to their represented outputs.
4	MIL connector	For the external I/O connecting cables UC-ET010-24D, UC-ET020-24D, UC-ET030-24D
5	Power LED indicator	Indicates 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	Secures the DIN rail
8	External module port	Connects the modules
9	Label	Nameplate

● **MIL connector, extension cable, and wiring modules**

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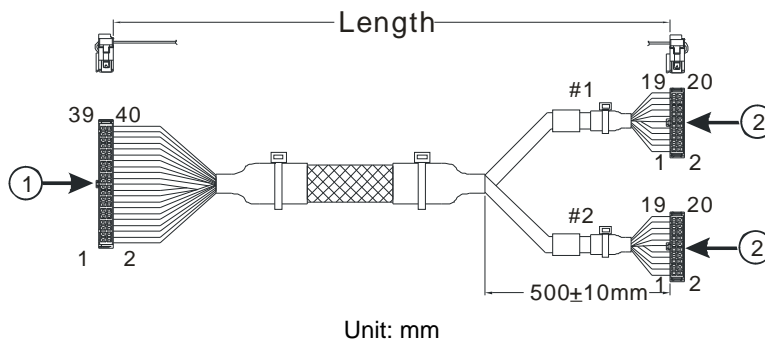
Unit: mm

Number	Name	Description
1	IDC 40-pin terminal	Connects a digital input/output module and an external terminal module.
2	IDC 20-pin terminal	Connects 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)
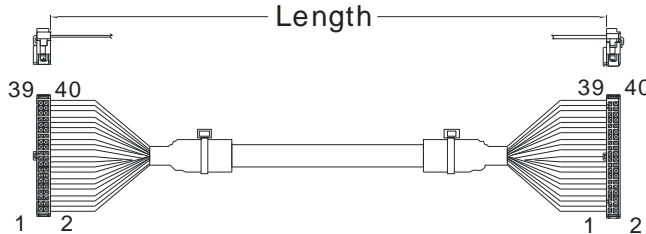
Number	Name	Description
1	IDC 40-pin terminal	Connects an external terminal module and a wiring module UB-10-ID32A, and UB-10-OT32A

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

◆ UB-10-ID16A
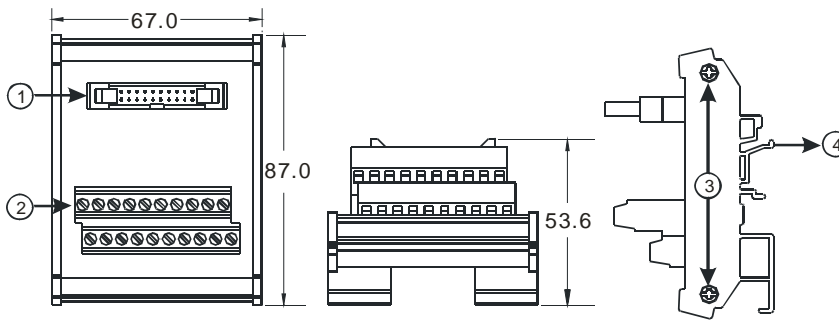
Unit: mm

◆ UB-10-ID32A
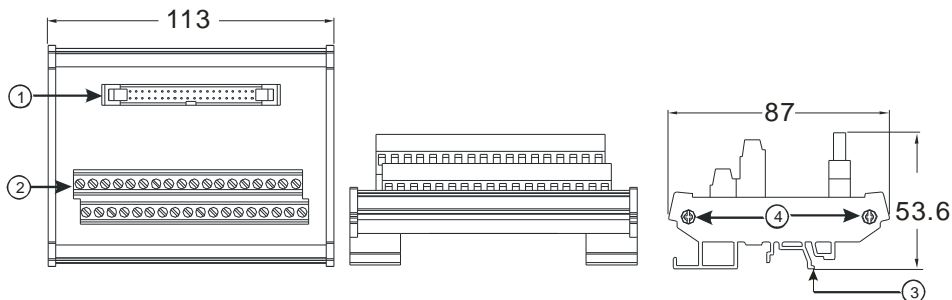
Unit: mm

Number	Name	Description
1	UB-10-ID16A: 20-pin MIL connector UB-10-ID32A: 40-pin MIL connector	Connects the external terminal module and a wiring module
2	Terminals	Input/Output terminals for wiring
3	Clip	Hangs the external terminal module on a DIN rail
4	Set screw	Fixes 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
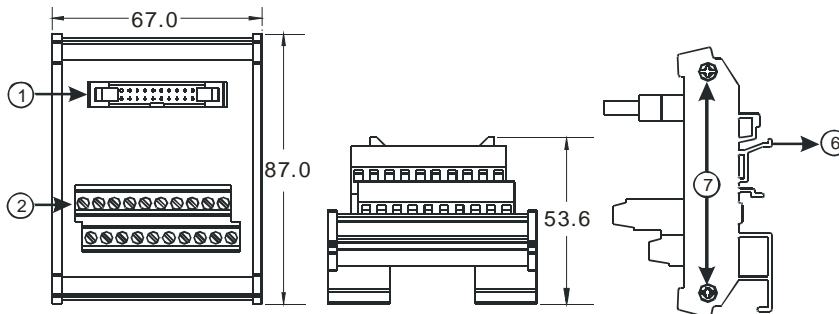
Unit: mm

◆ UB-10-OR16A
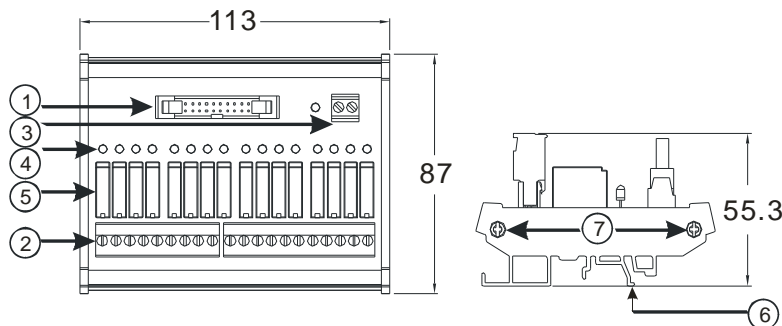
Unit: mm

◆ UB-10-OT32A
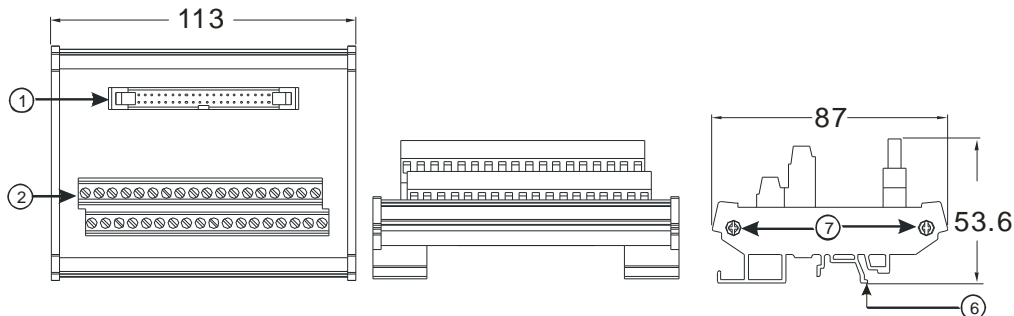
Unit: mm
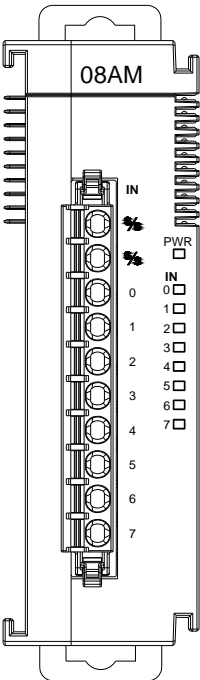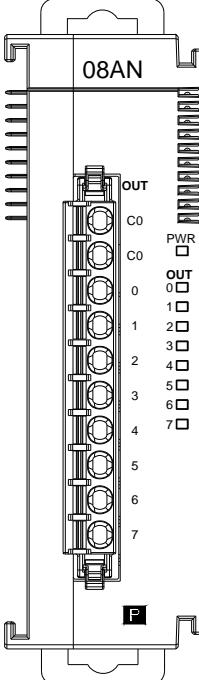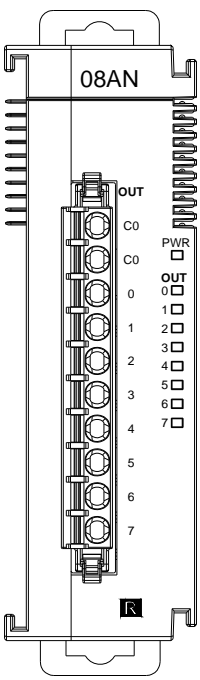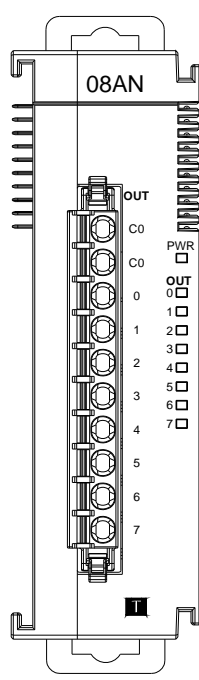
Number	Name	Description
1	UB-10- ID16A /OR16A: 20-pin MIL connector UB-10-OT32A: 40-pin MIL connector	Connects the external terminal module and a wiring module
2	Terminals	Input/Output terminals for wiring
3	2-pin power input terminal	Power input terminal for wiring
4	Output LED indicator	LED indicator is ON during output.
5	Relay output	Relay output
6	Clip	Hangs the external terminal module on a DIN rail
7	Set screw	Fixes the base

● **Spring clamp/MIL connector terminal block UB-10-IO32D for AS32AM10N-A/AS32AN02T-A**
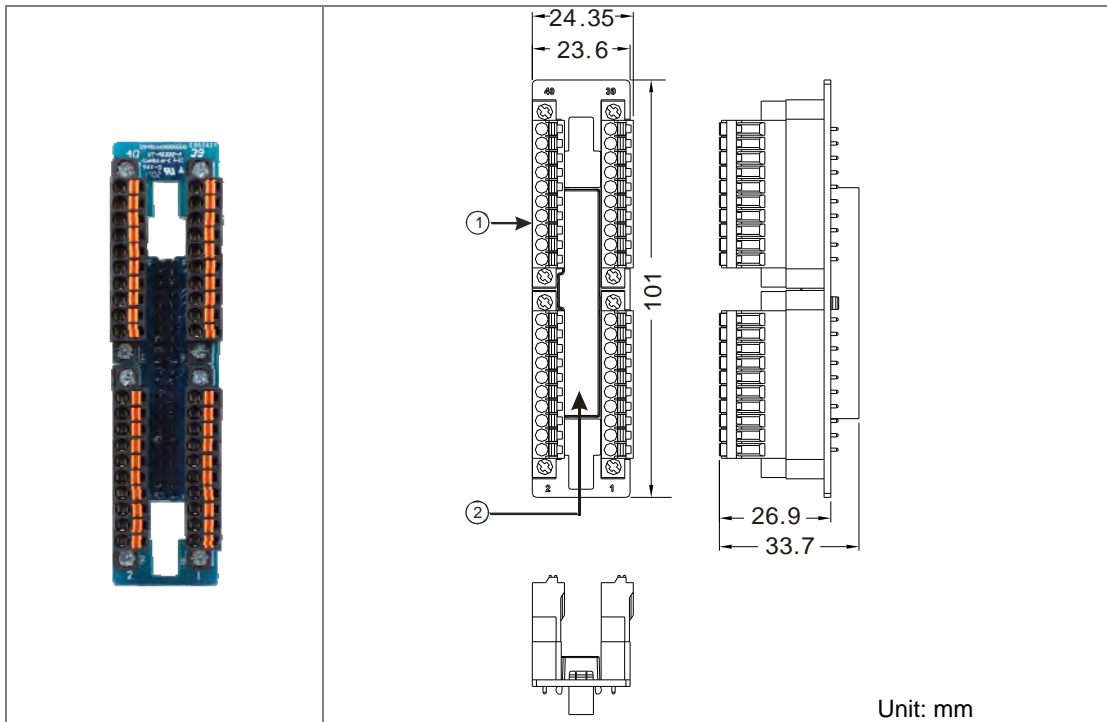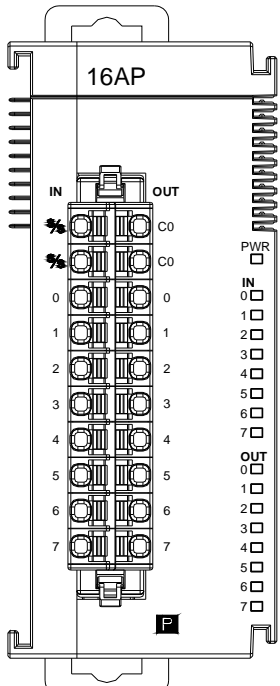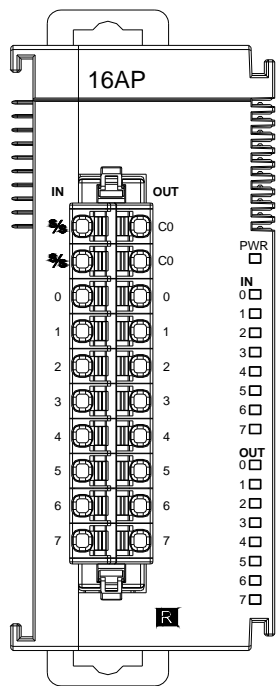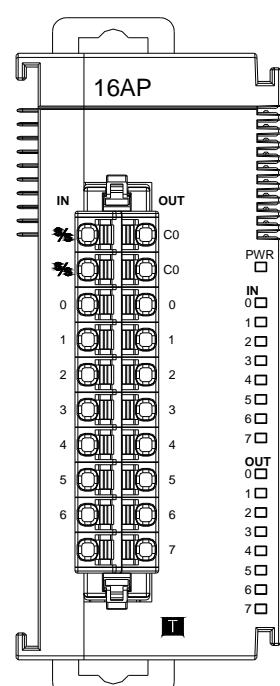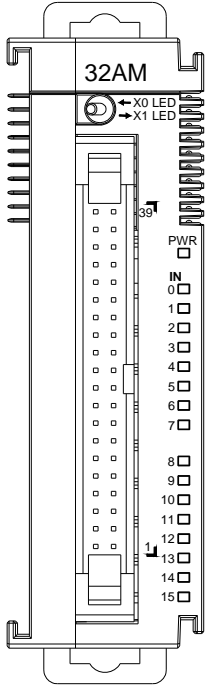
Unit: mm

Number	Name	Description
1	Terminal block for output	Terminal block
2	40-pin MIL connector	Connects the module and the wiring module

3.4.3 Digital Input/Output Module Terminals

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

AS16AM10N-A	AS16AN01P-A
16AM	16AN
AS16AN01R-A	AS16AN01T-A
16AN	16AN

AS16AP11P-A	AS16AP11R-A

AS16AP11T-A	AS32AM10N-A		
		-	-
		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	-	-

● **MIL connector and the wiring module**

1. AS32AM10N-A/AS64AM10N-A

◆ The wiring module: UB-10-ID16A
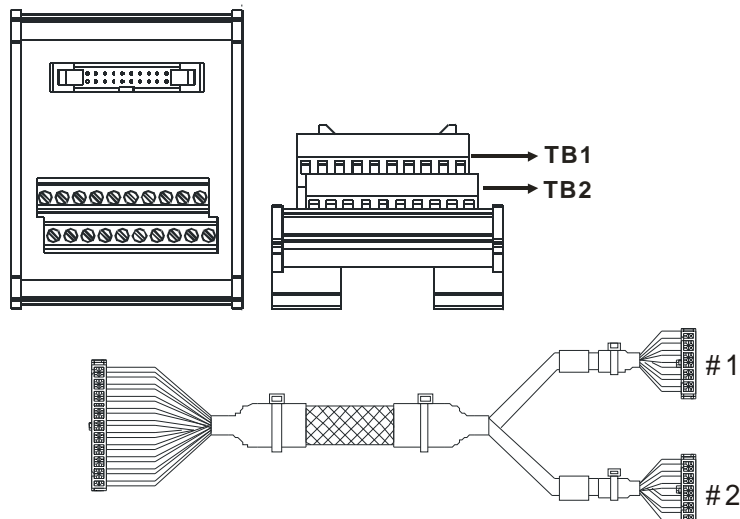
AS32AM10N-A/ AS64AM10N-A											
#2	TB1	X0.0	X0.2	X0.4	X0.6	X0.8	X0.10	X0.12	X0.14	S/S	-
	TB2	X0.1	X0.3	X0.5	X0.7	X0.9	X0.11	X0.13	X0.15	S/S	-

◆ The wiring module: UB-10-ID32A
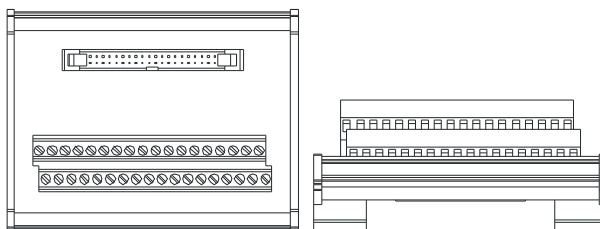
Terminals:

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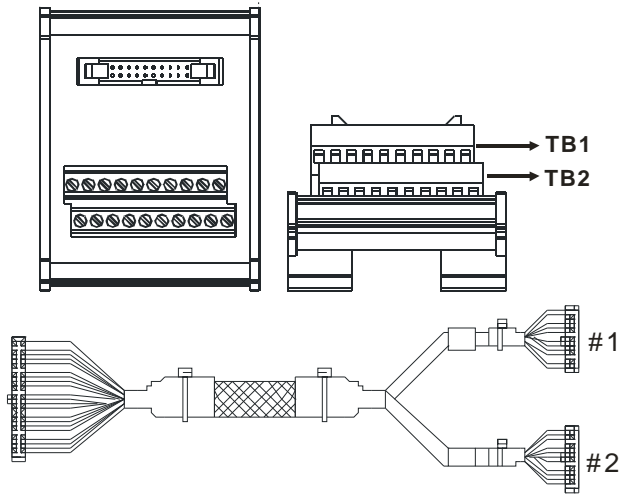
		AS332T-A									
#1	TB1	Y0.0	Y0.2	Y0.4	Y0.6	Y0.8	Y0.10	Y0.12	Y0.14	C0	-
	TB2	Y0.1	Y0.3	Y0.5	Y0.7	Y0.9	Y0.11	Y0.13	Y0.15	C0	-

◆ UB-10-OT32A
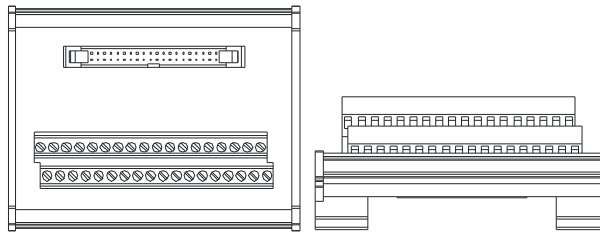
Terminals:

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
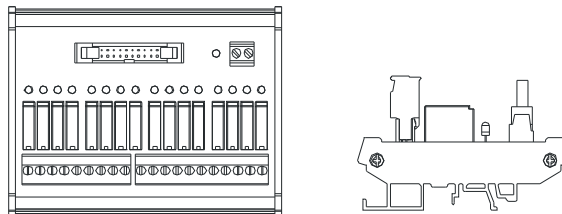
Terminals:

																		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. AS32AM10N-A/AS32AN02T-A and the wiring modules:

◆ UB-10-IO32D
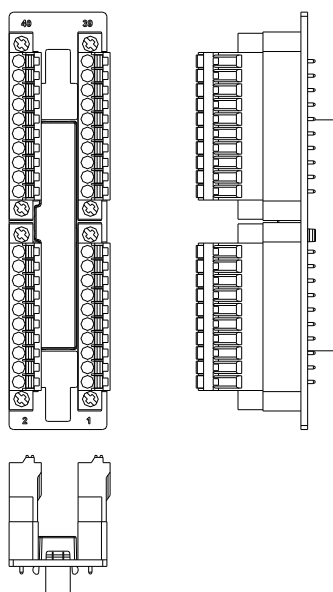
3.5 Analog Input/Output Module Specifications

3.5.1 General Specifications

● **AS04AD-A**

Electrical specifications

Module name	AS04AD-A
Number of inputs	Four
Analog-to-digital conversion	Voltage input/Current input
Supply voltage	24 VDC (20.4 VDC–28.8 VDC) (-15% to +20%)
Connector type	Removable terminal block
Conversion time	2 ms/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
Weight	145g

Functional specifications

Analog-to-digital conversion	Voltage input				
Rated input range	-10 V to +10 V	0 V–10 V	±5 V	0 V–5 V	1 V–5 V
Hardware input range	-10.1 V to +10.1 V	-0.1 V to +10.1 V	-5.05 V to +5.05 V	-0.05 V to +5.05 V	0.95 V–5.05 V
Error rate (Room temperature)	±0.2%				
Error rate (Full temperature range)	±0. 5%				
Linearity error (Room temperature)	±0.02%				
Linearity error (Full temperature range)	±0.06%				
Hardware resolution	16 bits				
Input impedance	1 MΩ				
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 to +20.2 mA	-0.2 mA to +20.2 mA	3.8 mA–20.2 mA
Error rate (Room temperature)	±0.2%		
Error rate (Full temperature range)	±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		

● **AS08AD-B**

Electrical specifications

Module name	AS08AD-B
Number of inputs	Eight
Analog-to-digital conversion	Voltage input
Supply voltage	24 VDC (20.4 VDC–28.8 VDC) (-15% to +20%)
Connector type	Removable terminal block
Conversion time	2 ms/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
Weight	145g

Functional specifications

Analog-to-digital conversion	Voltage input				
Rated input range	-10 V to +10 V	0 V–10 V	±5 V	0 V–5 V	1 V–5 V
Hardware input range	-10.1 V to +10.1 V	-0.1 V to +10.1 V	-5.05 V to +5.05 V	-0.05 V to +5.05 V	0.95 V–5.05 V
Error rate (Room temperature)	±0.2%				
Error rate (Full temperature range)	±0. 5%				
Linearity error (Room temperature)	±0.02%				
Linearity error (Full temperature range)	±0.06%				
Hardware resolution	16 bits				
Input impedance	1 MΩ				
Absolute input range	±15 V				

● **AS08AD-C**

Electrical specifications

Module name	AS08AD-C
Number of inputs	Eight
Analog-to-digital conversion	Current input
Supply voltage	24 VDC (20.4 VDC–28.8 VDC) (-15% to +20%)
Connector type	Removable terminal block
Conversion time	2 ms/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
Weight	145g

Functional specifications

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 to +20.2 mA	-0.2 mA to +20.2 mA	3.8 mA–20.2 mA
Error rate (Room temperature)	±0.2%		
Error rate (Full temperature range)	±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 outputs	Four
Analog-to-digital conversion	Voltage output/Current output
Supply voltage	24 VDC (20.4 VDC–28.8 VDC) (-15%–+20%)
Connector type	Removable terminal block
Conversion time	2 ms/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 output				
Rated output range	±10 V	0 V–10 V	±5 V	0 V–5 V	1 V–5 V
Hardware output range	-10.1V to +10.1V	-0.1V to +10.1V	-5.05V to +5.05V	-0.05V to +5.05V	0.95V–5.05V
Error rate (Room temperature)	±0.2%				
Error rate (Full temperature range)	±0. 5%				
Linearity error (Room temperature)	±0.05%				
Linearity error (Full temperature range)	±0.05%				
Hardware resolution	12 bits				
Input impedance	1 kΩ–2 MΩ at ±10 V and 0 V–10 V				
Absolute input range	≧500 Ω at 1 V–5 V				

Analog-to-digital conversion	Current output	
Rated output range	0 mA–20 mA	4 mA–20 mA
Hardware output range	-0.2 mA to +20.2 mA	3.8 mA–20.2 mA
Error rate (Room temperature)	±0.2%	

Analog-to-digital conversion	Current output
Error rate (Full temperature range)	±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: four; Outputs: two
Analog-to-digital conversion	Voltage input/Current input; Voltage output/Current output;
Supply voltage	24 VDC (20.4 VDC–28.8 VDC) (-15% to +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 to +10V	0V–10V	±5V	0V–5V	1V–5V
Hardware input range	-10.1V to +10.1V	-0.1V to +10.1V	-5.05V to +5.05V	-0.05 V to +5.05 V	0.95V–5.05V
Error rate (Room temperature)	±0.2%				
Error rate (Full temperature range)	±0. 5%				
Linearity error (Room temperature)	±0.02%				
Linearity error (Full temperature range)	±0.06%				
Hardware resolution	16 bits				
Input impedance	1 MΩ				

Analog-to-digital conversion	Voltage input		
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
Error rate (Room temperature)	±0.2%		
Error rate (Full temperature range)	±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 to +10.1V	-0.1V to +10.1V	-5.05V to +5.05V	-0.05 V to +5.05 V	0.95V–5.05V
Error rate (Room temperature)	±0.2%				
Error rate (Full temperature range)	±0. 5%				
Linearity error (Room temperature)	±0.05%				
Linearity error (Full temperature range)	±0.05%				
Hardware resolution	12 bits				
Input impedance	1 kΩ–2 MΩ at ±10 V and 0 V–10 V				
Absolute input range	≧500 Ω at 1 V–5 V				

Analog-to-digital conversion	Current input	
Rated input range	0 mA–20 mA	4 mA–20 mA
Hardware input range	-0.2 mA to +20.2 mA	3.8 mA–20.2 mA
Error rate (Room	±0.2%	

Analog-to-digital conversion	Current input
temperature)	
Error rate (Full temperature range)	±0.5%
Linearity error (Room temperature) (Full temperature range)	±0.03%
Linearity error	±0.10%
Hardware resolution	12 bits
Input impedance	≦550 Ω

3.5.2 Analog Input/Output Module Profiles

● **AS04AD-A/AS08AD-B/AS08AD-C/AS04DA-A/AS06XA-A**

Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	POWER LED indicator	Indicates 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 minor error occurs in the module.
	Analog to digital conversion indicator	Indicates 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 to be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals

Number	Name	Description
5	Terminal block clip	Removal of the terminal block
6	DIN rail clip	Secures the module onto the DIN rail
7	Module connecting set	Connects the modules
8	Ground clip	
9	Label	Nameplate

3.5.3 Analog Input/Output Terminals

AS04AD-A	AS08AD-B	AS08AD-C

AS04DA-A	AS06XA-A
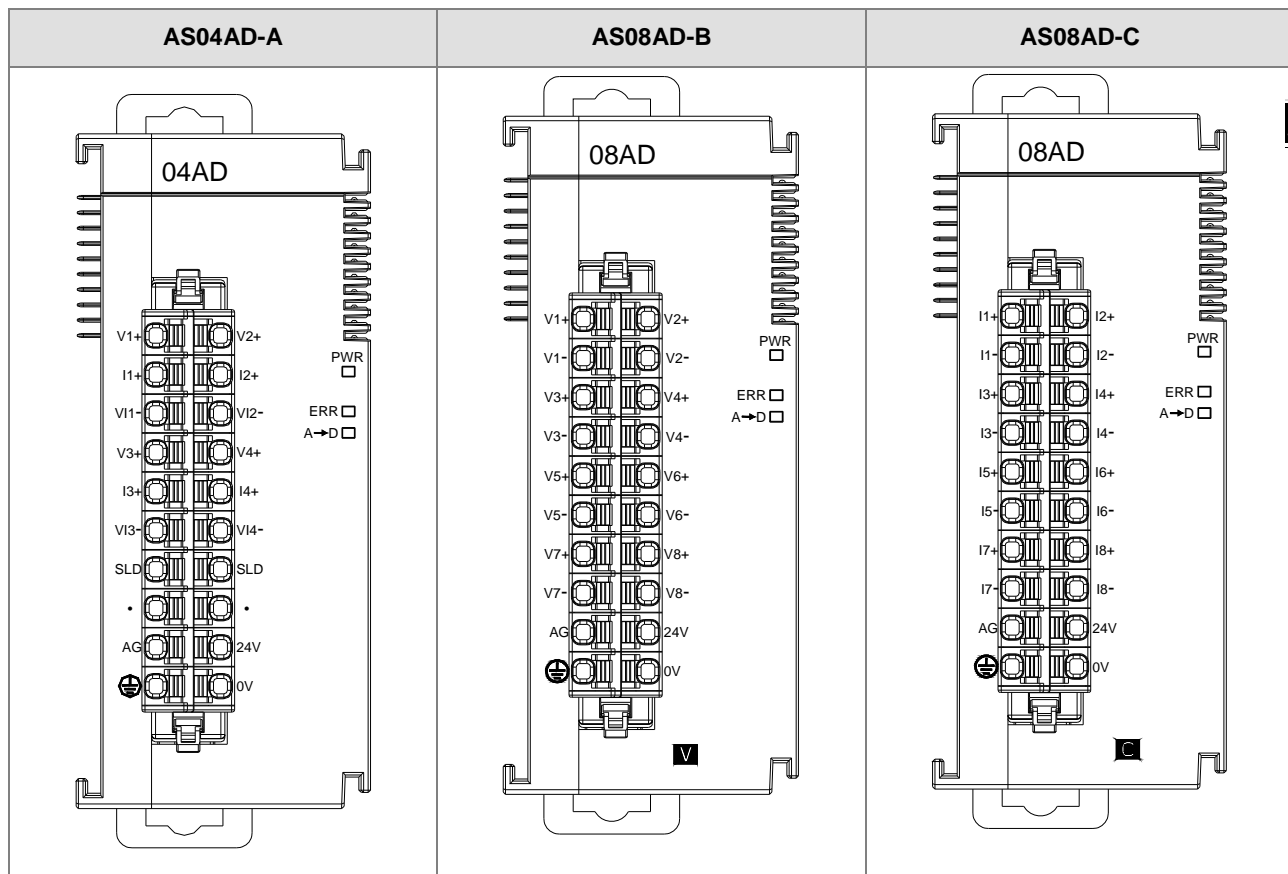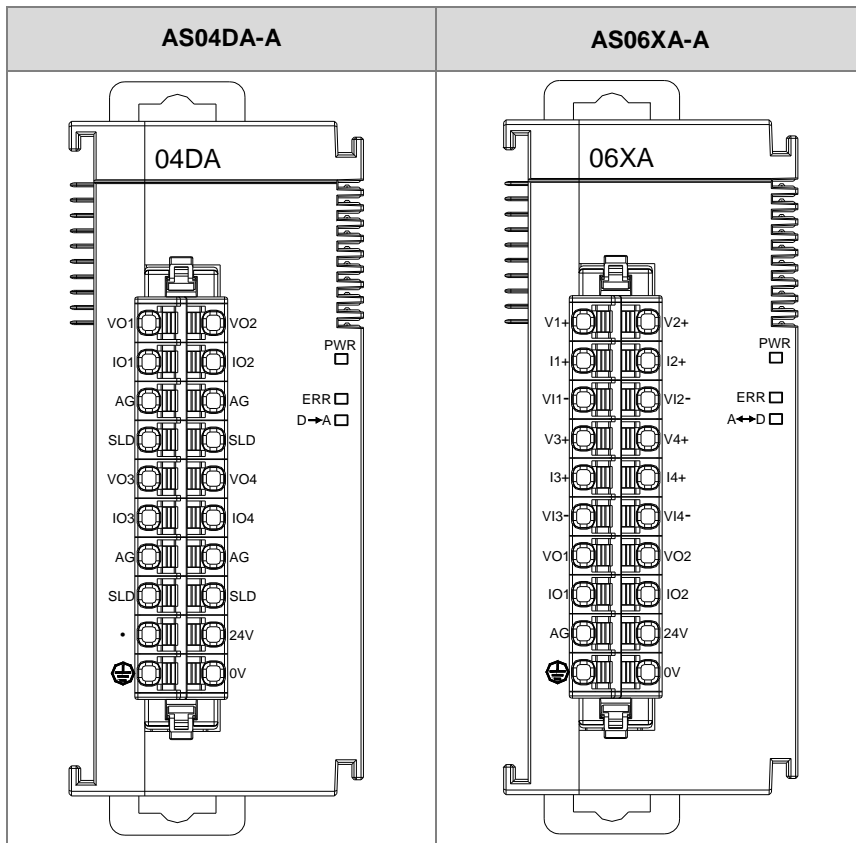
3.6 Temperature Measurement Module Specifications

3.6.1 General Specifications

● **AS04RTD-A / AS06RTD-A**

Electrical specifications

Number of analog inputs	AS04RTD-A: four ; AS06RTD-A: six
Applicable sensor	2-WIRE & 3-WIRE Pt100/Ni100/Pt1000/Ni1000/ JPt100/LG-Ni1000/Cu50/Cu100/0–300 Ω/0–3000 Ω Pt100：DIN 43760-1980 JIS C1604-1989；100 Ω 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% to +20%)
Connector type	Removable terminal block
Overall accuracy	Pt100/Ni100/Pt1000/Ni1000/JPt100	25°C/77°F: The error is ±0.1% of the input within the range. -20 to +60°C/-4 to +140°F: The error is ±0.5% of the input within the range.

	LG-Ni1000	25°C/77°F: The error is ±0.2% 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	Two-wire/three-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	
Weight	AS04RTD-A: 115g ; AS06RTD-A: 125g	

Functional specifications

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

● **AS04TC-A / AS08TC-A**

Electrical specifications

Number of analog inputs	AS04TC-A: four ; AS08TC-A: eight
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% to +20%)
Connector type	Removable terminal block
Overall accuracy	25°C/77°F: The error is ±0.5% of the input within the range. -20 to +60°C/-4 to +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
Weight	AS04TC-A: 115g ; AS08TC-A: 125g

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 Temperature Measurement Module Profiles

● **AS04RTD-A / AS06RTD-A**

Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	POWER LED indicator	Indicates 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 minor error occurs in the module.
	Analog to digital conversion indicator	Indicates 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 to be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Terminal block clip	Removal of the terminal block
6	DIN rail clip	Secures the module onto the DIN rail

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

● **AS04TC-A / AS08TC-A**

Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	POWER LED indicator	Indicates 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 minor error occurs in the module.
	Analog to digital conversion indicator	Indicates 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 to be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Terminal block clip	Removal of the terminal block
6	DIN rail clip	Secures the module onto the DIN rail
7	Module connecting set	Connects the modules
8	Ground clip	
9	Label	Nameplate

3.6.3 Temperature Measurement Module Dimensions

AS04RTD-A	AS04TC-A

AS06RTD-A	AS08TC-A

Unit: mm

3.7 Positioning Module Specifications

3.7.1 General Specifications

Electrical specifications for the inputs

- **AS02PU-A**

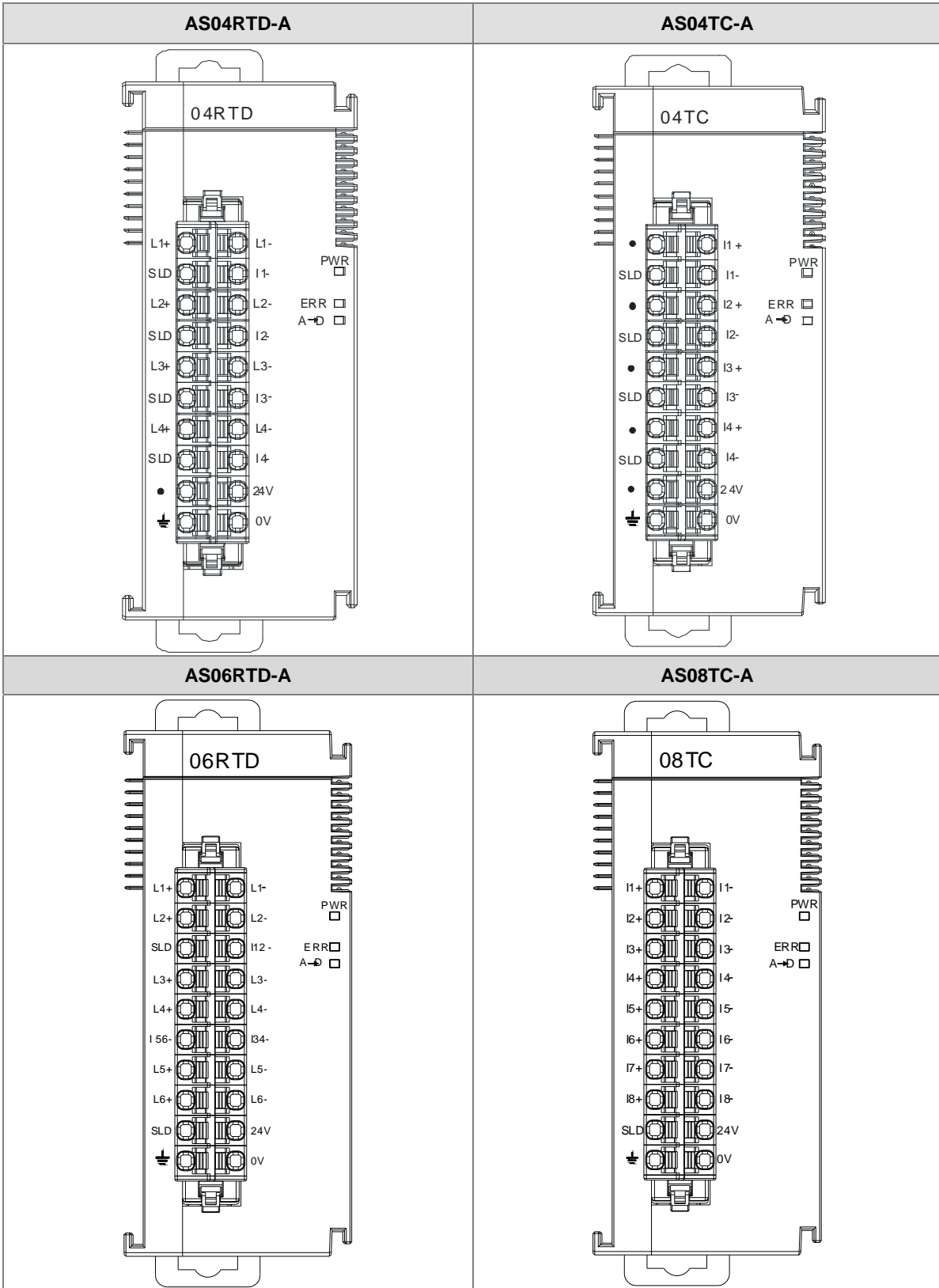| Item \ Model		Differential inputs on both ends	24VDC COM on one end
Number of inputs		3 (A+/B+/Z+/A-/B-/Z-)	5 (X0.0-X0.4)
Connector type		Removable terminal blocks	
Input type		Digital input	
Input form		Connected by an independent terminal	Direct current (sinking or sourcing)
Input current		5-24 VDC, 5 mA	24 VDC, 5 mA
Action level	OFF→ON	-	>15 VDC
	ON→OFF	-	<5 VDC
Response time		2.5 µs	< 0.5 ms
Maximum input frequency		200 KHz	1 KHz
Input impedance		4.7 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.	
Weight		120g	

- **AS04PU-A**

Item \ Model		AS04PU-A
Number of inputs		Six
Connector type		Removable terminal blocks
Input type		Digital input
Input form		Direct current (sinking or sourcing)
Input current		24 VDC, 5 mA
Action level	OFF→ON	>15 VDC
	ON→OFF	<5 VDC
Response time		< 0.5 ms
Maximum input frequency		1 KHz
Input impedance		4.7 kΩ

Model Item	AS04PU-A
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.
Weight	120g

Electrical specifications for the outputs

Model Item		AS02PU-A	AS04PU-A
Number of inputs		Four	Eight
Connector type		Removable terminal blocks	
Output form		differential output	Transistor-T (sinking) (NPN)
Output current		5 VDC, 20 mA	5-30 VDC, 0.1A
Maximum load	Resistance	20 mA	0.1A
	Inductance	N/A	
	Bulb	N/A	
Maximum output frequency[1]	Resistance	200 KHz	100 KHz
	Inductance	N/A	
	Bulb	N/A	
Maximum Response time	OFF→ON	2.5 µs	5 µs
Weight		120 g	

3.7.2 Positioning Module Profiles

● **AS02PU-A / AS04PU-A**

Number	Name	Description
1	Model name	Model name of the module
2	POWER LED indicator	Indicates the status of the power supply ON: the power is on OFF: no power
	Run LED indicator	Operating status of the module ON: the module is running. OFF: the module is stopped. Blinking: the module is detecting an error.
	Error LED indicator	Error status of the module ON: a serious error occurs in the module. OFF: the module is normal. Blinking: a minor error occurs in the module.
3	Removable terminal block	The inputs are connected to sensors. The outputs are connected to loads to be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Terminal block clip	Removal of the terminal block
6	DIN rail clip	Secures the module onto the DIN rail
7	Module connecting set	Connects the modules
8	Ground clip	
9	Label	Nameplate

3.7.3 Positioning Module Terminals

AS02PU-A	AS04PU-A
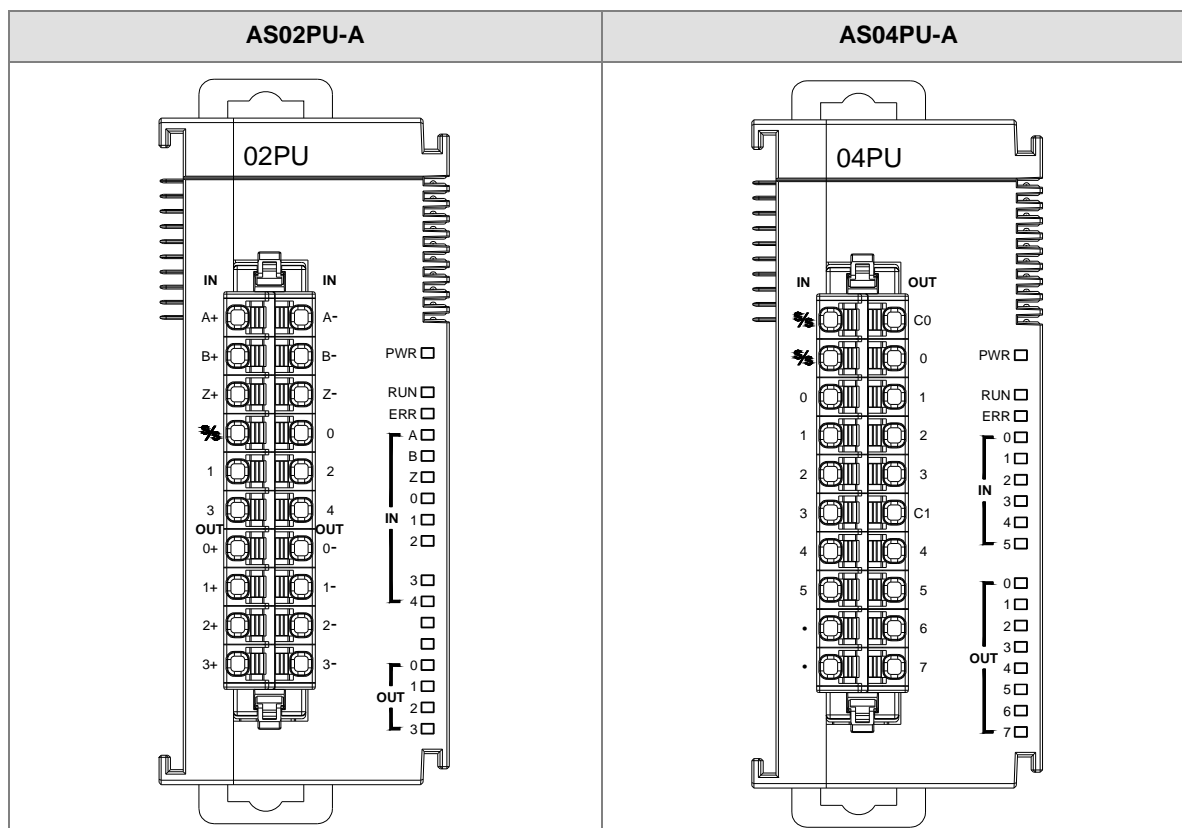
3.8 Network Module Specifications

3.8.1 General Specifications

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

Item	Specifications
Connector type	European-style terminal block, spring-clamp terminal 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

- **CAN communication interface**

Item	Specifications
Connector type	RJ-45
Transmission speed	10K, 20K, 50K, 125K, 250K, 500K, 1000 Kbps
Communication protocol	AS special remote mode (for RTU mode) CANopen (available for models with firmware V2.0 or later)

- **Ethernet communication interface**

Item	Specifications
Connector type	RJ-45
Transmission speed	10M, 100 Mbps
Communication protocol	MODBUS TCP, EtherNet/IP (available for models with firmware V2.02 or later)

- **Electrical specifications**

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

3.8.2 Network Module Profiles

● **AS00SCM-A**

Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	POWER LED indicator	Indicates 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/AS-FEN02
	Slot for function card 2	Available for AS-F232/AS-F422/AS-F485/AS-FCOPM AS-FEN02 (only for RTU mode)
5	Mode switch	COM: communication mode ; RTU: remote control mode
6	DIN rail clip	Secures the module onto the DIN rail
7	Module connecting set	Connects the modules
8	Ground clip	
9	Label	Nameplate
10	Input for supplying power to remote modules	Power supply for the remote module

● **AS01DNET-A**

Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	State LED indicator	**Master/slave mode:** ● **NS LED** **OFF:** no power or duplicate ID check has not been completed. **Green light blinking every 0.5 seconds:** the connection to the DeviceNet network failed. **Green light ON**: online; the connection to the DeviceNet network is normal. **Red light blinking every 0.5 seconds:** communication error **Red light ON:** Network trouble, duplicate node ID, no network power or Bus-OFF. ● **MS LED** **OFF:** no power **Green light blinking every 0.5 seconds:** no module is configured. **Green light ON**: input and output data are normal. **Red light blinking every 0.5 seconds:** when AS01DNET works as the master, the slave in Scan List can not work normally. When AS01DNET works as the slave, an error occurs in the configuration. **Red light ON:** hardware error ● **Combination of NS LED and MS LED** **NS LED OFF & MS LED OFF:** no power **NS LED OFF & MS LED green light ON:** duplicate ID check has not been completed. **NS LED red light ON & MS LED green light ON**: duplicate ID check failed or Bus-OFF. **NS LED red light ON & MS LED red light blinking every 0.5 seconds:** no network power **NS LED red light ON & MS LED red light ON:** hardware error

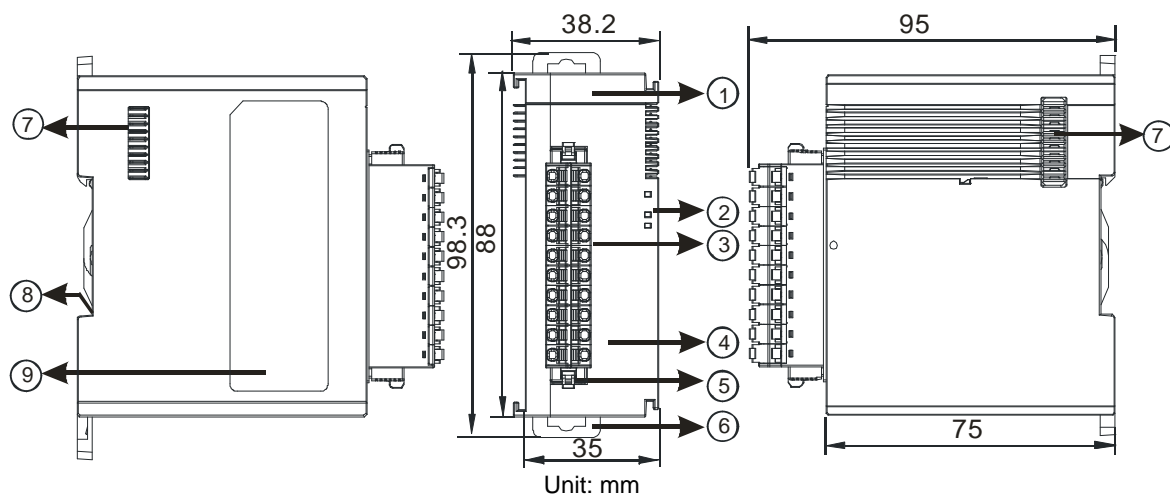| Number	Name	Description
		RTU mode:
		● **NS LED**
		OFF: no power or duplicate ID check has not been completed.
		Green light blinking every 0.5 seconds: the connection to the DeviceNet network failed.
		Green light ON: online; the connection to the DeviceNet network is normal.
		Red light blinking every 0.5 seconds: I/O connection timeout between AS01DNET (RTU) and DeviceNet master
		Red light ON: Network trouble, duplicate node ID, no network power or Bus-OFF.
		● **MS LED**
		OFF: no power
		Green light blinking every 0.5 seconds:
		- AS01DNET (RTU) is waiting for the I/O data from DeviceNet master.
		- No I/O data transmission between AS01DNET(RTU) and DeviceNet master
		- The PLC connected to DeviceNet master is in STOP state.
		Green light ON: normal transmission of I/O data between AS01DNET (RTU) and DeviceNet master
		Red light blinking every 0.5 seconds: no network power supply; configuration error; module alarms.
		Red light ON: hardware error
3	Address switch	Setting up the address
4	Function switch	Setting up the funcitons, including the work mode and baud rate of DeviceNet network
5	DeviceNet communication port	Connects the modules via DeviceNet communication. Use AS01DNET-A connector for wiring.
6	Mode switch (RTU/DNET; Master/Slave)	Master/Slave mode: the port does not need an external 24VDC power supply connected. RTU mode: the power input port of the network module is required to connect an external 24VDC power supply only. You can connect
7	Left-side extension port	Connects the modules
8	Label	Nameplate
9	Right-side extension port	Connects the modules
10	Input for supplying power to remote modules	Power supply for the remote module

3.9 Load Cell Module Specifications

3.9.1 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	Four-wire or six-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

3.9.2 Load Cell Module Profiles

● **AS02LC-A**

Unit: mm

Number	Name	Description
1	Model name	Model name of the module
2	POWER LED indicator	Indicates the status of the power supply ON: the power is on OFF: no power
2	ERROR LED indicator	Error status of the module ON: a serious error occurs in the module. OFF: the module is normal. Blinking: a minor error occurs in the module.
	Analog to digital conversion indicator	Indicates 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 to be driven.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Terminal block clip	Removal of the terminal block
6	DIN rail clip	Secures the module onto the DIN rail
7	Module connecting set	Connects the modules
8	Ground clip	
9	Label	Nameplate

3.9.3 Load Cell Module Dimensions
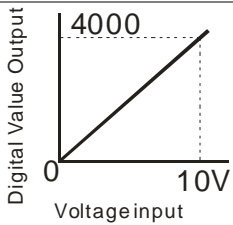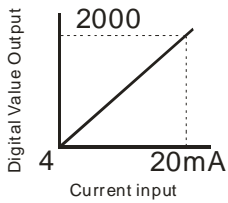
● **AS02LC-A**

Unit: mm
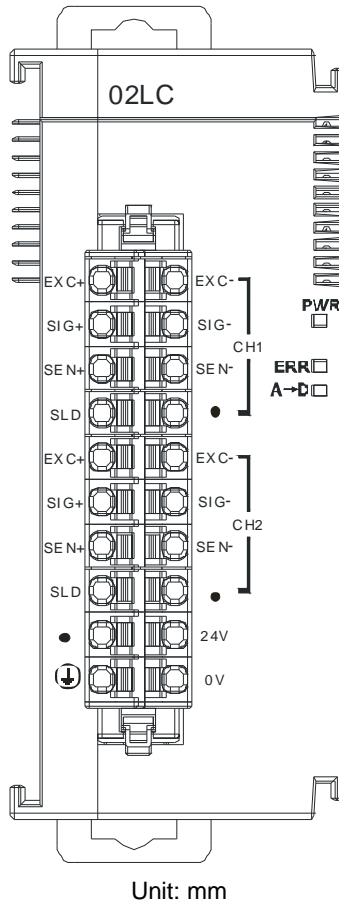
3.10 Extension Card Specifications
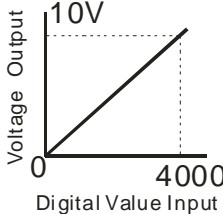
3.10.1 General Specifications

- **AS-F2AD**
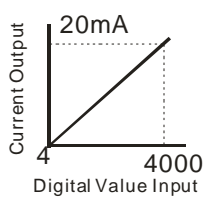
Two analog signal input channels:

Item	Voltage Input	Current input
Analog Signal	DC 0–10 V	DC 4–20 mA
Resolution	12-bit	11-bit
Input impedance	≧1 MΩ	250 Ω
Conversion time	3 ms / CH	
Characteristic curve		
Digital value output Card1	SR168 (CH1)	SR169 (CH2)
Card2	SR170 (CH1)	SR171 (CH2)

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

- **AS-F2DA**

Two analog signal output channels:

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

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

● **AS-F232**

The AS series PLC is built with COM1 (RS-485), and COM2 (RS-485). You can use this extension card for communication with different interfaces such as RS-232 and a PC. The Communication functions are the same as the built-in ones. You can set the communication port as a slave or a master node. After installing the extension card, go to the HWCONFIG in the ISPSoft for communication setup.

■ Wiring example
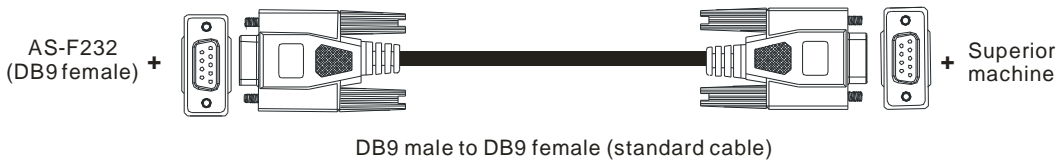
AS-F232 (DB9 female) + ... + Superior machine

DB9 male to DB9 female (standard cable)

● **AS-FCOPM**

With its own standalone communication port, the module can work independently and can be set as a slave or a master node. After installing the extension card, go to the HWCONFIG in ISPSoft to set up the communication.

■ Wiring example

● **AS-F422**

You can use this extension card for communication with Delta HMI series or other devices through the RS-422 communication port.   The Communication functions are the same as the built-in ones. You can set the communication port as a slave or a master node. After installing the extension card, go to the HWCONFIG in ISPSoft to set up communication.

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

AS-F422		Delta HMI DOPA series	
1	R+	Tx+	3 6 **RTS-**
2	R-	Tx-	4 7 **RTS+**
3	T+	Rx+	2 8
4	T-	Rx-	1 9 **CTS+**
			CTS-

COM2/DB-9

● **AS-F485**

With its own standalone communication port, the module can work independently and can be set as a slave or a master node. After installing the extension card, go to the HWCONFIG in ISPSoft to set up communication.

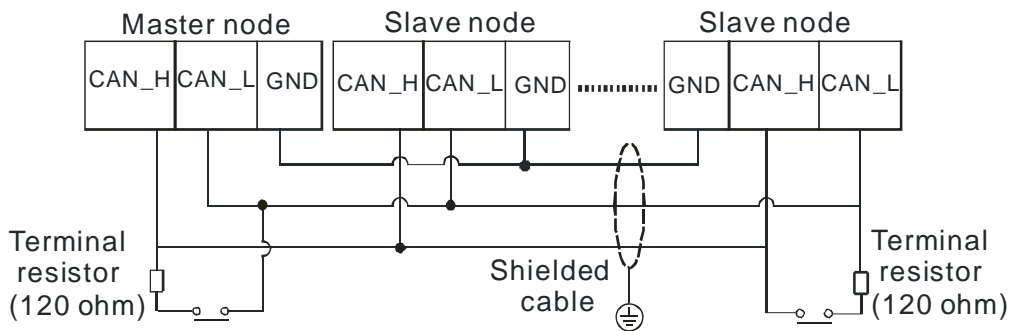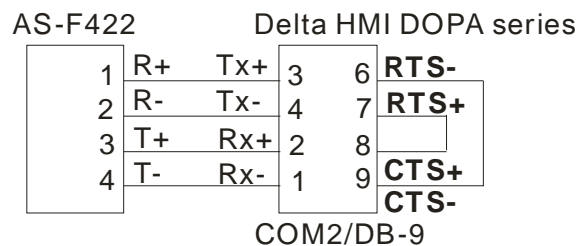■ Wiring example
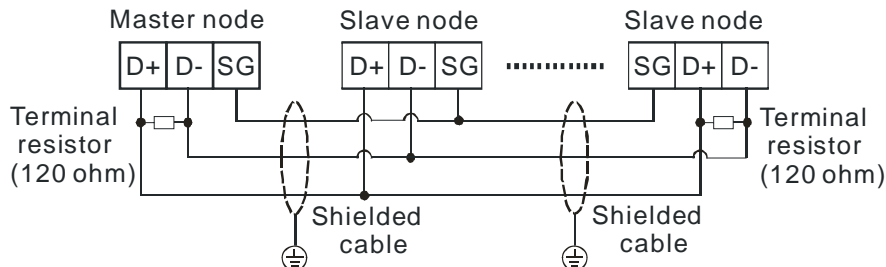
● **AS-FCOPM**

With its own standalone communication port, the module can work independently and can be set as a MODBUS TCP server, Client or EtherNet/IP Adapter. After installing the extension card, go to the HWCONFIG in ISPSoft to set up the communication.

■ Wiring example

● **Linear Topology**
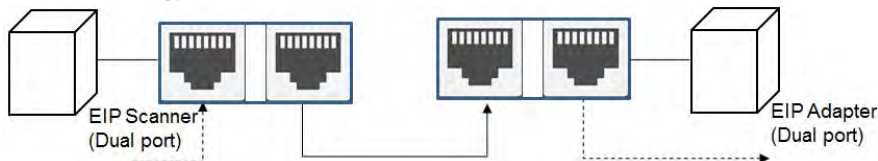
● **Star Topology**
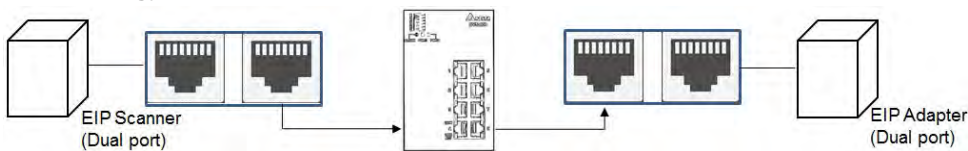
● **Ring Topology**

A DLR function is required to create a ring topology.

When a switch is needed for topology, the switch should support the DLR function. If not, the connection might fail.
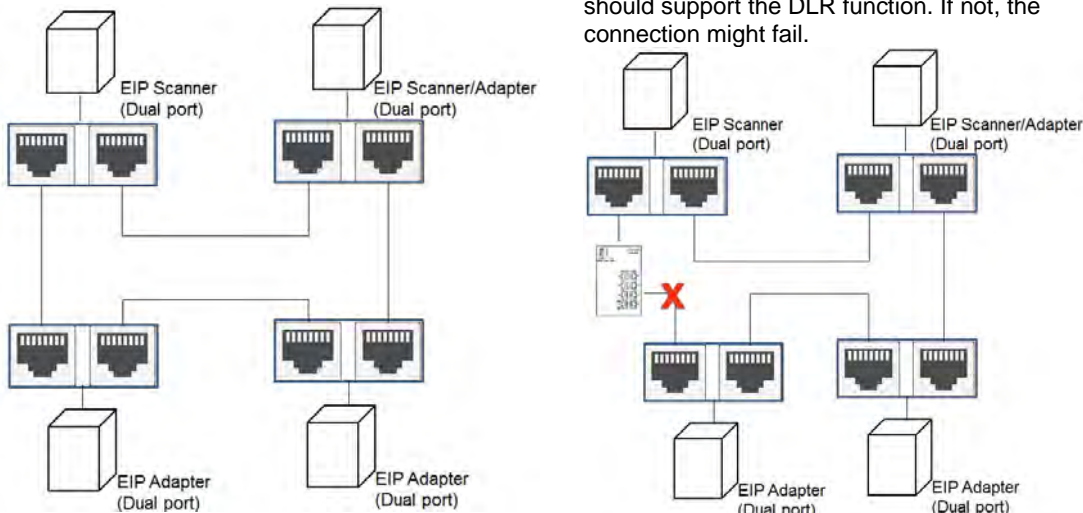
3.10.2 Extension Card Profiles

● **AS-F2AD/AS-F2DA/AS-F422/AS-F485**
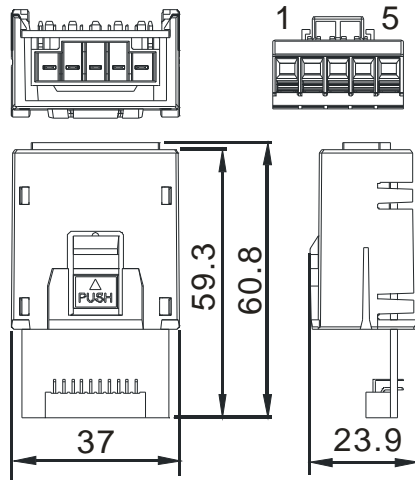
Unit: mm

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**
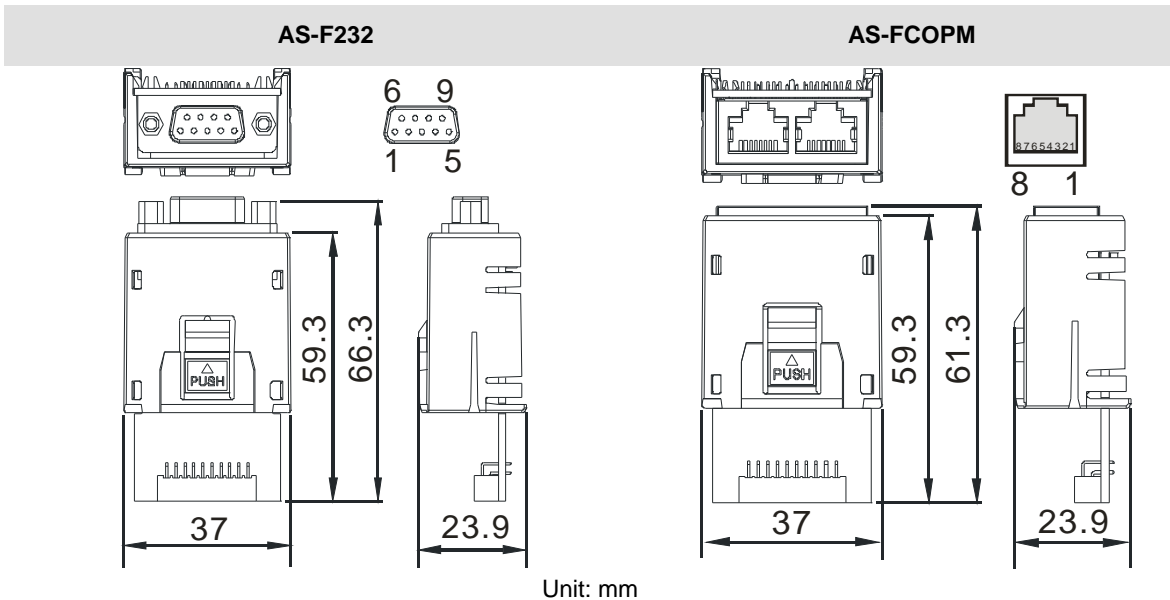
AS-F232	AS-FCOPM

Unit: mm

Pin no.	AS-F232	AS-FCOPM
1	-	CAN_H
2	TX	CAN_L
3	RX	GND

4	-	-
5	GND	-
6-9	-	-

● **AS-FEN02**

Number	Name	Description
1	MS indicator	Indicates if the module has been set ON: the setting is complete Blinking: the setting is not complete OFF: no power
2	NS indicator	Indicates the status of Ethernet connection Green lignt ON: a CIP connection is established Green lignt BLINKING: a CIP connection is not established Red light ON: duplicated IP address Red light BLINKING: communication timeout / DLR conection lost / IP address change OFF: no power / network cable is not connected
3	RJ-45 port X1/X2	Use for network connections
4	LINK indicator X1/X2	Indicate the status of Ethernet connection Green light ON: a network connection is established OFF: a network connection is not established
5	ACT indicator X1/X2	Indicate the status of Ethernet communication Orange BLINKING: data transmission OFF: no data transmission
6	Clip ring	Secures AS series

RJ-45 Pin Definition

1 TX+	2 TX-	3 RX+	4 N/C
5 N/C	6 RX-	7 N/C	8 N/C

8 ← 1

3.10.3 Function Card Weights

	AS-F2AD	AS-F2DA	AS-F422	AS-F485	AS-F232	AS-FCOPM	AS-FEN02
Weight	30g	30g	22g	29g	26g	29g	51g

Chapter 4 Assigning Addresses

Table of Contents

4.1 Assigning I/O Addresses

This chapter explains how to assign input and output devices to an AS Series input/output module.

Using HWCONFIG in ISPSoft

The following picture shows the **HWCONFIG** window in ISPSoft. Please refer to Chapter 8 in the AS Series Operation Manual for more information on the hardware configuration.

- **Software-defined address**

HWCONFIG automatically assigns a starting address to an input/output module through in ISPSoft.

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**

You use HWCONFIG to assign a start address to a remote module 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. You can assign a start address to the first remote module installed on the right side of the I/O module slot. The following I/O modules are then assigned addresses 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

HWCONFIG automatically assigns input/output devices to a digital input/output module in ISPSoft according to the number of inputs and outputs in the digital input/output module (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 eight inputs. The input device range occupies 16 bits (X**n**.0–X**n**.15).

● 08AN: There are eight 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 eight inputs and eight 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

HWCONFIG automatically assigns input and output data registers to an analog input/output module in ISPSoft according to the number of registers defined for the analog input/output module. A channel occupies two words.

- 04AD: There are four input channels. The input device range occupies 20 data registers.

- 08AD: There are eight input channels. The input device range occupies 20 data registers.

- 004DA: There are four output channels. The input device range occupies two data registers and the output device range occupies 18 data registers.

- 06XA: There are four input channels and two output channels. The input device range occupies 10 data registers, and the output device range occupies 10 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

HWCONFIG automatically assigns input data registers to a temperature measurement module in ISPSoft according to the number of registers defined for the temperature measurement module. A channel occupies two words.

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

- 06RTD: There are six input channels. The input device range occupies 20 data registers.

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

● 08TC: There are eight 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

HWCONFIG automatically assigns input and output data registers to a network module in ISPSoft according to the number of registers 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 the SCM module to see the Device Setting page.
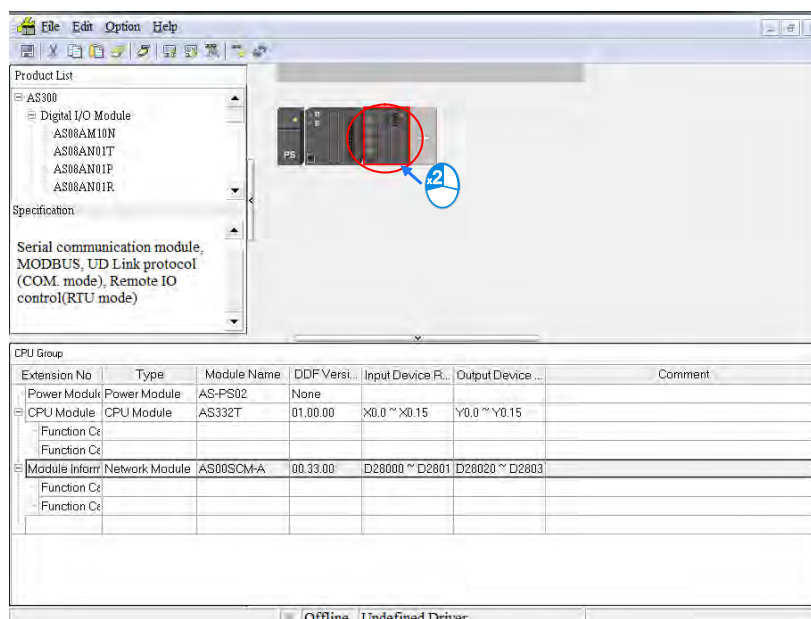
Click **COM1 Setting** or **COM2 Setting** to select the function card value from the drop-down list.
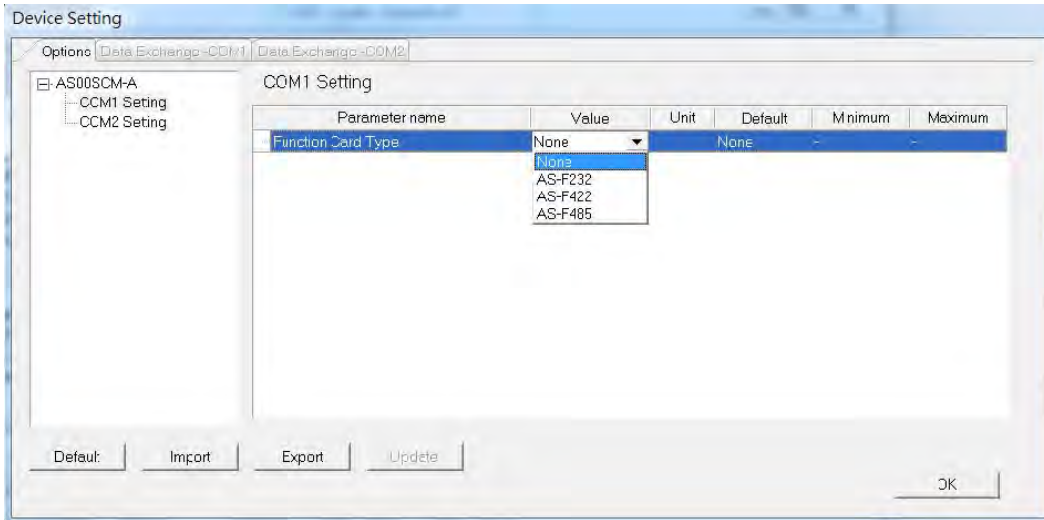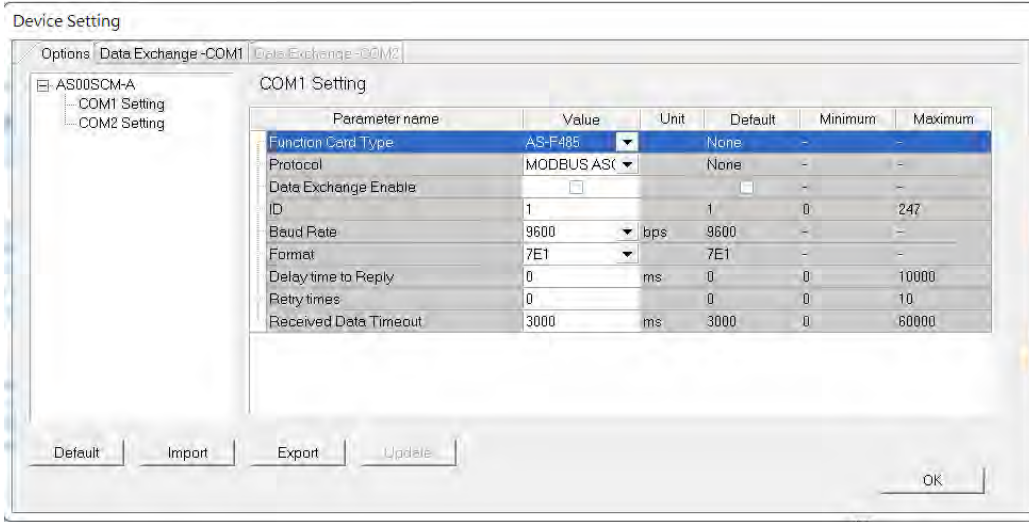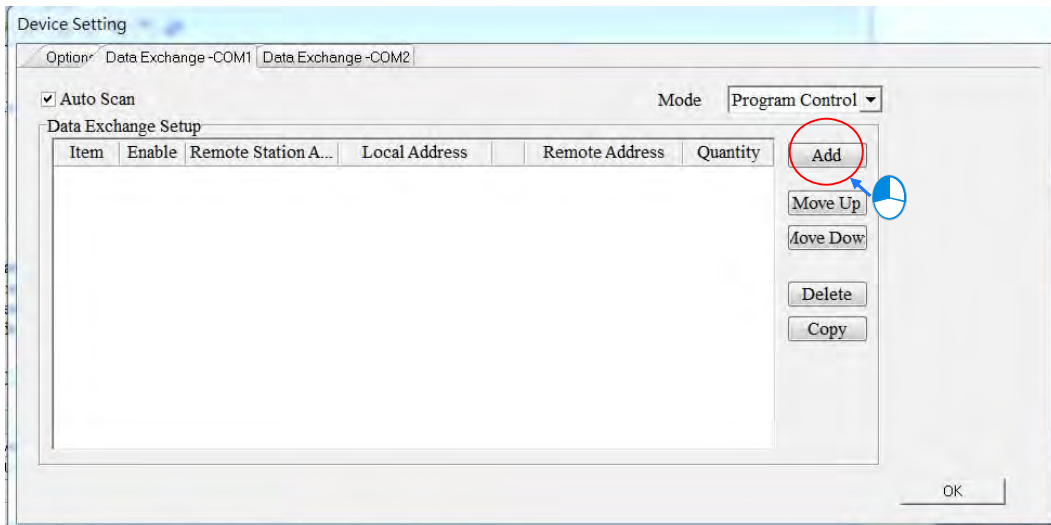

After completing the settings for COM1 and COM2, set up **Data Exchange-COM1**, and **Data Exchange-COM2**
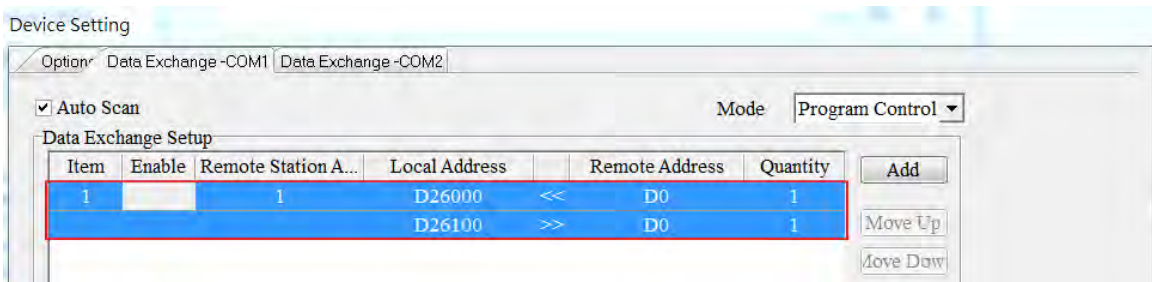
on the Data Exchange tabs.
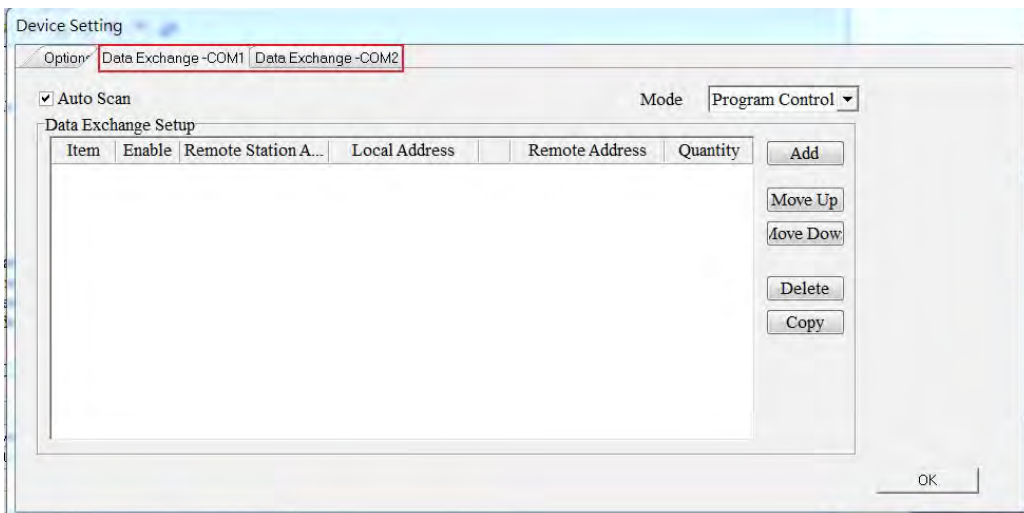
Example: setting up a data exchange to send and receive 100 data registers

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 quantity.
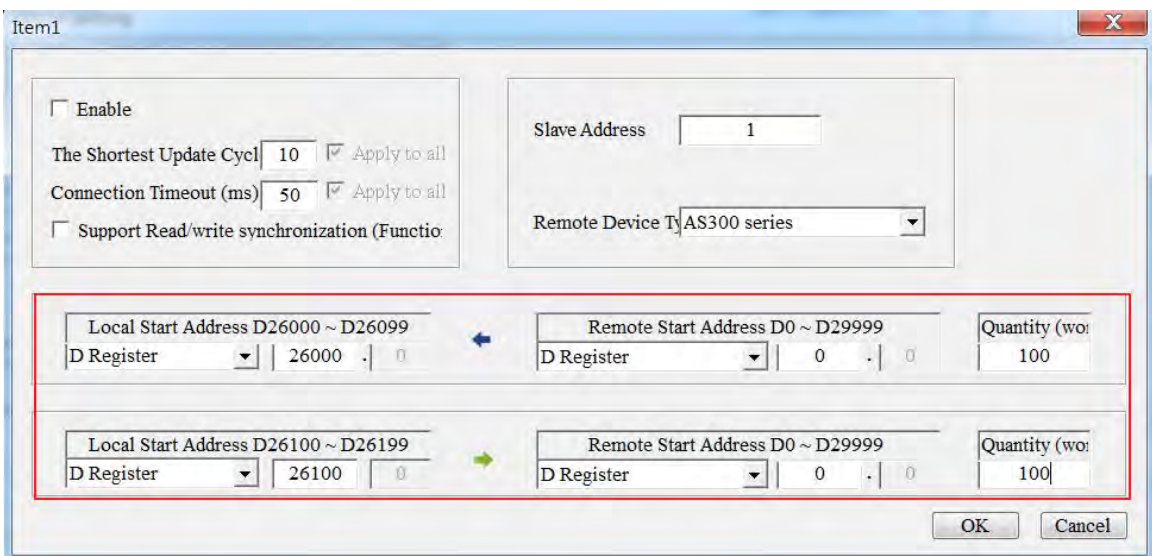
4.   Click **OK** to complete the setups for SCM COM1 and COM2.
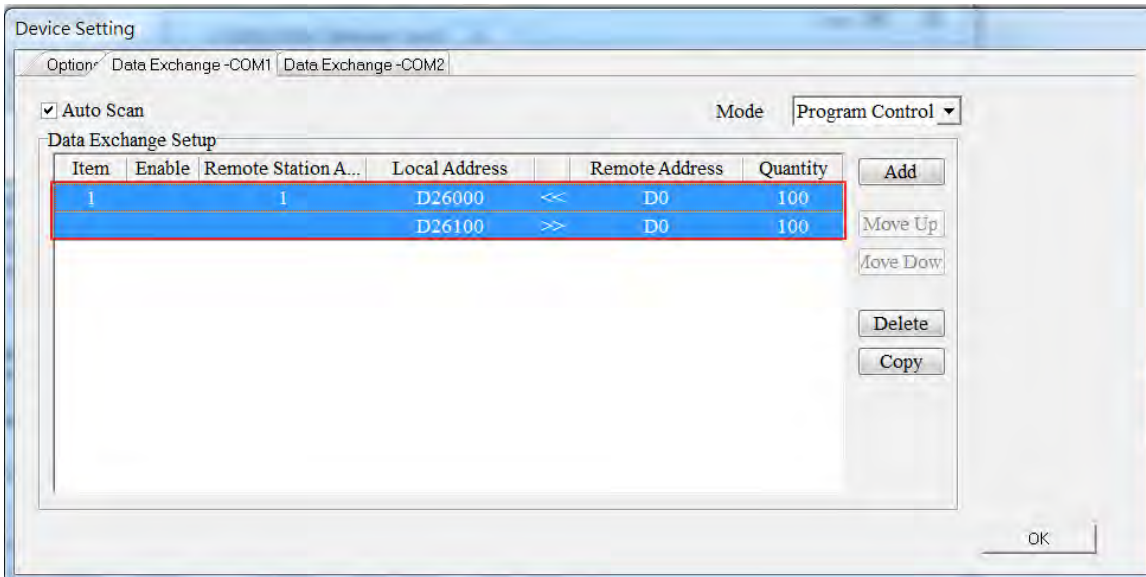
● Function card 1 using AS-F232: the input device range and output device range each occupy 100 data registers.

● Function card 1 using AS-F485: the input device range and output device range each occupy100 data registers.

● Remote module SCM: the input device range and output device range each occupy 10 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	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	

● AS01DNET-A: when selecting the COM communication mode, its communication status and communication method: the input device range occupies 20 data registers, and the output device range occupies 20 data registers.

Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Ra...
Power Module					
CPU Module	CPU Module	AS332T-A	01.04.00	X0.0 ~ X0.15	Y0.0 ~ Y0.15
Function Card1					
Function Card2					
Module Information1	Network Module	AS01DNET-A	01.00.00	D28000 ~ D28019	D28020 ~ D28039
Data Exchange	Data Exchange		None	D26000 ~ D26099	D26100 ~ D26199

Click the AS01DNET-A module to see the Device Setting page.

4.2.5   Start Addresses for Load Cell Modules

HWCONFIG automatically assigns input data registers to a load cell module in ISPSoft according to the number of registers defined for the load cell module.

- 02LC: The input device range occupies six 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 where you can set up the PLC parameters.
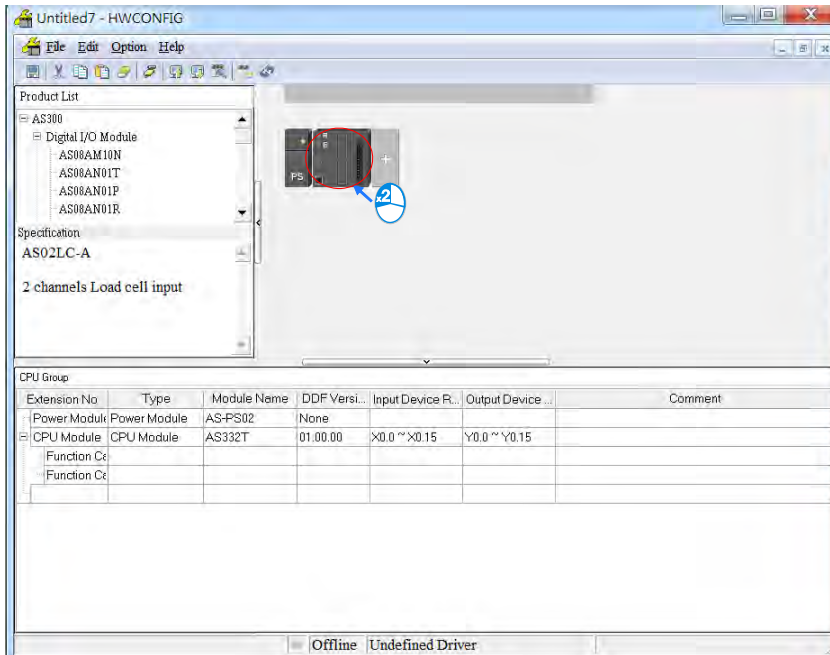
You can see the information for the CPU module on the Device Setting page. Click **Function Card2** on the left to set up the parameters.
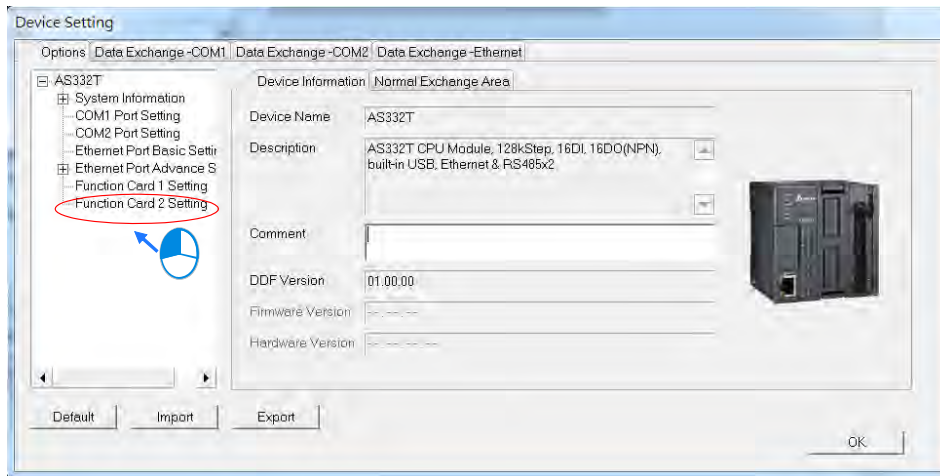
1. For **Card 2 Detect mode**, select **Manual**. For **Manual Select Card**, select **AS-FCOPM Card**.
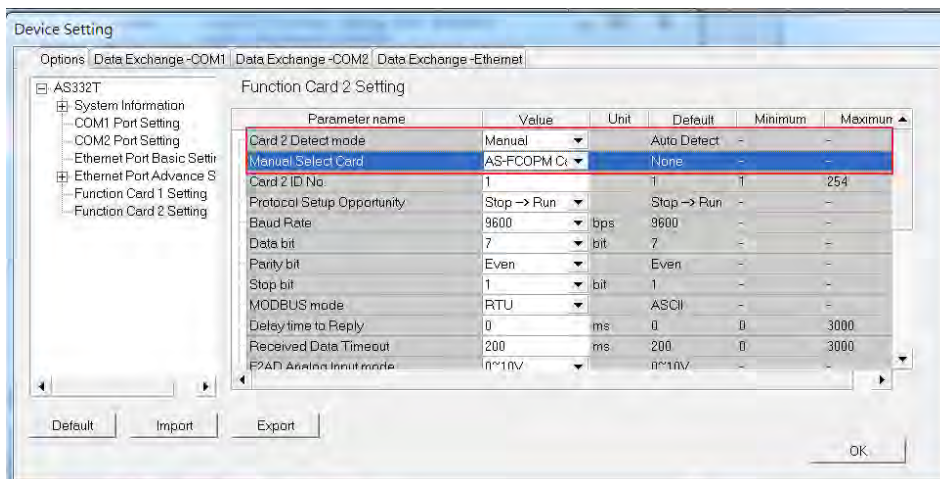
2. For **AS-FCOPM Working mode**, select **AS Remote Card**, and then enter the number of the connected AS Remote module.
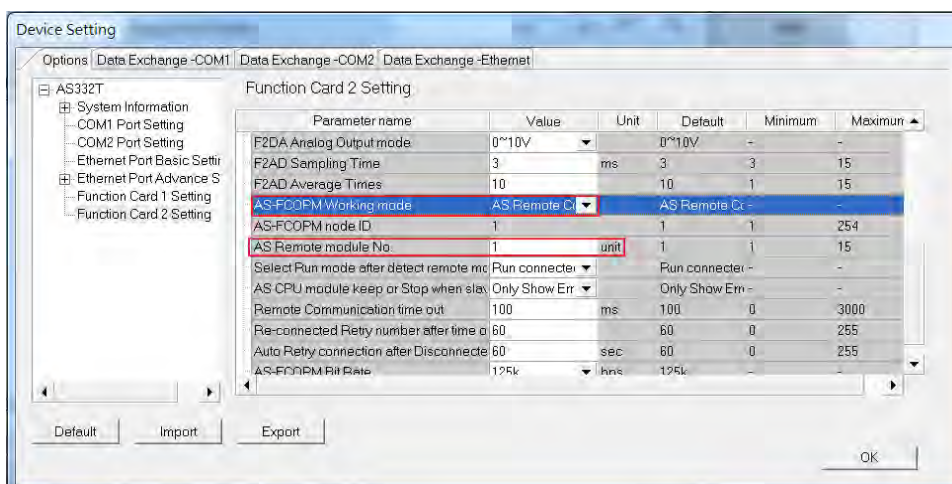
Click **OK**. You can see the new remote module on the main page. You can use only digital and analog modules for remote assignment. You can add up to 15 modules in the remote group. The total number of I/O modules and connected remote modules cannot exceed 32. For the assignment of remote input and output devices to an AS Series input/output module, refer to Sections 4.1 and 4.2.
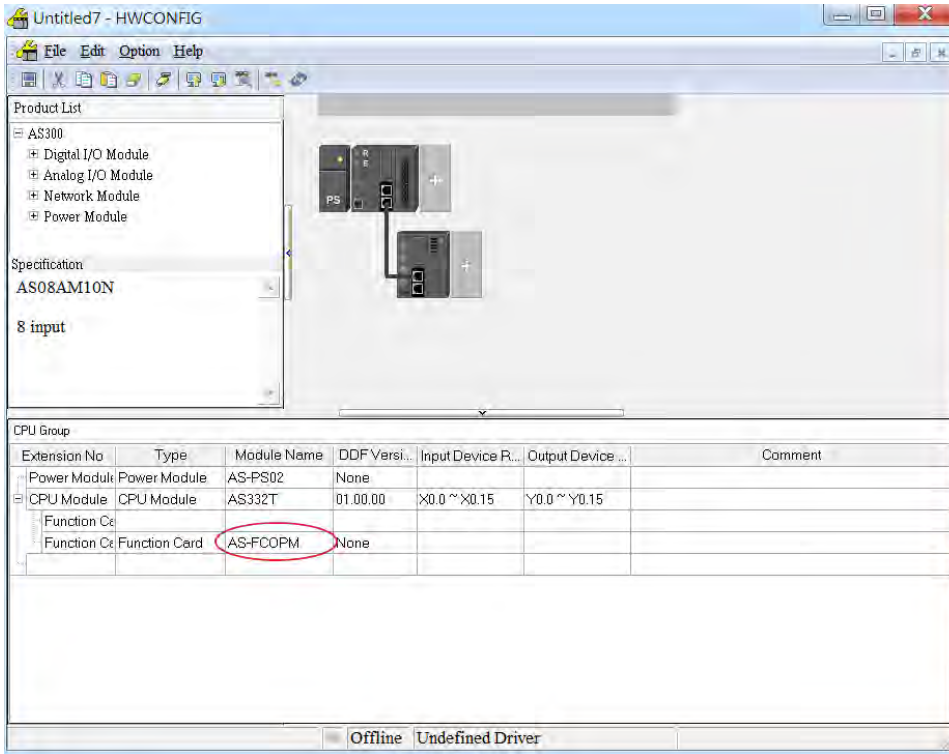
4.3.1 Start Addresses for Digital Input/Output Modules

The remote module AS00SCM-A can connect to up to eight modules on its right side. HWCONFIG automatically assigns input and output devices to a digital input/output module in ISPSoft according to the number of inputs/outputs in the digital input/output module (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 eight inputs. The input device range occupies 16 bits ($X\mathbf{n}.0$–$X\mathbf{n}.15$).

- 08AN: There are eight outputs. The output device range occupies 16 bits ($Y\mathbf{n}.0$–$Y\mathbf{n}.15$).

- 16AM: There are 16 inputs. The input device range occupies 16 bits ($X\mathbf{n}.0$–$X\mathbf{n}.15$).

- 16AN: There are 16 outputs. The output device range occupies 16 bits ($Y\mathbf{n}.0$–$Y\mathbf{n}.15$).

- 16AP: There are eight inputs and eight outputs. The input and output device range occupies 16 bits. ($X\mathbf{n}.0$–$X\mathbf{n}.15$), ($Y\mathbf{n}.0$–$Y\mathbf{n}.15$).

- 32AM: There are 32 inputs. The input device range occupies 32 bits ($X\mathbf{n}.0$–$X\mathbf{n+1}.15$).

- 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

You can assign a start address to the first remote module installed on the right side of the I/O module slot.

The software automatically assigns the next address to the next I/O module.

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

HWCONFIG automatically assigns input and output data registers to an analog input/output module in ISPSoft according to the number of registers defined for the analog input/output module. The default start address is D29000.

- 04AD: There are four input channels. The input device range occupies 20 data registers.

- 08AD: There are eight input channels. The input device range occupies 20 data registers.

- 004DA: There are four output channels. The input device range occupies two data registers and the output device range occupies 18 data registers.

- 06XA: There are four input channels, and two output channels. The input device range occupies 10 data registers, and the output device range occupies 10 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

You can assign a start address to the first remote module installed on the right side of the I/O module slot. The software automatically assigns the next address to the next I/O module.

Remote Module Group 1
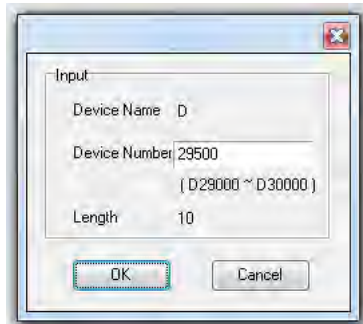
Extension No	Type	Module Name	DDF Version	Input Device Range	Output Device Range
Remote Module	Network Module	AS00SCM-A	00.33.00	D29500 ~ D29509	D29510 ~ D29519
Function Card1					
Function Card2	Function Card	AS-FCOPM	None		
Module Information1	Analog I/O Module	AS04AD-A	00.50.00	D29520 ~ D29539	
Module 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

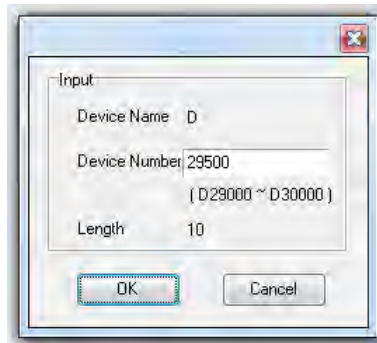### 4.3.3 Start Addresses for Temperature Measurement Modules

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

● 04RTD: There are four input channels. The input device range occupies 20 data registers.

● 06RTD: There are six input channels. The input device range occupies 20 data registers.

● 04TC: There are four input channels. The input device range occupies 20 data registers.

● 08TC: There are eight 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	

You can assign a start address to the first remote module installed on the right side of the I/O module slot. The software automatically assigns the next address to the next I/O module.

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

HWCONFIG automatically assigns input data registers to a load cell module in ISPSoft according to the number of registers defined for the load cell module. The default start address is D29000.

● 02LC: The input device range occupies six 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

You can assign a start address to the first remote module installed on the right side of the I/O module slot. The software automatically assigns the next address to the next I/O module.

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

Chapter 5   Wiring

Table of Contents

5.1 Wiring

● **Please pay attention to the following warnings.**

⚠ **DANGER**	● Before installing or wiring a module, you must verify that the external power supply is turned off. If the power supply is not turned off, you may get an electric shock, or the product may be damaged. ● After you complete installing or wiring the module, make sure that a terminal block cover is installed on the module before turning on the power supply or operating the module. If the terminal block cover is not installed properly, you 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, you may get an electric shock, or the module may not operate normally. ● To ensure that a PLC is wired correctly, you must check the rated voltage of the product and the arrangement of the terminals. If the PLC is connected to a power supply that does not conform to the rated voltage, or the product is not wired correctly, a fire may occur, or the product may be damaged. ● The external connections should be crimped, press-welded by specific tools, or soldered correctly. Improper connections may result in a short circuit, fire, or malfunction. ● Tighten the terminal screws to the specified torque. If the terminal screws are loose, a short circuit, fire, or faulty operation may occur. Tightening the terminal screws too far may cause damage to the terminal screws or the module, resulting in a short circuit or malfunction. ● Make sure there are no foreign substances such as iron filings or wiring debris inside the module. Foreign substances may result in a fire, damage, or malfunction.

● **Wiring an I/O module**

(1) Terminal definitions

   ◆ Two-/three-wire (passive sensor): the sensor and the system share the same power circuit.

   ◆ Four-wire (active sensor): the sensor uses an independent power supply and should not share the same power circuit with the system.

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

(3) Use single-wire cables or two-wire cables with a diameter of 24 AWG~22 AWG and with less than 1mm pin-type terminals. Only use copper conducting wires with a temperature rating of 60/75°C.

< 1mm 8-10mm 24-22AWG
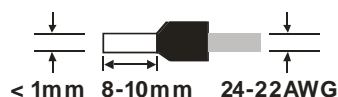
(4) Keep the input cables, output cables, and power cable separate from one another.

(5) If the main circuit and the power cable cannot be separated from each other, use a shielded cable, and ground it at the side of the I/O module. In some cases, the shielded cable can be grounded at the opposite side.
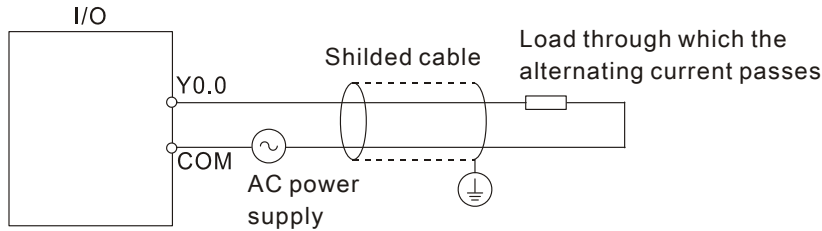
(6) If you wire a module through conduit, you must ground the conduit correctly.

(7) 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 (656.19 feet), leakage current can result from parasitic capacitance, and the system will not function properly.

● **Grounding a cable**

Ground cables according to the steps below.

(1) Ground the cable correctly.

(2) Use single-wire cables or two-wire cables with a diameter of 22 AWG~18 AWG and with less than 2 mm pin-type terminals.
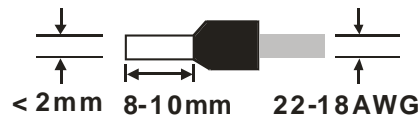
(1) The ground point should be near the PLC. Ground the cable properly.

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 2 mm pin-type terminals. Be sure to twist the power cables at the terminal screws. To prevent a short circuit from loose screws, you must use solderless terminals with insulation sleeves.

(2) If cables are connected to the terminals LG and FG, you must ground the cables. 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 carries electric potential, you will get an electric shock if you touch the metal parts.

5.2 Connecting Power Cables

5.2.1 Precautions

● **Connecting AC power cables**

(1) The cables carrying the 110 VAC, 220 VAC, and 24 VDC should be single or two-wire cables.

(2) Do not bundle 110 VAC cable, 220 VAC cable, 24 VDC cable, the (high-voltage high-current) main circuit, and the I/O signal cable together. The distance between adjacent cables should be more than 100 millimeters (3.94 inches).

(3) To prevent electrical surge from lightning, install a surge protector as shown below.
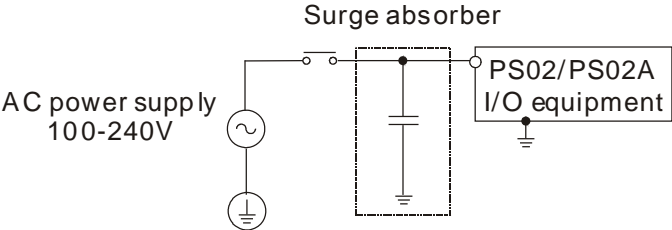
Points for attention:

1. Ground the surge protector and the PLC system.

2. Select the surge protector with a working voltage that 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 using multiple pieces of equipment, use a single-point ground.

The single-point ground is better.

● If you cannot use a single-point ground, use a common-point ground.

The common-point ground is permitted.

● Do not connect equipment ground wires together as shown on the right.

The equipment can not be grounded in this way.
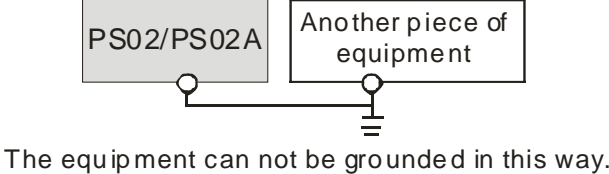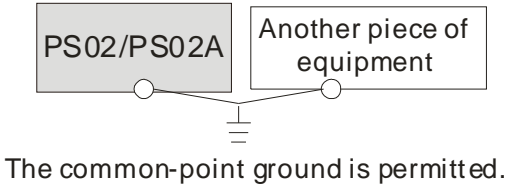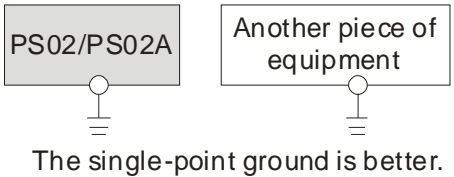
5.2.3 Wiring Power Supply Modules

● **Connecting an AC power cable**
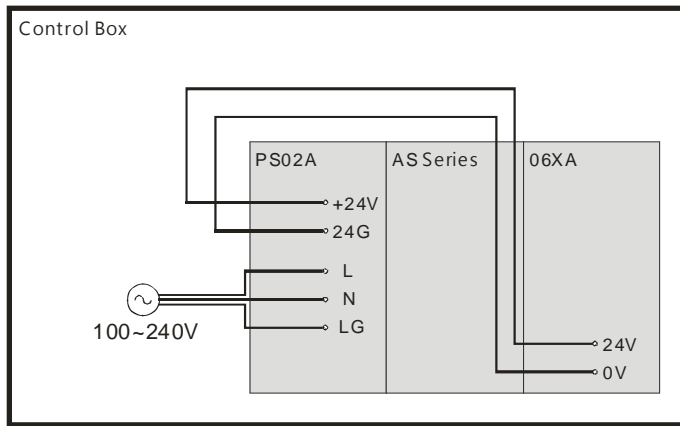
*1. The live wire and the neutral wire in the AC power cable are connected to L and N on the power supply module respectively. To prevent incorrect system operation, the ground in the AC power cable must be connected to LG on the power supply module.

The power input of AS-PS02/AS-PS02A is the AC input. You must pay attention to the following points when using AS-PS02/AS-PS02A.

● The alternating-current input voltage is between 100 VAC–240 VAC. Connect the power supply to the terminals L and N. If you connect the 110 VAC or the 220 VAC power supply to the input terminals +24V and 24G, you will damage the PLC.

● If a power outage lasts for less than 10 milliseconds, the PLC keeps running without being affected. If the power outage lasts longer, 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 operating. Note that there are latched auxiliary relays and registers in the PLC when you write the program.

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

< 2mm   8-10mm   22-18AWG
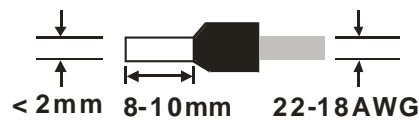
5.2.4 Power Consumption

The following table lists the power consumption for AS Series modules.

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
	AS320P-B	150	3.6	N/A
	AS320T-B	150	3.6	N/A
	AS300N-A	125	3	N/A
	AS228T-A	175	4.2	N/A
	AS228P-A	175	4.2	N/A
	AS228R-A	220	4.3	N/A
	AS218TX-A	180	4.3	N/A
	AS218PX-A	180	4.3	N/A
	AS218RX-A	196	4.7	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
	AS08AD-B	50	1.2	2.5
	AS08AD-C	50	1.2	2.5
	AS04DA-A	50	1.2	2.64
	AS06XA-A	50	1.2	2.16
Temperature measurement module	AS04RTD-A	30	0.75	2
	AS06RTD-A	30	0.75	2
	AS04TC-A	30	0.75	2
	AS08TC-A	30	0.75	2
Load cell module	AS02LC-A	30	0.75	3
Positioning module	AS02PU-A	62.5	1.5	N/A
	AS04PU-A	62.5	1.5	N/A
Network module	AS00SCM-A	25	0.6	N/A
	AS01DNET-A	33	0.8	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

Classification	Model name	Internal power consumption (mA)	Internal power consumption (W)	External power consumption (W)
	AS-FCOPM	20	0.48	N/A
	AS-F2AD	15	0.36	N/A
	AS-F2DA	50	1.2	N/A
	AS-FEN02	50	1.2	N/A

5

5.3 Wiring CPU Modules

● When you use open collector NPN/PNP outputs to activate AS300 high speed inputs, you need to have the pull up/pull down resistor connected to X point and S/S. Only use 3 W / 470 ohm or 2 W / 1 Kohm resistors.

● When you use Push-Pull outputs to activate AS300 high speed inputs, you don't need to use any pull up/pull down resistor connected to X point and S/S.

Note:

● In case open collector NPN/PNP outputs are used to activate AS300 high speed inputs, you need to have the pull up/pull down resistor connected to X point and S/S.

● In case Push-Pull outputs are used to activate AS300 high speed inputs, you don't need to use any pull up/pull down resistor connected to X point and S/S.

● It is recommended to use the resistor of 3W/470ohm or 2W/1Kohm.

NPN	PNP
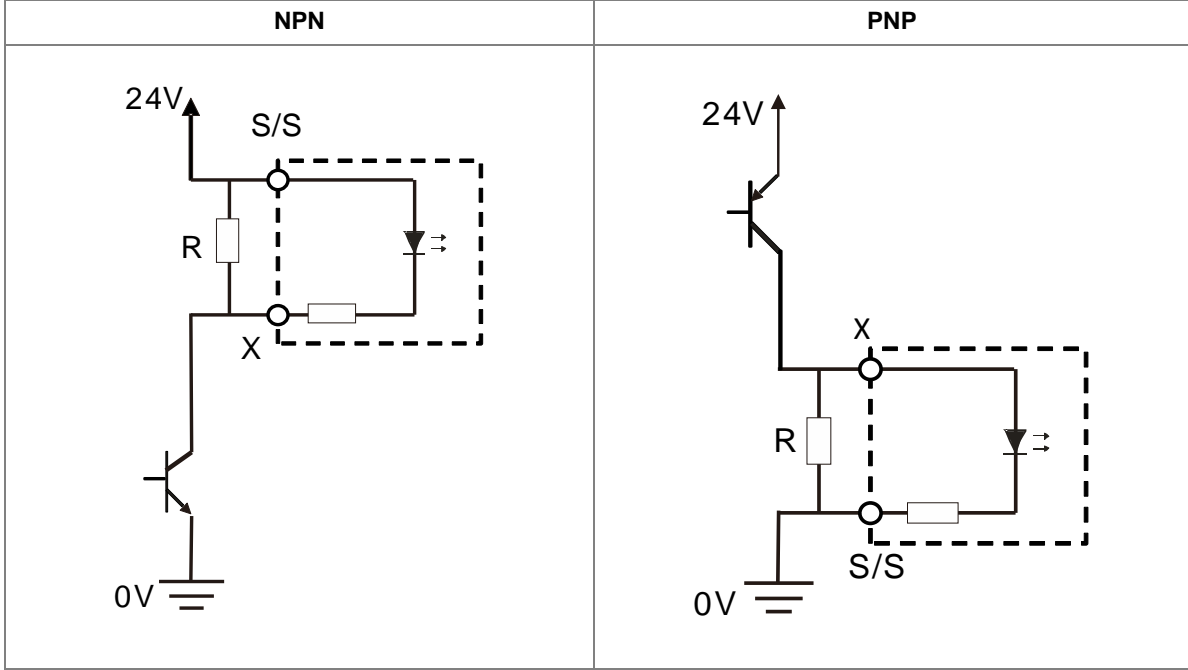
5.3.1 Wiring AS324MT-A

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

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+

Wiring the External Terminal Module UB-10-ID16A

Input form	X0.0+ to X0.3+/X0.0- to X0.3-: Differential input
	X0.4–X0.11: Direct current (sinking or sourcing)
Input current/voltage	X0.0+ to X0.3+/X0.0- to X0.3- : 5　VDC, 5 mA
	X0.4–X0.11: 24 VDC, 5 mA
Output form	Y0.0+ to Y0.3+/Y0.0- to Y0.3- : Differential input
	Y0.4–Y0.11: Transistor-T (sinking)
Output current/voltage	Y0.0+ to Y0.3+/Y0.0- Y0.3-: 5　VDC, 20 mA
	Y0.4–Y0.11: 5~30 VDC, 0.1 A
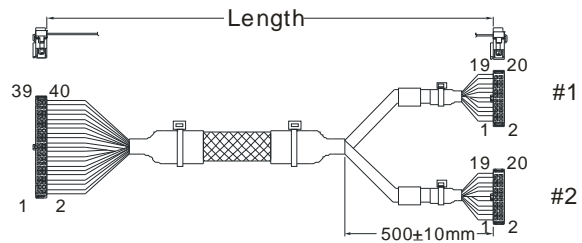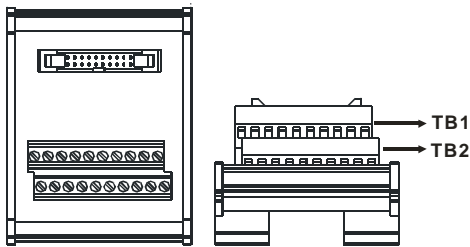
Length:
UC-ET010-24D(1M)(28AWG)
UC-ET020-24D(2M)(28AWG)
UC-ET030-24D(3M)(28AWG)

#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	24 VDC, 5 mA
Output form	Transistor-P (souring)
Output current/voltage	5~30 VDC, 0.1A

Wiring the External Terminal Module UB-10-ID16A

Input form	Direct current (sinking or sourcing)
Input current/voltage	24 VDC. 5 mA
Output form	Transistor-P (souring)
Output current/voltage	5~30 VDC. 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 250 VAC, 30 VDC

Length:
UC-ET010-24D(1M)(28AWG)
UC-ET020-24D(2M)(28AWG)
UC-ET030-24D(3M)(28AWG)
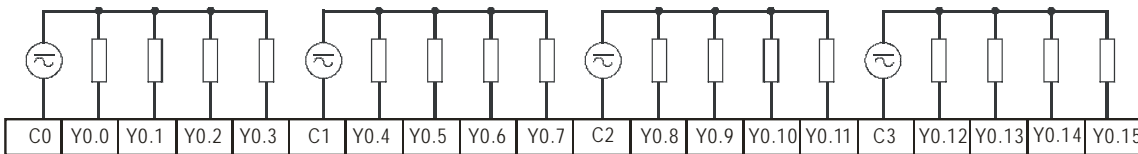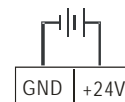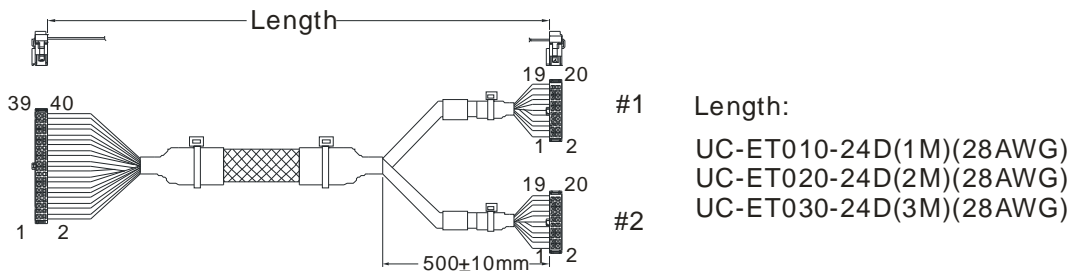
5.3.3 Wiring AS332T-A

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

Wiring the External Terminal Module UB-10-ID16A

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

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 250 VAC, 30 VDC

#1 Length:

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

500±10mm

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

5
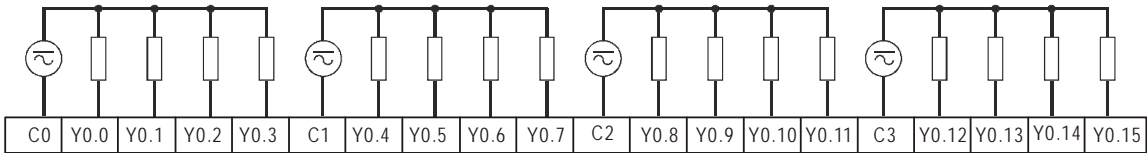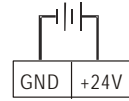
5.3.4 Wiring AS320P-B

Input form	Direct current (sinking or sourcing)
Input current/voltage	24 VDC, 5 mA
Output form	Transistor-P (souring)
Output current/voltage	5~30 VDC, 0.1A
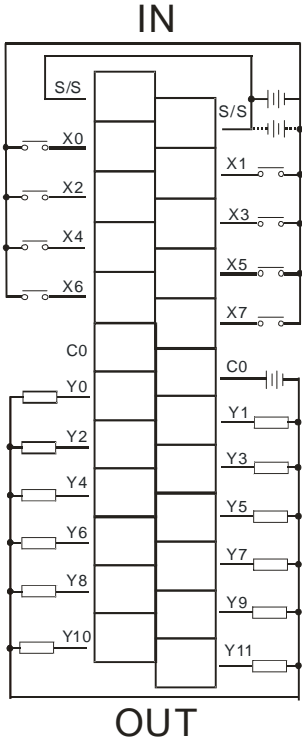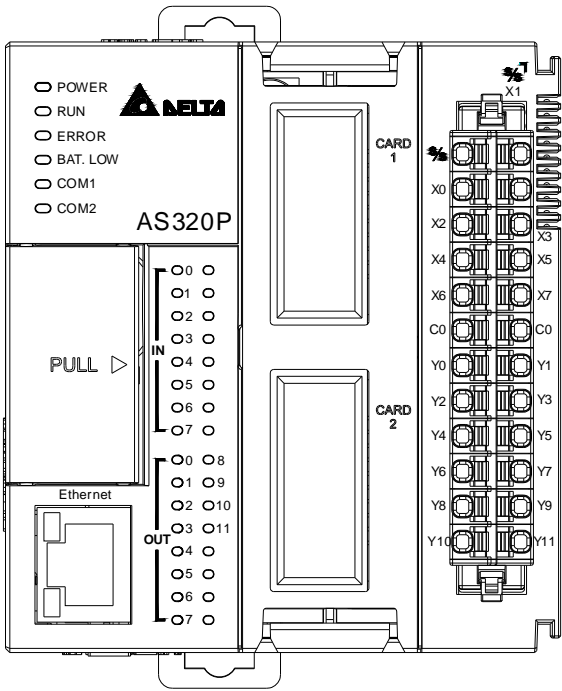
5.3.5 Wiring AS320T-B

Input form	Direct current (sinking or sourcing)
Input current/voltage	24 VDC, 5 mA
Output form	Transistor-T (sinking)
Output current/voltage	5~30 VDC, 0.1A
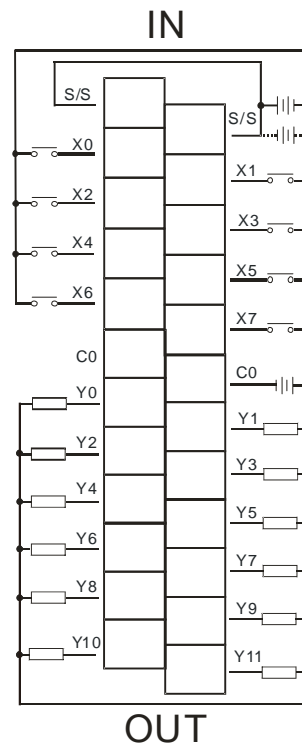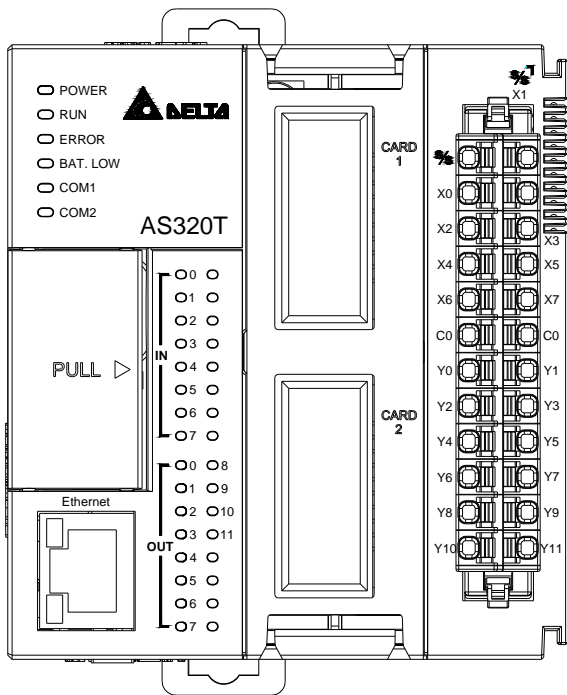
5.3.6 Wiring AS228P-A

Input form	Direct current (sinking or sourcing)
Input current/voltage	24 VDC, 5 mA
Output form	Transistor-P (sourcing) (PNP)
Output current/voltage	5~30 VDC, 0.5A
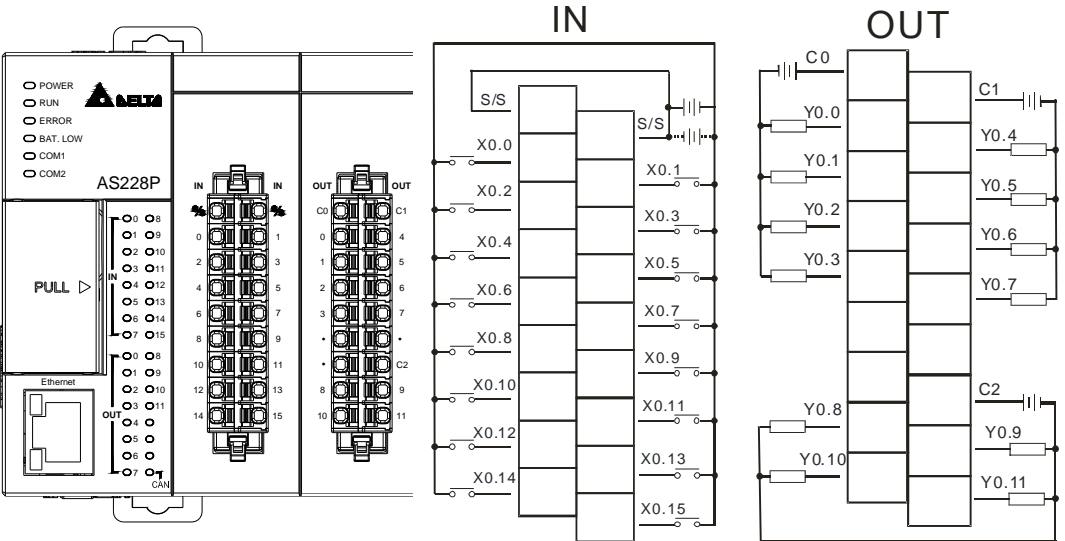
5.3.7 **Wiring AS228R-A**

Input form	Direct current (sinking or sourcing)
Input current/voltage	24 VDC, 5 mA
Output form	Relay
Output current/voltage	240VAC/24VDC, 2A/output, 8A/COM
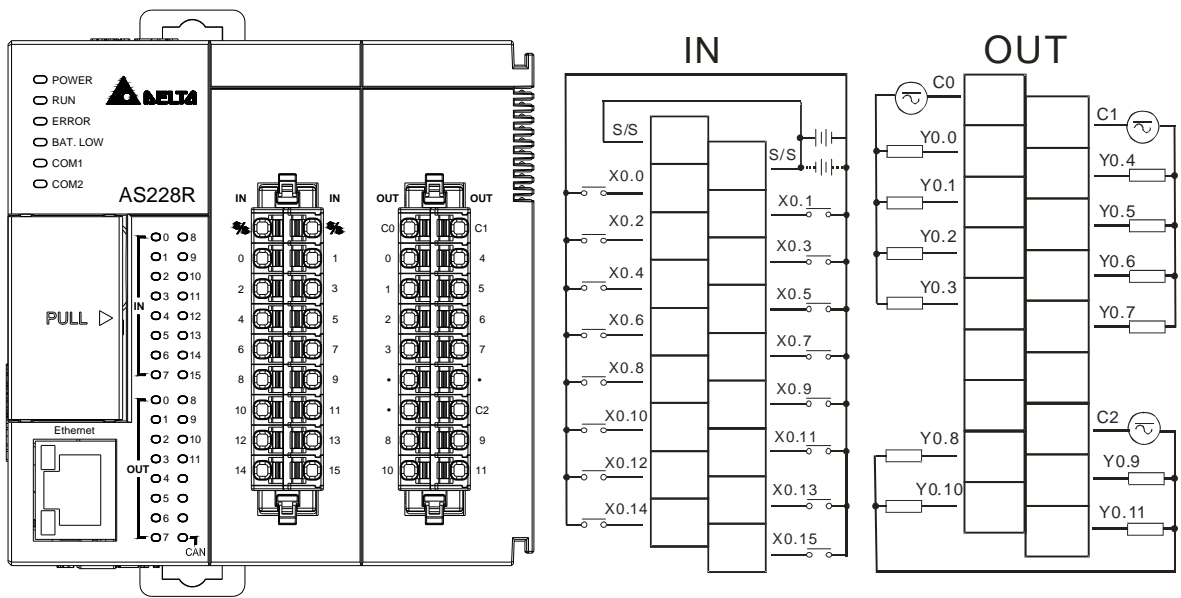
5.3.8 Wiring AS228T-A

Input form	Direct current (sinking or sourcing)
Input current/voltage	24 VDC, 5 mA
Output form	Transistor-T (sinking) (NPN)
Output current/voltage	5~30 VDC, 0.5A
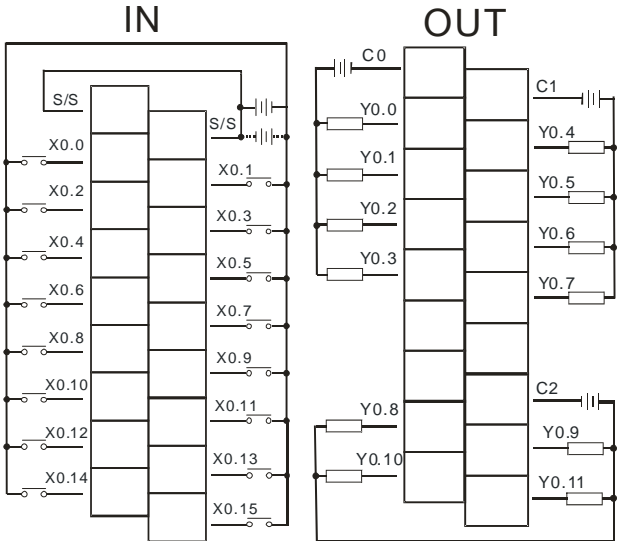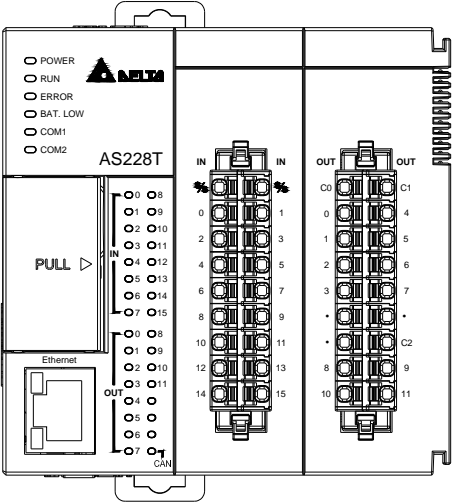
5.3.9 Wiring AS218PX-A / AS218RX-A / AS218TX-A

5.3.9.1 Wiring AS218PX-A

Input form	Direct current (sinking or sourcing)
Input current/voltage	24 VDC, 5 mA
Output form	Transistor-P (sourcing) (PNP)
Output current/voltage	5~30 VDC, 0.5A
Analog input*[1]	12bits, -10V-10V (voltage), -20mA-20mA (current)
Analog output*[1]	12bits, -10V-10V(voltage), 0- 20mA (current)

*[1]. Refer to section 5.3.9.4 for more details on wiring analog input and output.
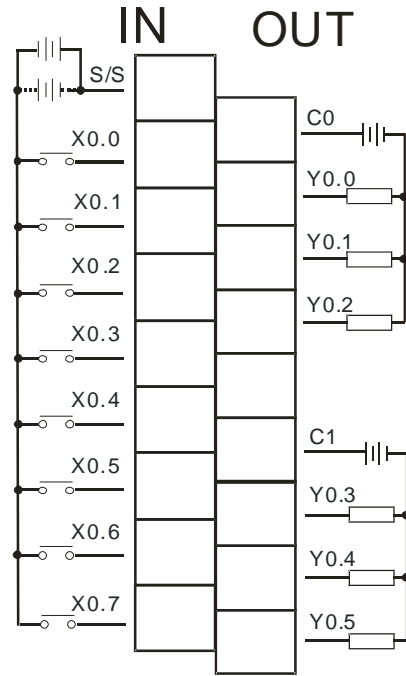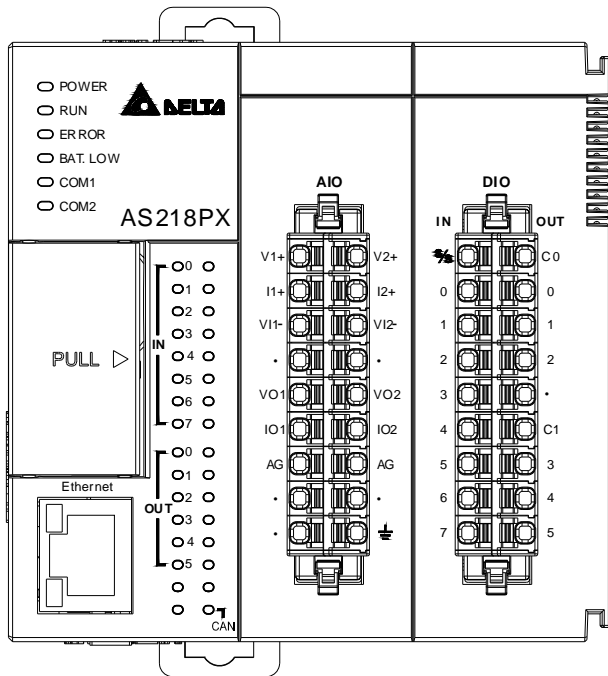
5.3.9.2 Wiring AS218RX-A

Input form	Direct current (sinking or sourcing)
Input current/voltage	24 VDC, 5 mA
Output form	Relay
Output current/voltage	240 VAC / 24 VDC, 2A/output, 8A/COM
Analog input*[1]	12 bits, -10V-10V (voltage), -20mA-20mA (current)
Analog output*[1]	12 bits, -10V-10V(voltage), 0- 20mA (current)

*[1]. Refer to section 5.3.9.4 for more details on wiring analog input and output.
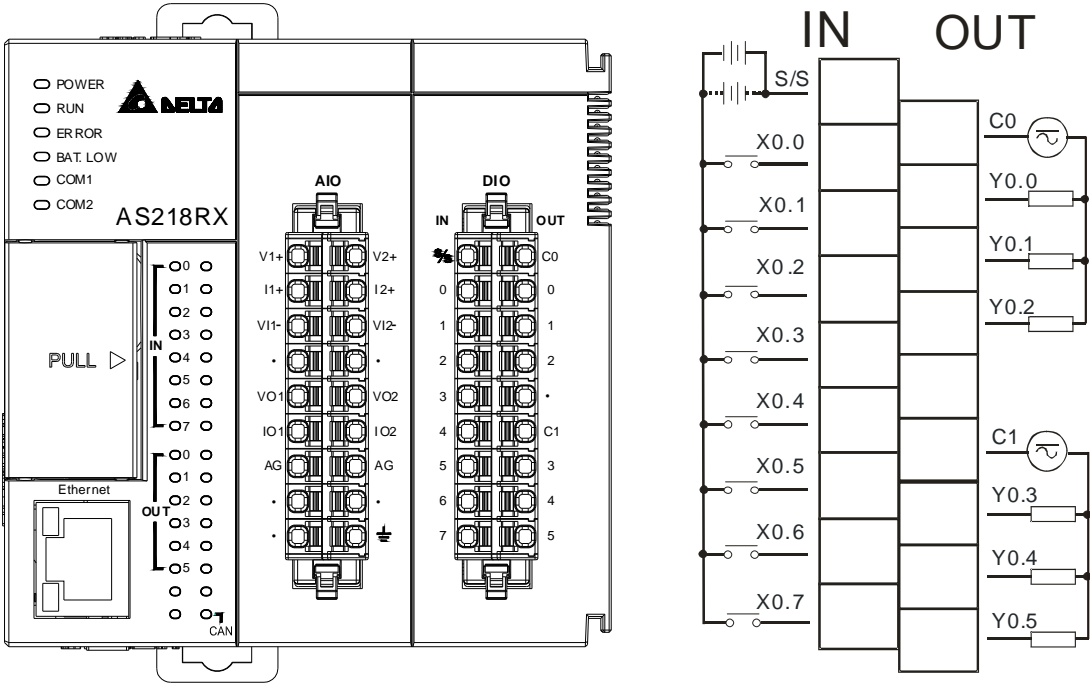
5.3.9.3 Wiring Details on AS218PX-A/AS218RX-A/AS218TX-A

5.3.10 Wiring

AS300/AS200 Series	AS300 Series	AS200 Series
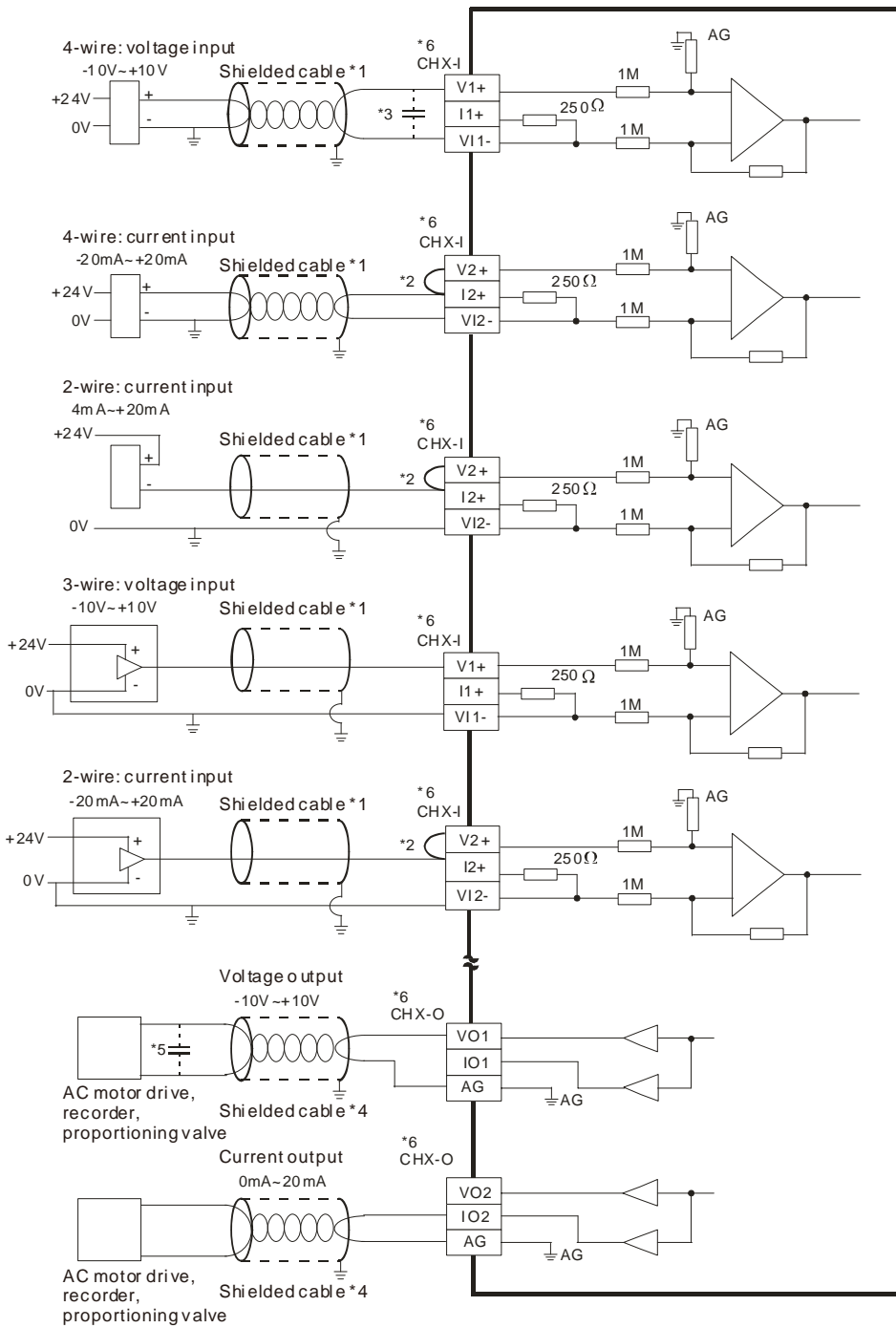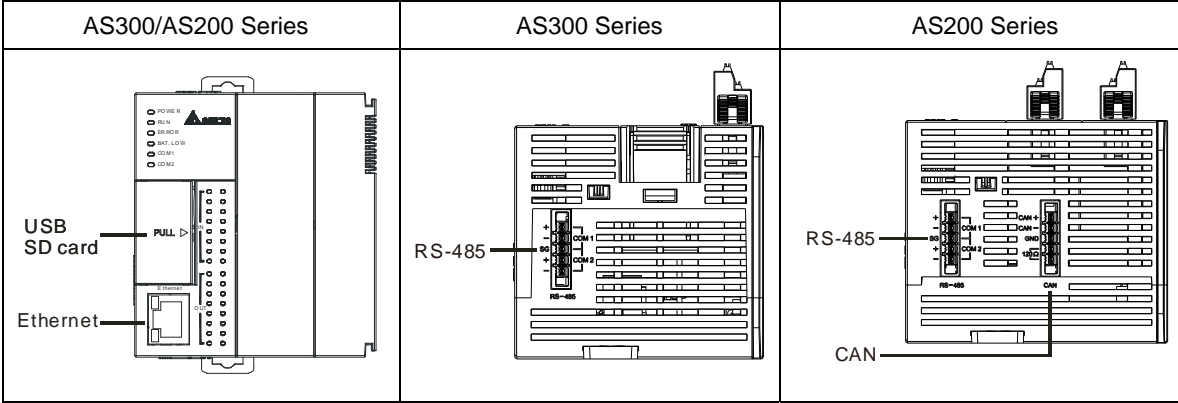
● **USB port**

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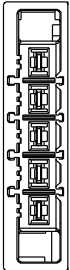
● **Ethernet port**

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	

● **RS-485**

Pin	Signal	Description
1	+	COM1 D+
2	-	COM1 D-
3	SG	Signal Ground
4	+	COM2 D+
5	-	COM2 D-
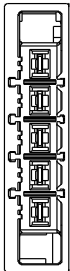
■ **RS-485 Wiring**
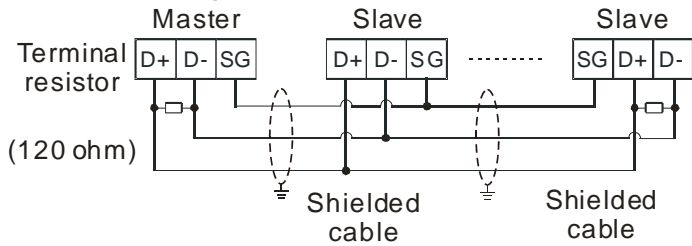
● **CAN**

Pin	Signal	Description
1	CAN+	CAN_H
2	CAN-	CAN_L
3	GND	GROUND
4	120Ω	Terminal resistor
5		

Note: Pin4 and Pin5 must be short-circuited to activate the built-in terminal resistor 120Ω and work as an impedance to reduce noise inference when signal reflections occur and ensure signal can be transmitted normally.

■ **CAN Wiring**
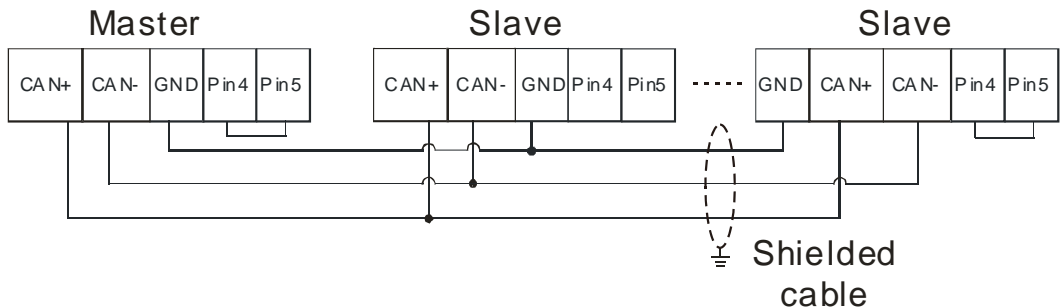
1. It is recommended to use Daisy Chain for connection and be sure to use terminal resistor in the beginning and the end of the terminal arrangement.
2. Pin4 and Pin5 must be short-circuited to activate the built-in terminal resistor 120Ω.

5.4 Wiring Digital Input/Output Modules

This section illustrates how to wire digital input/output modules. The wiring diagrams below also illustrate how the power supplies are connected to S/S, and COM. If you need more information about wiring of digital input/output terminals, 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
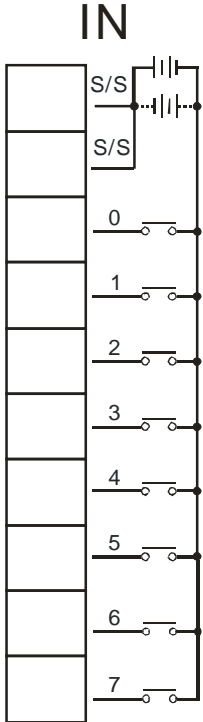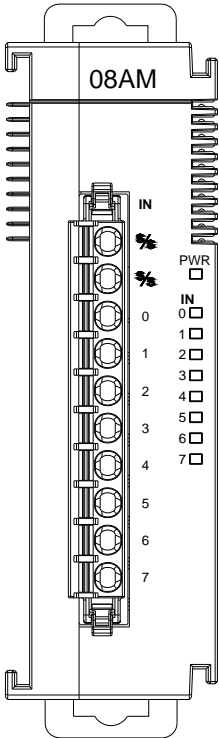
5.4.2　Wiring AS08AN01P-A

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

5.4.3 Wiring AS08AN01R-A

Output form	Relay
Voltage specifications	240 VAC/24 VDC, 2 A/inputs, 8 A/I/O
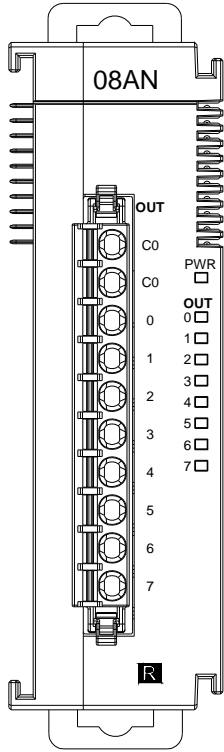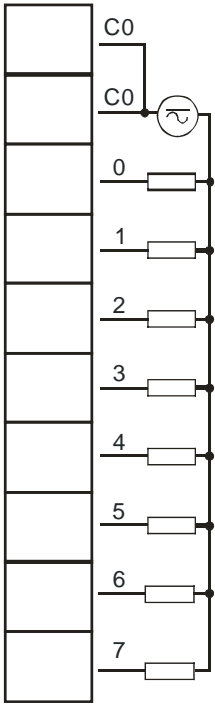
5.4.4 Wiring AS08AN01T-A

Output type	Transistor-T (sinking)
Voltage specifications	5~30 VDC, 0.5 A
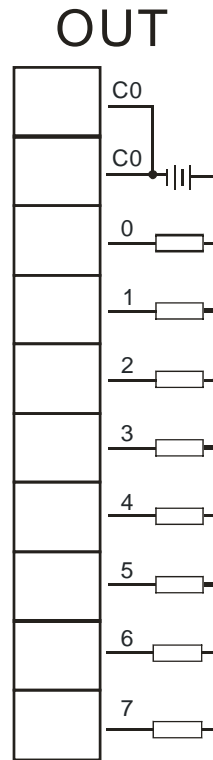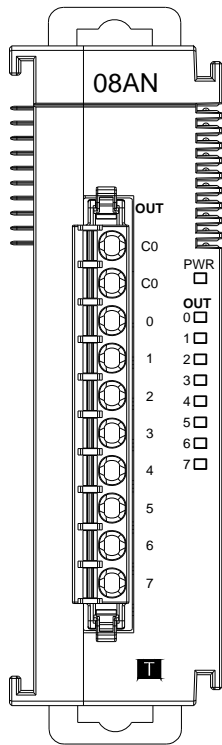
5.4.5 Wiring AS16AM10N-A

Input type	Direct current (sinking or sourcing)
Voltage specifications	24 VDC, 5 mA
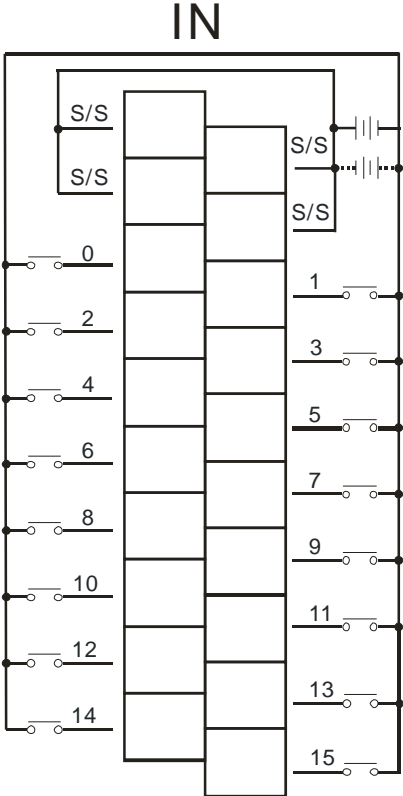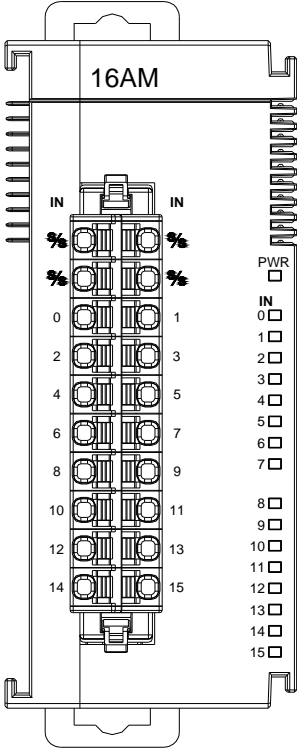
5.4.6 Wiring AS16AN01R-A

Output type	Relay
Voltage specifications	240 VAC/24 VDC, 2 A/inputs, 8 A/I/O
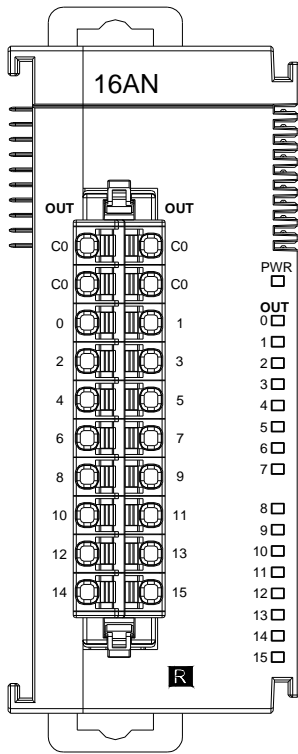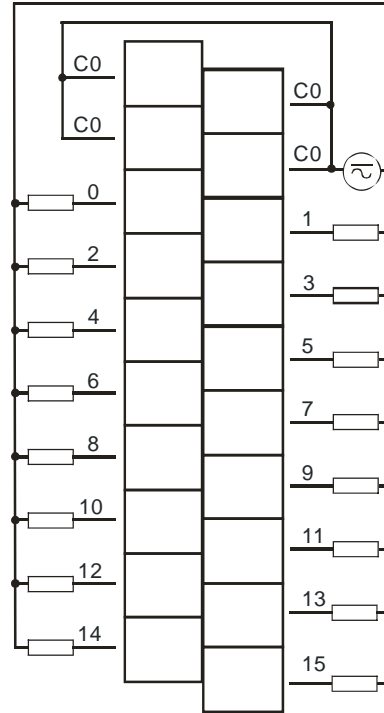
5.4.7 Wiring AS16AN01T-A

Output type	Transistor-T (sinking)
Voltage specifications	5~30 VDC, 0.5 A
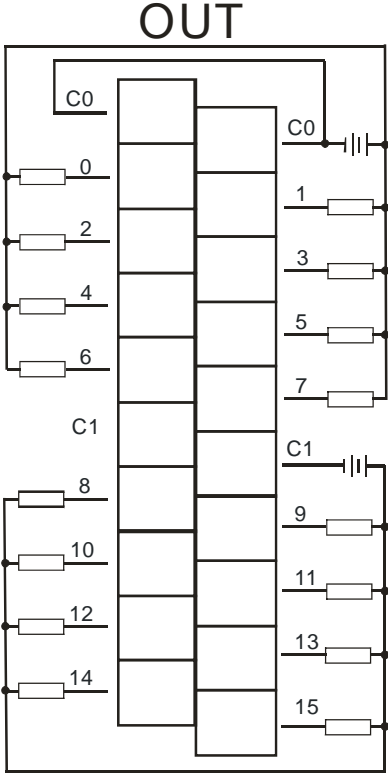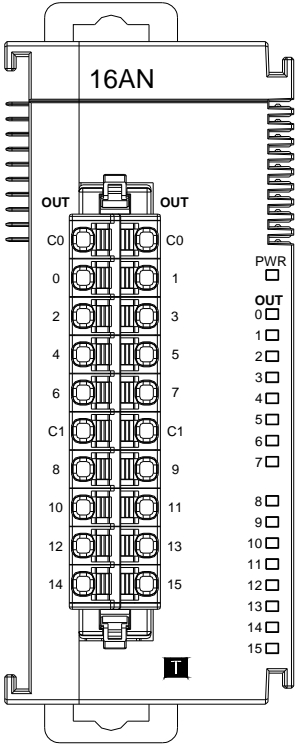
5.4.8 Wiring AS16AN01P-A

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

5.4.9 Wiring AS16AP11R-A

Input form	Direct current (sinking or sourcing)
Voltage specifications	24 VDC, 5 mA
Output type	Relay
Voltage specifications	240 VAC/24 VDC, 2 A/inputs, 8 A/I/O
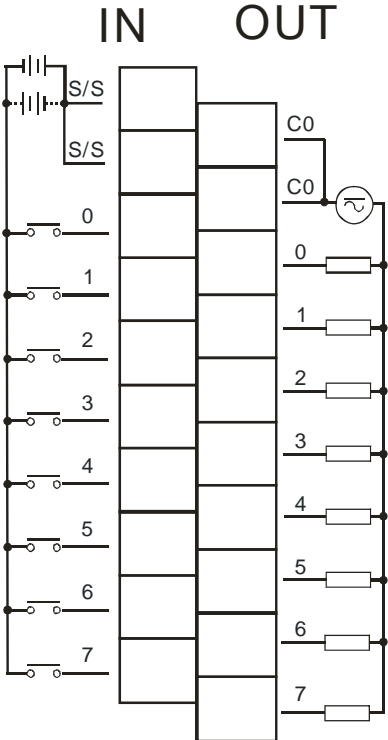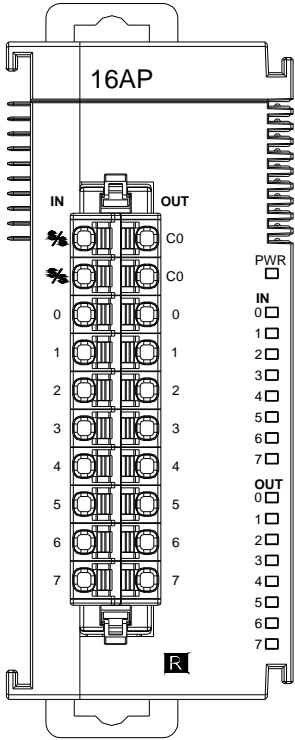
5.4.10 Wiring AS16AP11T-A

Input form	Direct current (sinking or sourcing)
Voltage specifications	24 VDC, 5 mA
Output type	Transistor-T (sinking)
Voltage specifications	5~30 VDC, 0.5 A
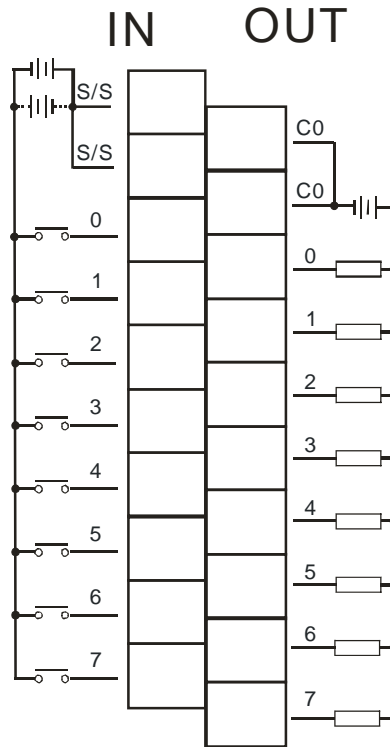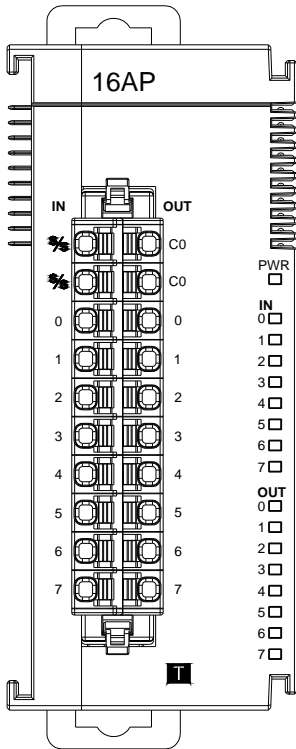
5.4.11 Wiring AS16AP11P-A

Input form	Direct current (sinking or sourcing)
Voltage specifications	24 VDC, 5 mA
Output type	Transistor-P (sourcing)
Voltage specifications	5~30 VDC, 0.5 A
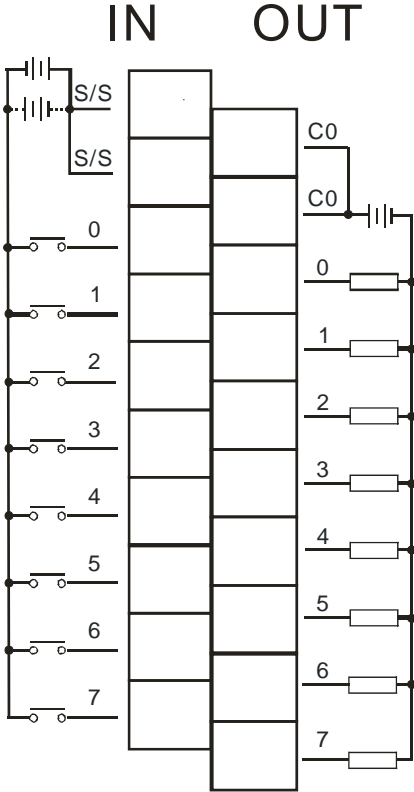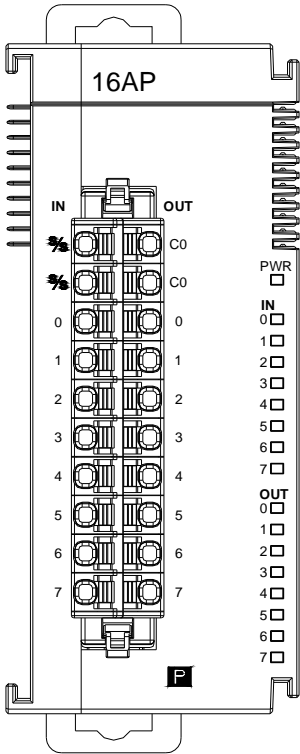
5.4.12 Wiring AS32AM10N-A

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	24 VDC, 5 mA

Length:
UC-ET010-24D(1M)(28AWG)
UC-ET020-24D(2M)(28AWG)
UC-ET030-24D(3M)(28AWG)
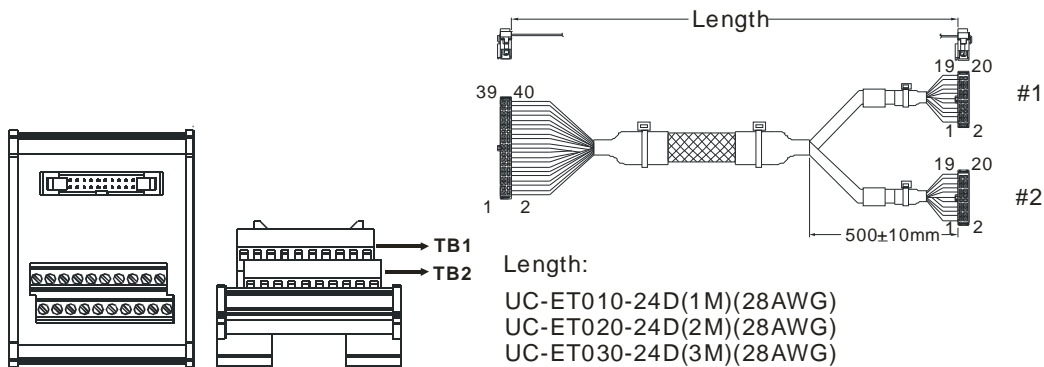
| #2 | TB1 | X0.0 | X0.2 | X0.4 | X0.6 | X0.8 | X0.10 | X0.12 | X0.14 | S/S | - |
| | TB2 | X0.1 | X0.3 | X0.5 | X0.7 | X0.9 | X0.11 | X0.13 | X0.15 | S/S | - |

Wiring the External Terminal Module UB-10-ID32A

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

Length:

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

24 V DC, 5 mA
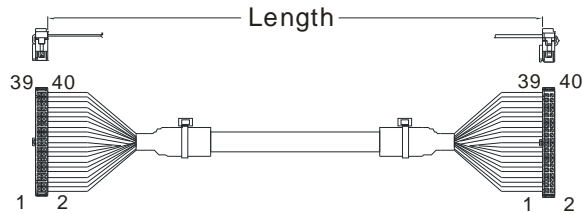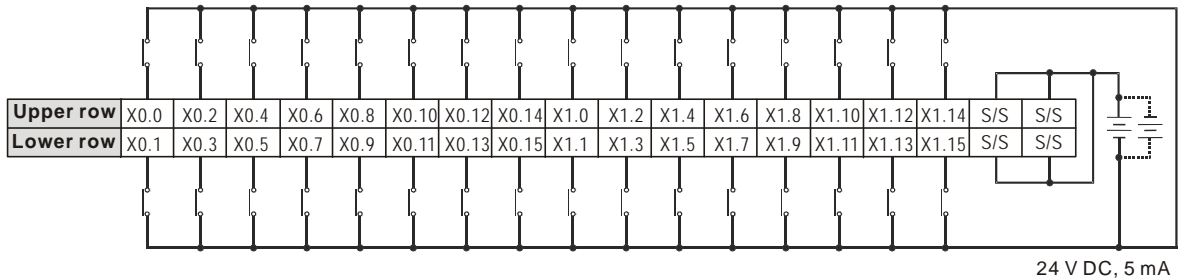
5.4.13 Wiring AS32AN02T-A

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

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	5~30 VDC, 0.1 A

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 250 VAC, 30 VDC, 2 A

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

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

Wiring the External Terminal Module UB-10-OT32A

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

Length:

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

	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	•	•
Upper row																		
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

5.4.14 Wiring AS64AM10N-A

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

Length:
UC-ET010-24D(1M)(28AWG)
UC-ET020-24D(2M)(28AWG)
UC-ET030-24D(3M)(28AWG)
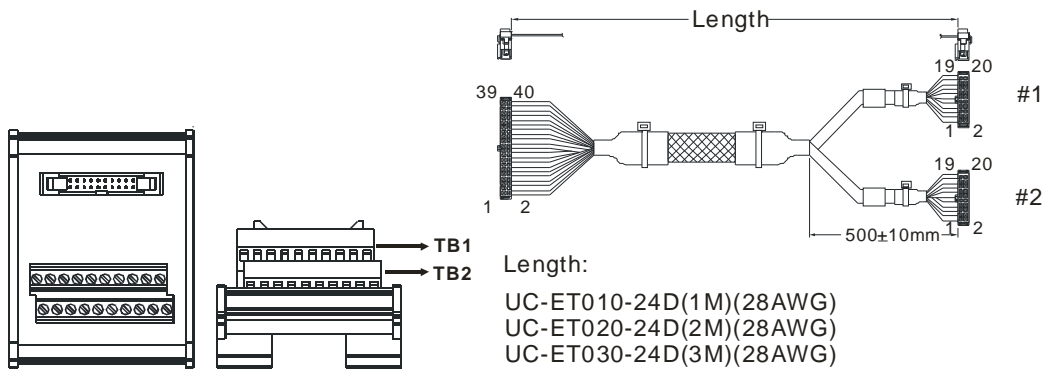
#2	TB1	X0.0	X0.2	X0.4	X0.6	X0.8	X0.10	X0.12	X0.14	S/S	-
	TB2	X0.1	X0.3	X0.5	X0.7	X0.9	X0.11	X0.13	X0.15	S/S	-

Wiring the External Terminal Module UB-10-ID32A

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
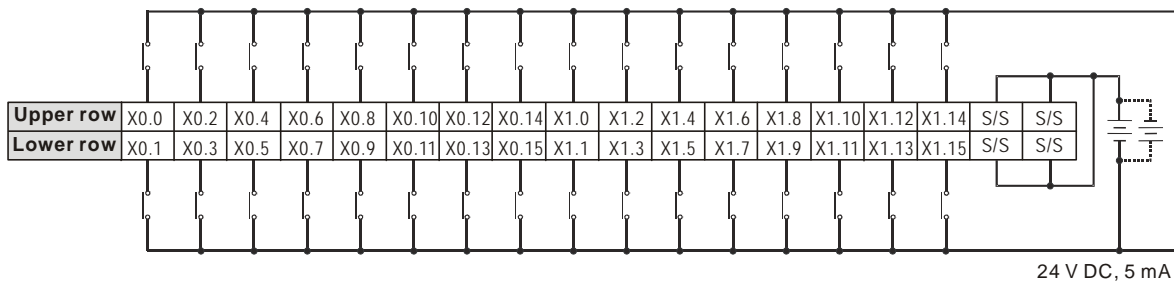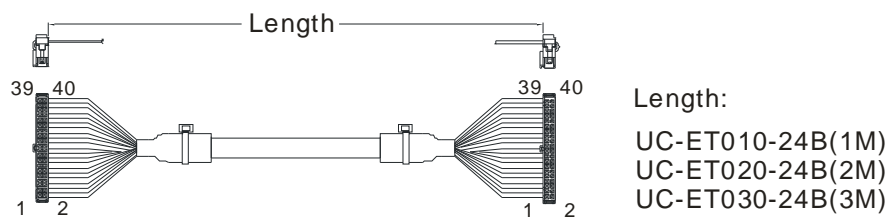
5.4.15 Wiring AS64AN02T-A

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

OUT
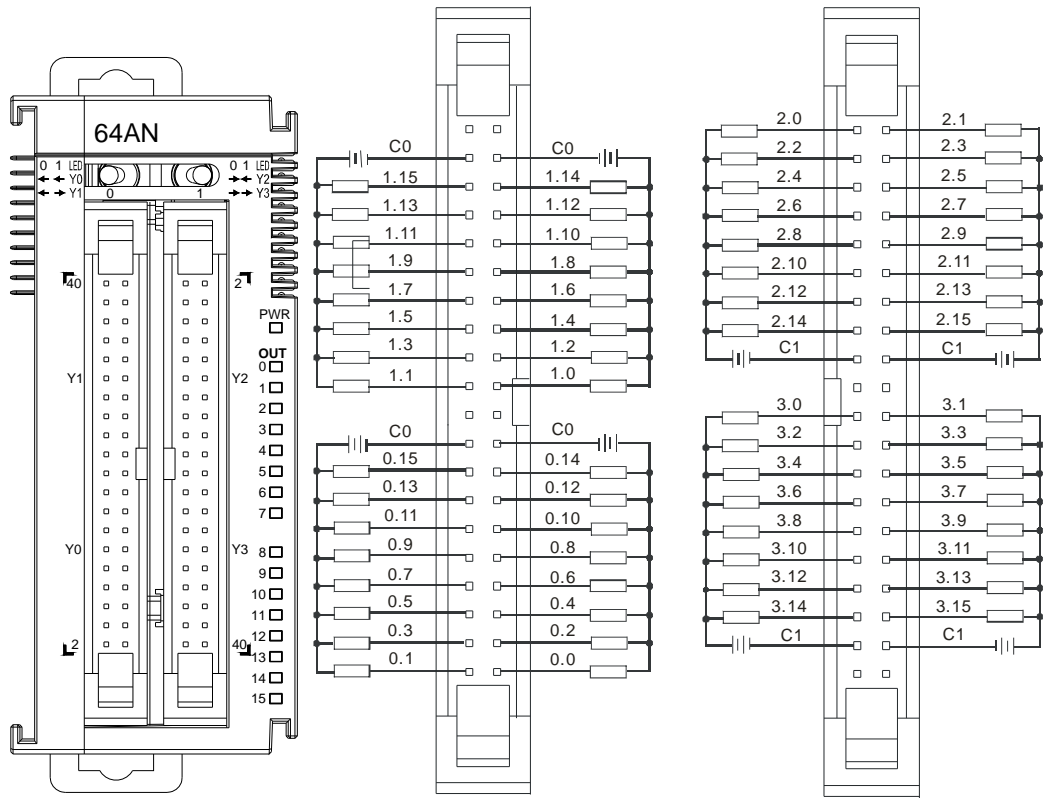
Wiring the External Terminal Module UB-10-ID16A

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

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

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 250 VAC, 30 VDC, 2 A

Length:

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

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

Wiring the External Terminal Module UB-10-OT32A

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

Length:

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

	Upper row																			
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	

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 the 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.
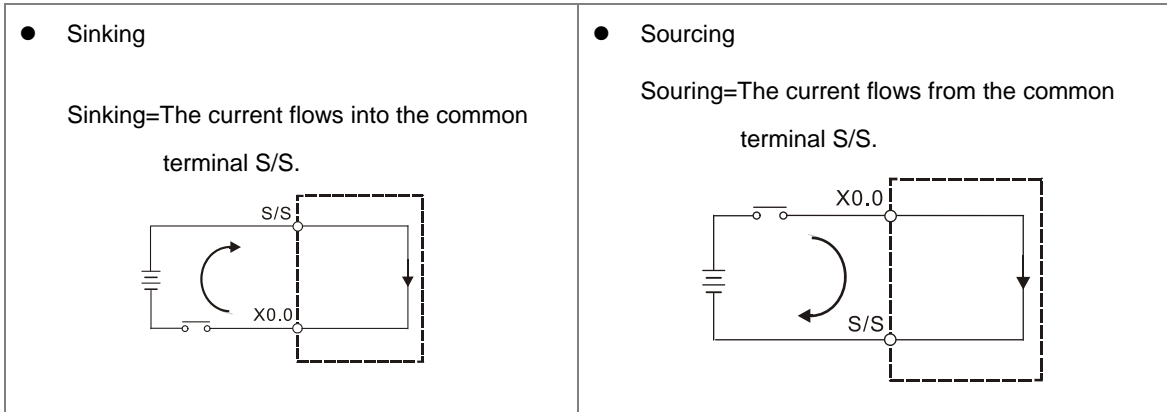
5.5.1.2 Relay Type

- Sinking
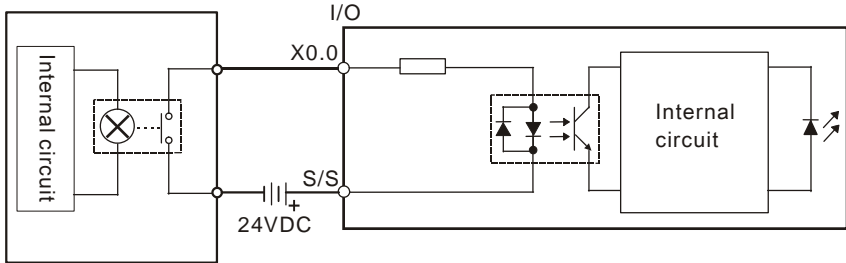
- Sourcing
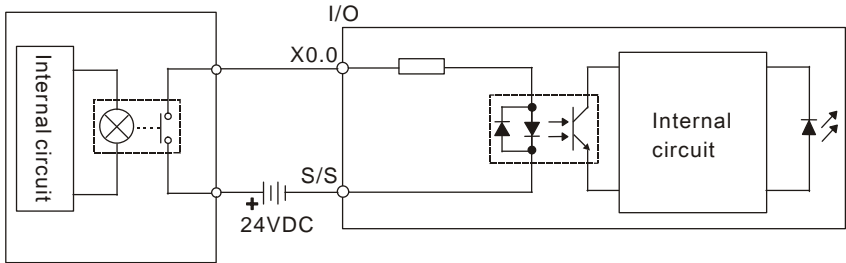
5.5.1.3 Open-collector Input Type

● Sinking

(NPN transistor whose collector is open)

NPN
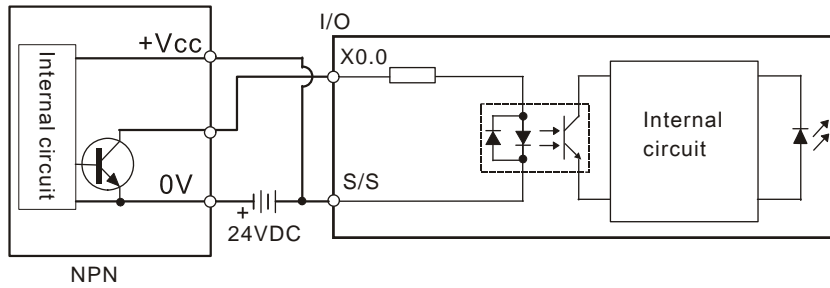
● Sourcing

(PNP transistor whose collector is open)

PNP
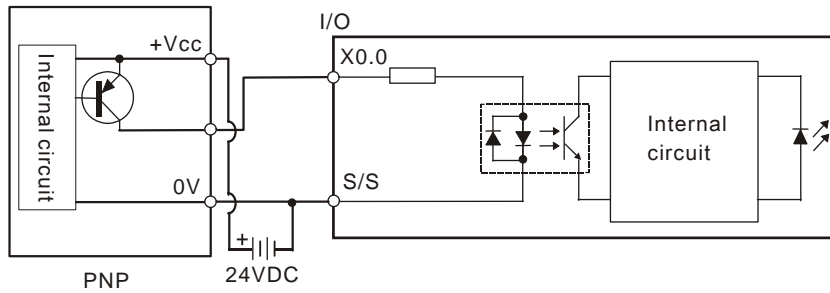
5.5.1.4 Two-wire Proximity Switch

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, connect the divider resistance Rb using the formula below.

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

● Sinking
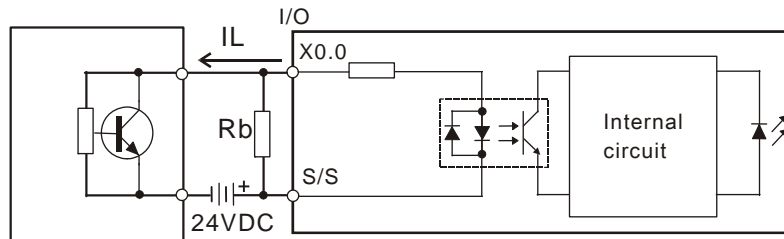
Two-wire proximity switch

- Sourcing
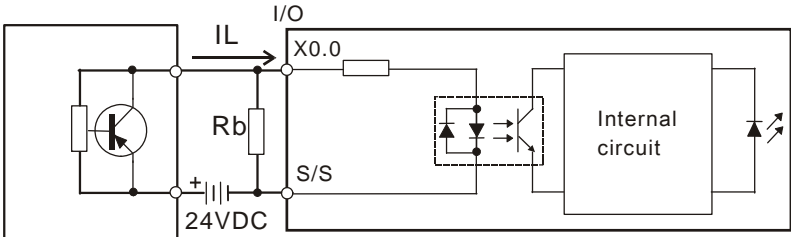
Two-wire proximity switch

5.5.1.5 Three-wire Switch

- Sinking
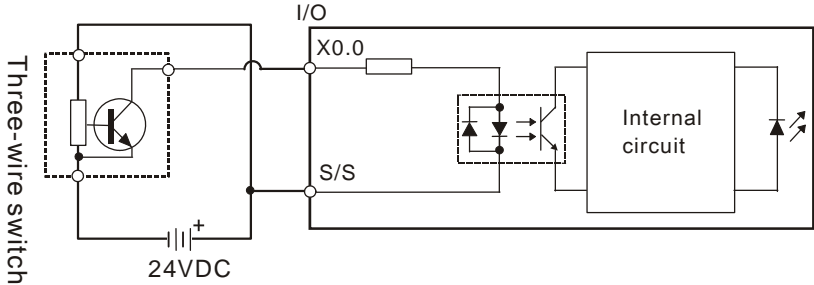
- Sourcing
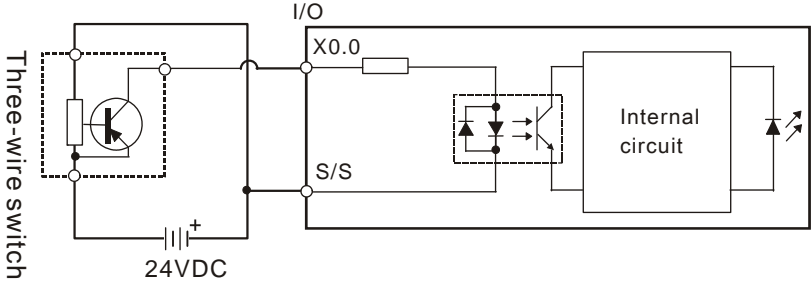
5.5.1.6 Optoelectronic Switch

- Sinking
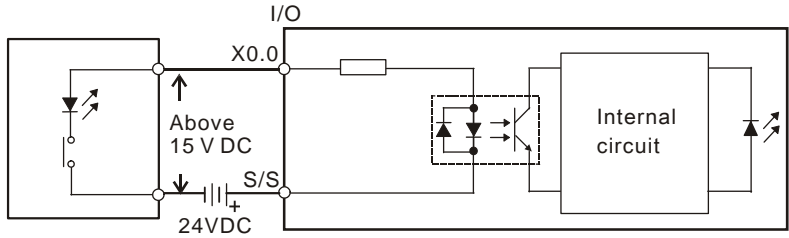
Optoelectronic switch

● Sourcing

Optoelectronic switch
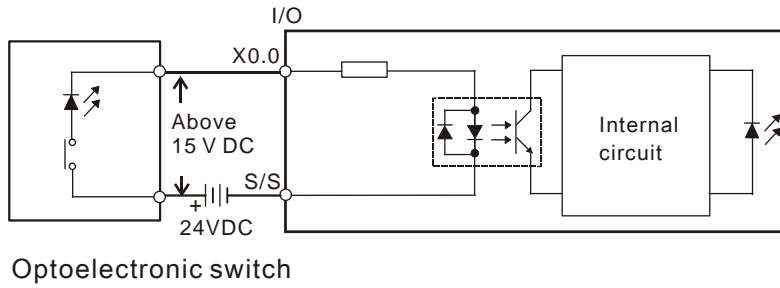
5.5.1.7 Differential Input
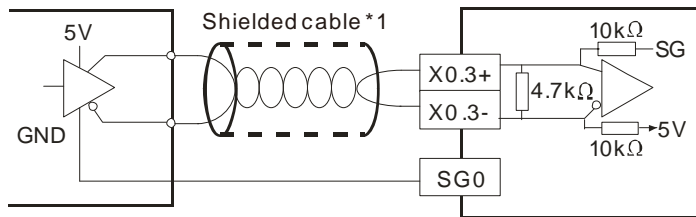
5.5.2 Wiring Digital Output Terminals

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
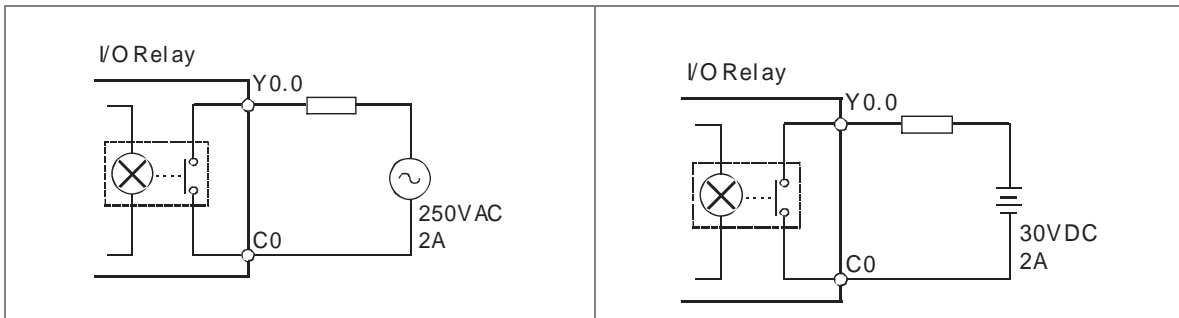
2. Transistor output
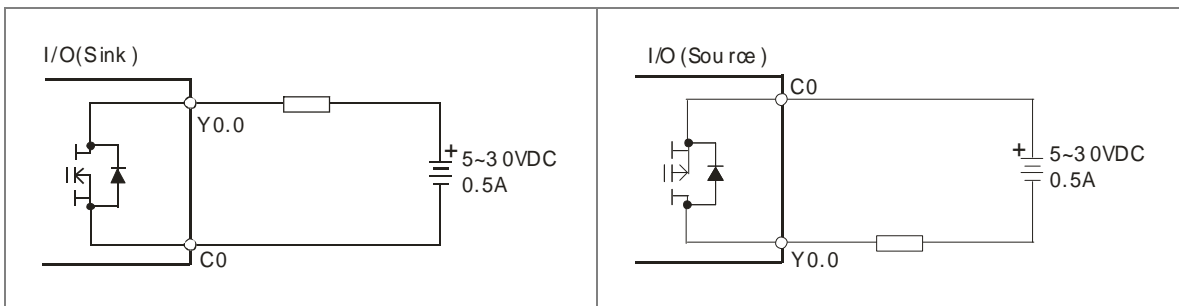
3. Differential output
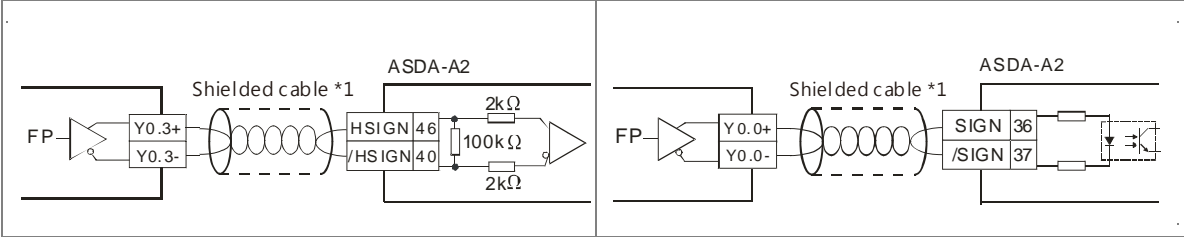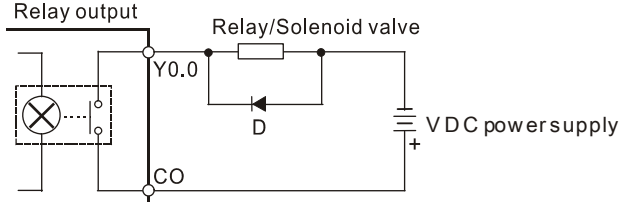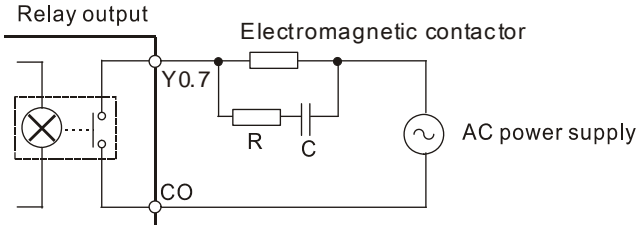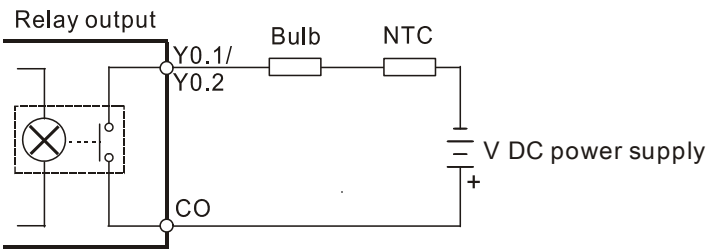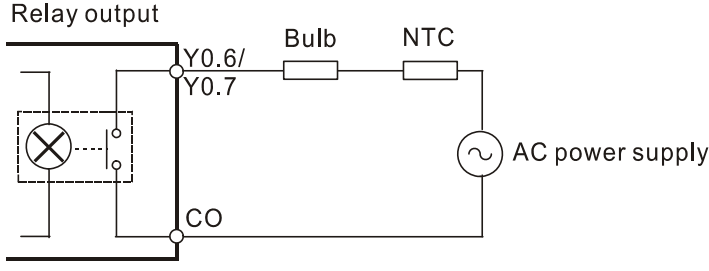
5.5.2.2 Relay Output Circuit

Relay terminals have no polarity. They can be used with alternating current that passes through a load, or with direct current that passes through a load. The maximum current that can pass through every relay terminal is 2 A, and the maximum current that can pass through every common terminal is 5 A. The lifetime of a relay terminal varies with the working voltage, the load type (the power factor cosψ), 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 using an external switch.
③	Fuse: to protect the output circuit, a fuse having a breaking capacity between 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 that occurs when the load is OFF.
⑥	An electromagnetic contactor is used as an AC load. A resistor and a capacitor are connected in parallel to absorb the surge voltage that occurs when the load is OFF.
⑦	A bulb (incandescent lamp) is used as a DC load. A thermistor is connected in series to absorb the surge current that occurs when the load is ON. A bulb (neon lamp) is used as an AC load. A thermistor is connected in series to absorb the surge current that occurs when the load is ON.
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. This interlock circuit 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)

[Figure 1]

Low-power

D: 1N4001 diode

[Figure 2]

High-power
Frequently ON/OFF

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

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. This interlock circuit 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

Definitions of the terminals

◆ Two/three-wire (passive sensor): the sensor and the system share the same power circuit.

◆ Four-wire (active sensor): the sensor uses an independent power supply and should not share the same power circuit with the system.

◆ Note: use cables with the same length (less than 200 m) and use terminal resistors of less than 100 ohm.

5.6.1 Wiring AS04AD-A
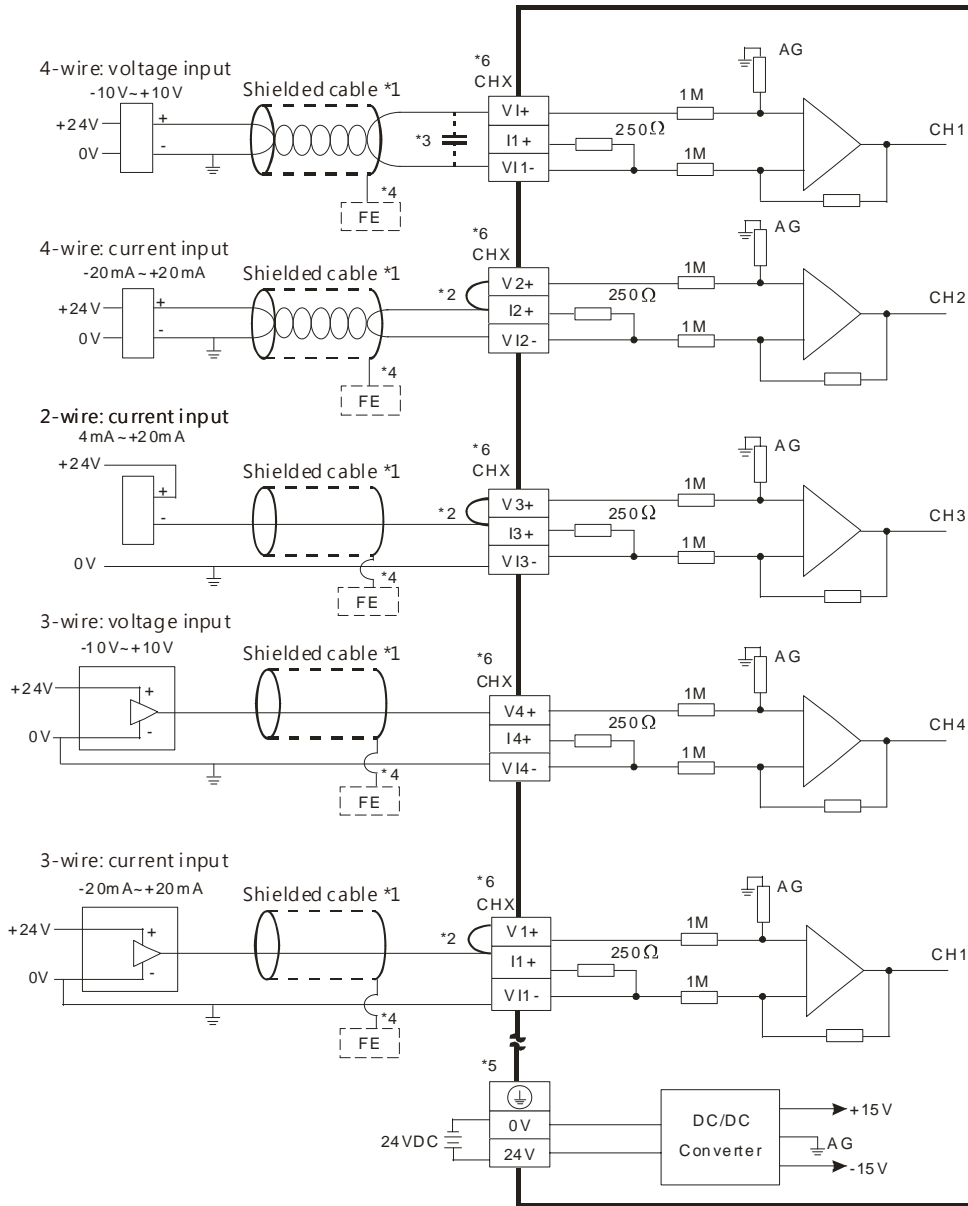
*1. Use shielded cables to isolate the analog input signal cable from other power cables.

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

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

*4. Connect FE of the shielded cable to ground.

*5. Connect the terminal ⏚ to ground.

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

5.6.2 Wiring AS08AD-B
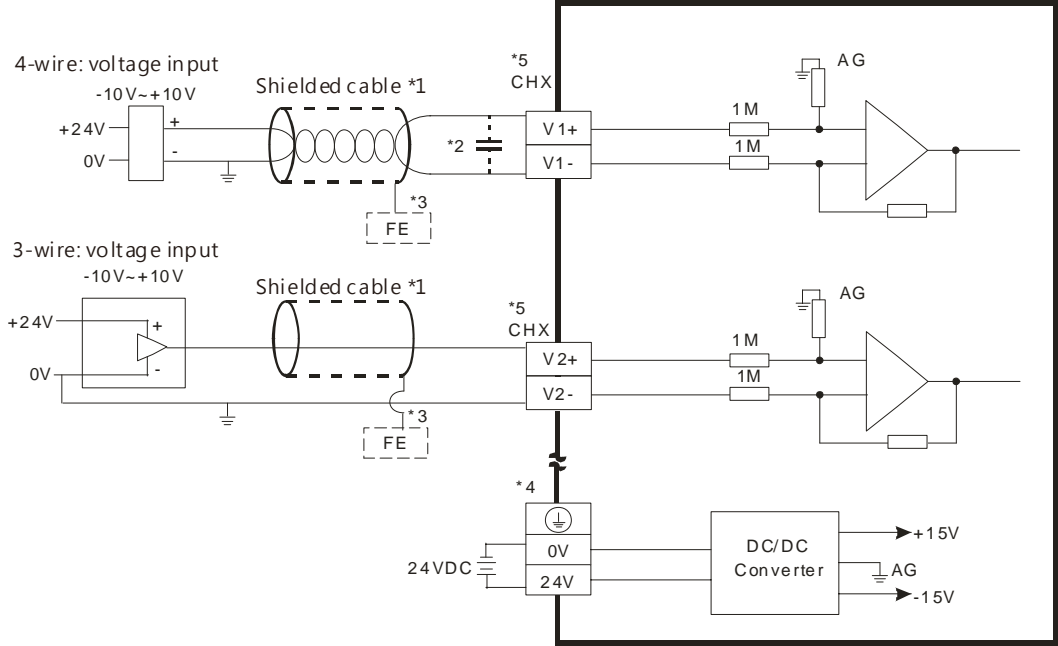
*1. Use shielded cables to isolate the analog input signal cable from other power cables.

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

*3. Connect FE of the shielded cable to ground.

*4. Connect the terminal ⏚ to ground.

*5. Every channel can work with the wiring shown above.

5.6.3 Wiring AS08AD-C
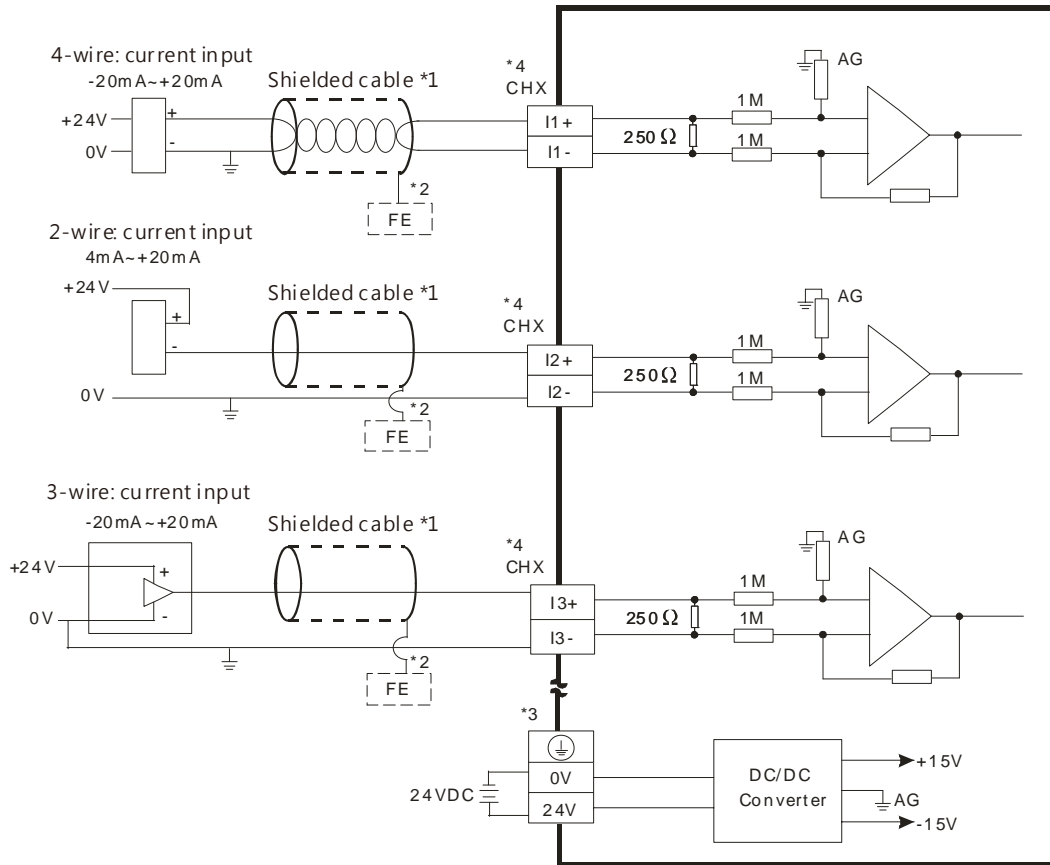
*1. Use shielded cables to isolate the analog input signal cable from other power cables.

*2. Connect FE of the shielded cable to ground.

*3. Connect the terminal ⊕ to ground.

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

5.6.4 Wiring AS04DA-A
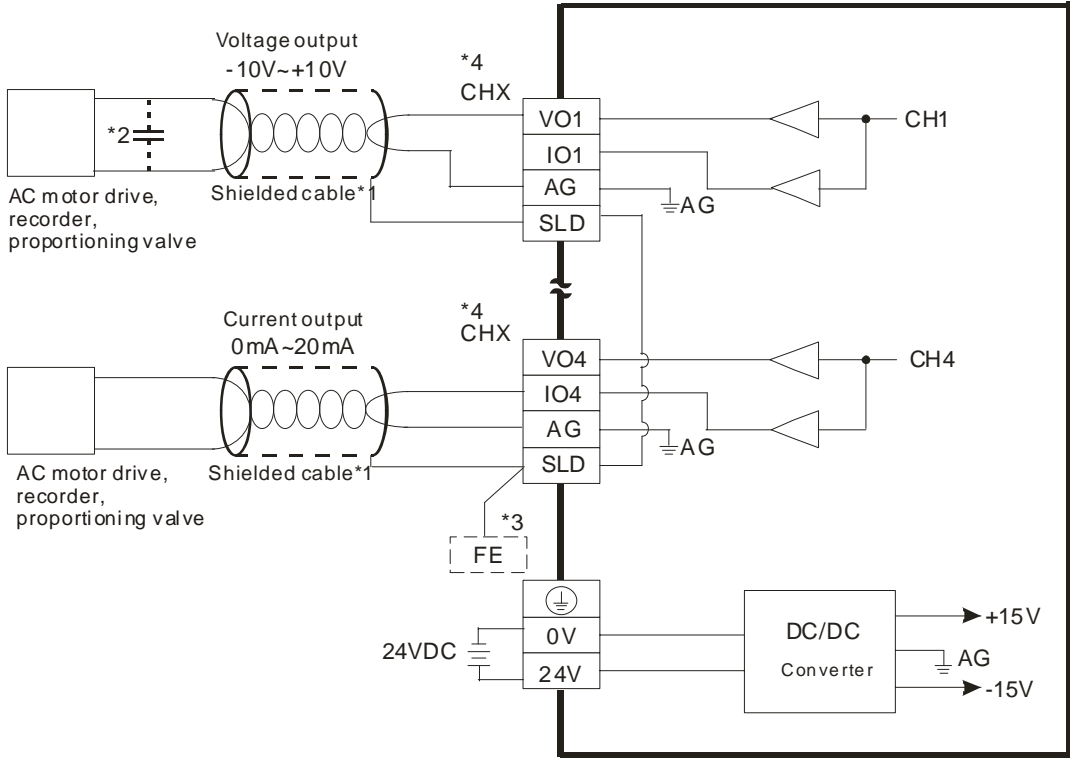
*1. Use shielded cables to isolate the analog input signal cable from other power cables.

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

*3. Connect the SLD to FE. Connect FE and the terminal ⏚ to ground.

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

5.6.5 Wiring AS06XA-A
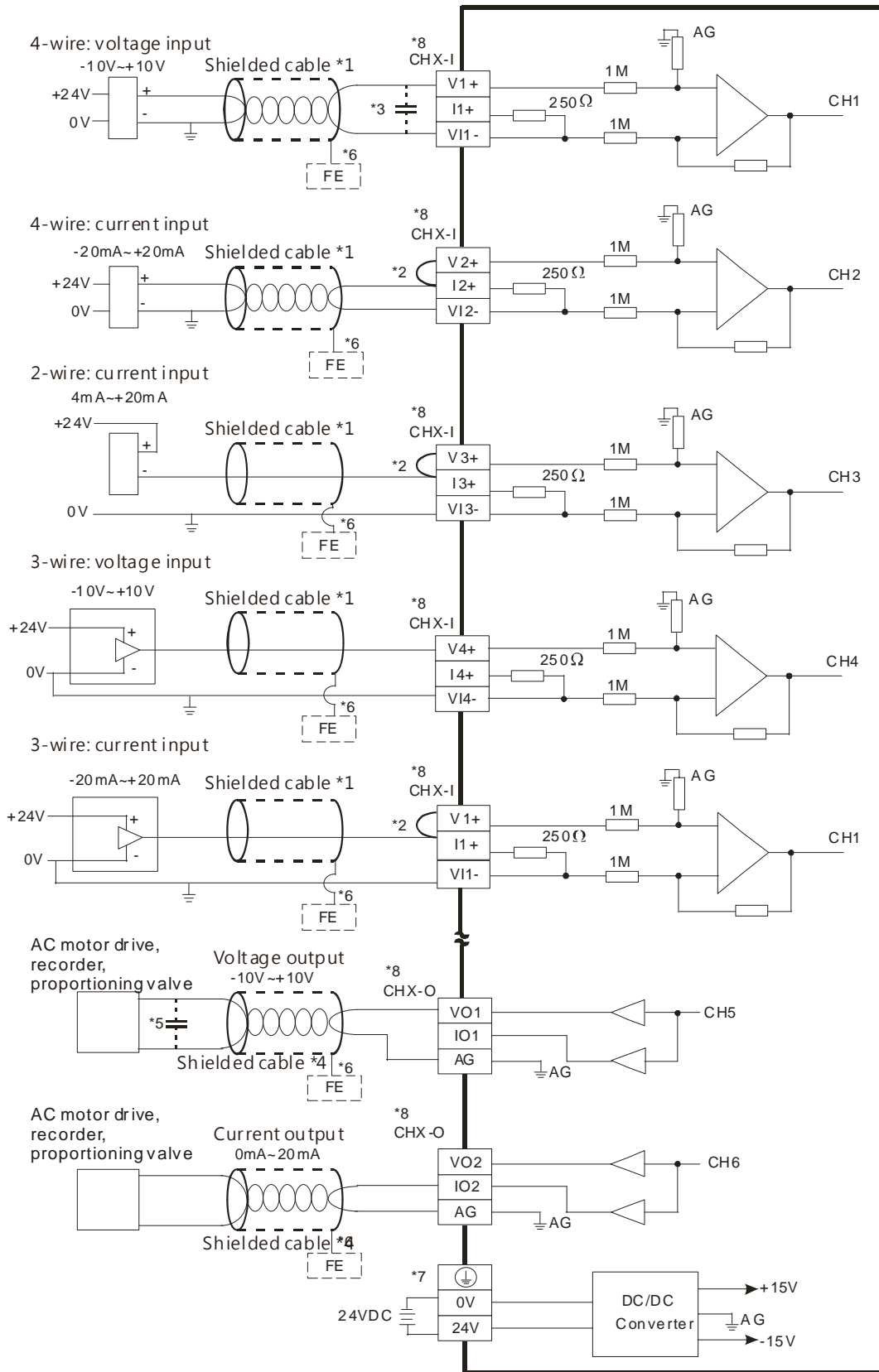
*1. Use shielded cables to isolate the analog input/output signal cable from other power cables.

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

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

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

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

*6. Connect FE of the shielded cable to ground.

*7. Connect the terminal ⏚ to ground.

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

5.7 Wiring Temperature Measurement Modules

5.7.1 Wiring AS04RTD-A
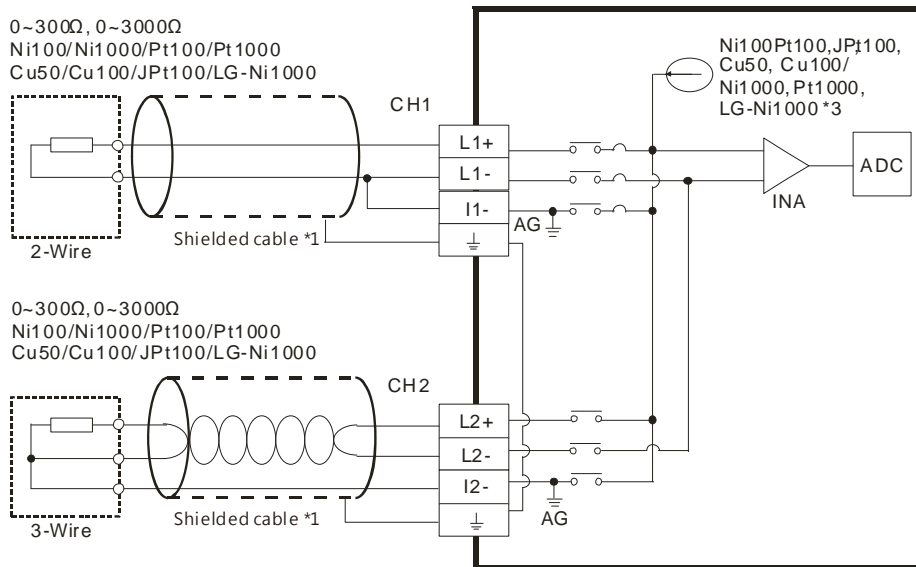
*1. The cable connected to the input terminal should be the cable or the shielded twisted pair cable connected to an Ni100/Ni1000, Pt100/Pt1000, Cu50/Cu100, JPt100, LG-Ni1000 sensor. It should be kept separate from other power cables and cables that generate noise. Use a three-wire temperature sensor. If you 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 you want to measure resistance between 0 Ω to 300 Ω, use a two-wire or three-wire sensor instead of a four-wire sensor.

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

◆ Note: use cables with the same length (less than 200 m) and use terminal resistors of less than 20 ohm.

5.7.2 Wiring AS06RTD-A
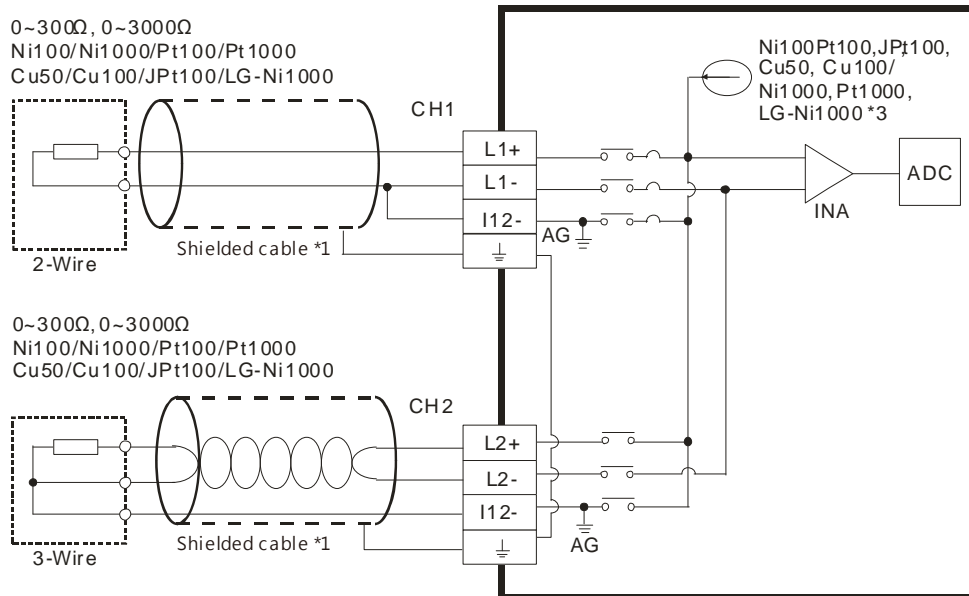
*1. The cable connected to the input terminal should be the cable or the shielded twisted pair cable connected to an Ni100/Ni1000, Pt100/Pt1000, Cu50/Cu100, JPt100, LG-Ni1000 sensor. It should be kept separate from other power cables and cables that generate noise. Use a three-wire temperature sensor. If you want to use a two-wire temperature sensor, Ln+ and In+ must be short-circuited, and Ln- and In- must be short-circuited (n=1–6).

*2. If you want to measure resistance between 0 Ω to 300 Ω, use a two-wire or three-wire sensor instead of a four-wire sensor.

*3. You must select an appropriate sensor. If using an Ni100, Pt100, Cu50/Cu100, JPt100, or a resistance sensor, the internal excitation current is 1.0389 mA. If using an Ni1000, Pt1000 or LG-Ni1000 temperature sensor, the internal excitation current is 208.3 µA.

◆ Note: use cables with the same length (less than 200 m) and use terminal resistors of less than 20 ohm.

5.7.3 Wiring AS04TC-A / AS08TC-A
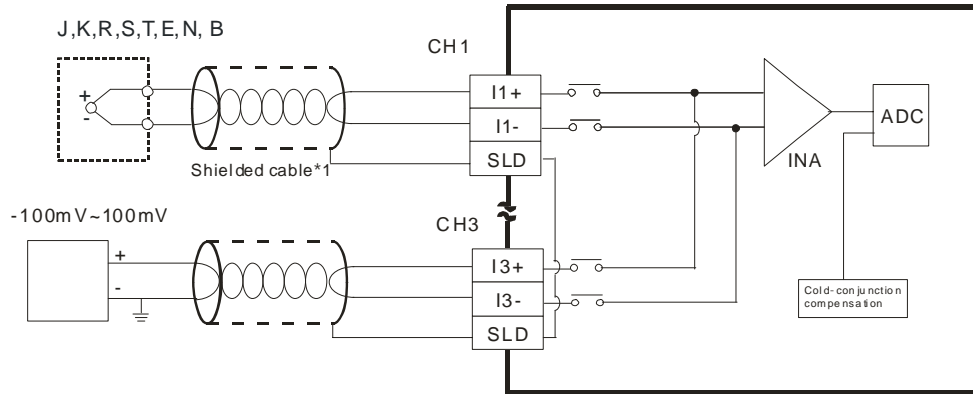
*1. The cable connected to the input terminal should be the cable or the shielded twisted pair cable connected to a type J, K, R, S, T, E, N, B thermocouple. It should be kept separate from other power cables and cables that generate noise.

Note1: do not wire empty terminals.

Note2: only use copper conducting wires with a temperature rating of 60/75°C and the length must be less than 50 m.

Note3: TC modules must run for 30 minutes before they start to take any temperature measurement.

5.8 Wiring Positioning Modules

5.8.1 Wiring AS02PU-A
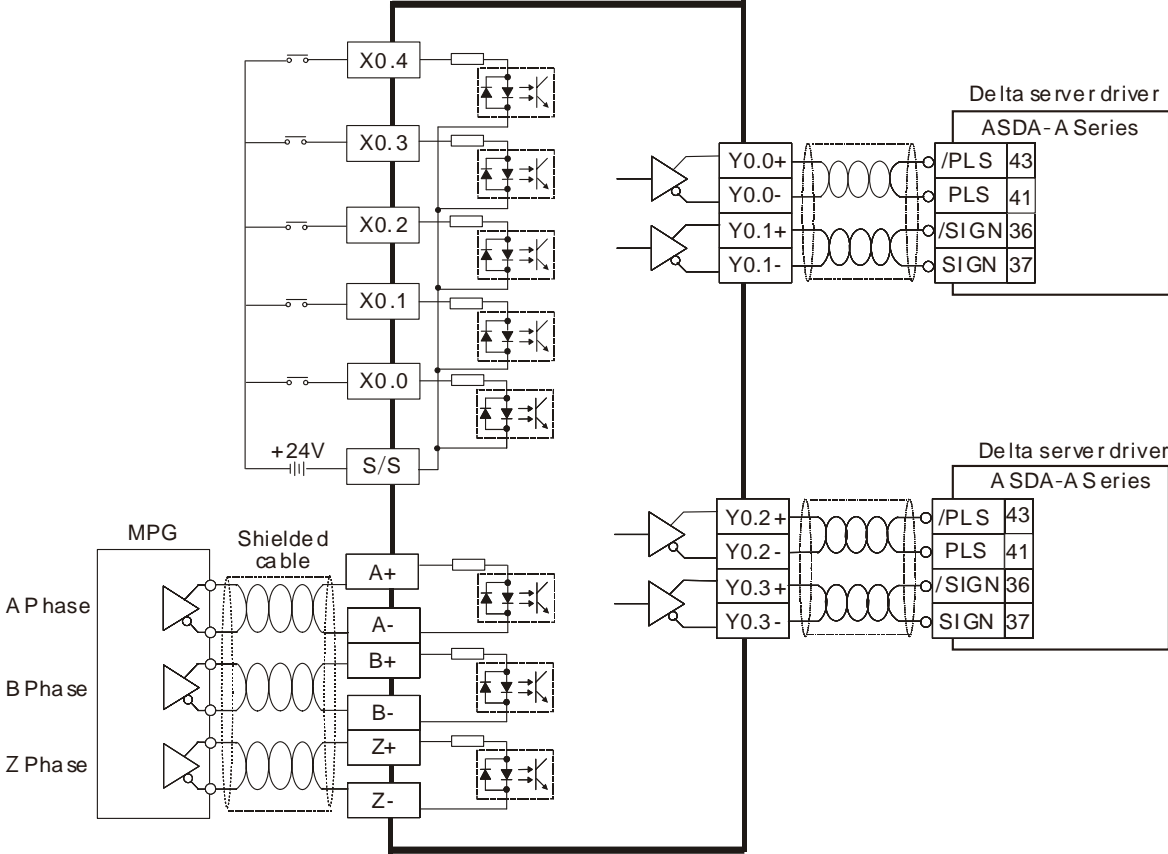
5.8.2 Wiring AS04PU-A
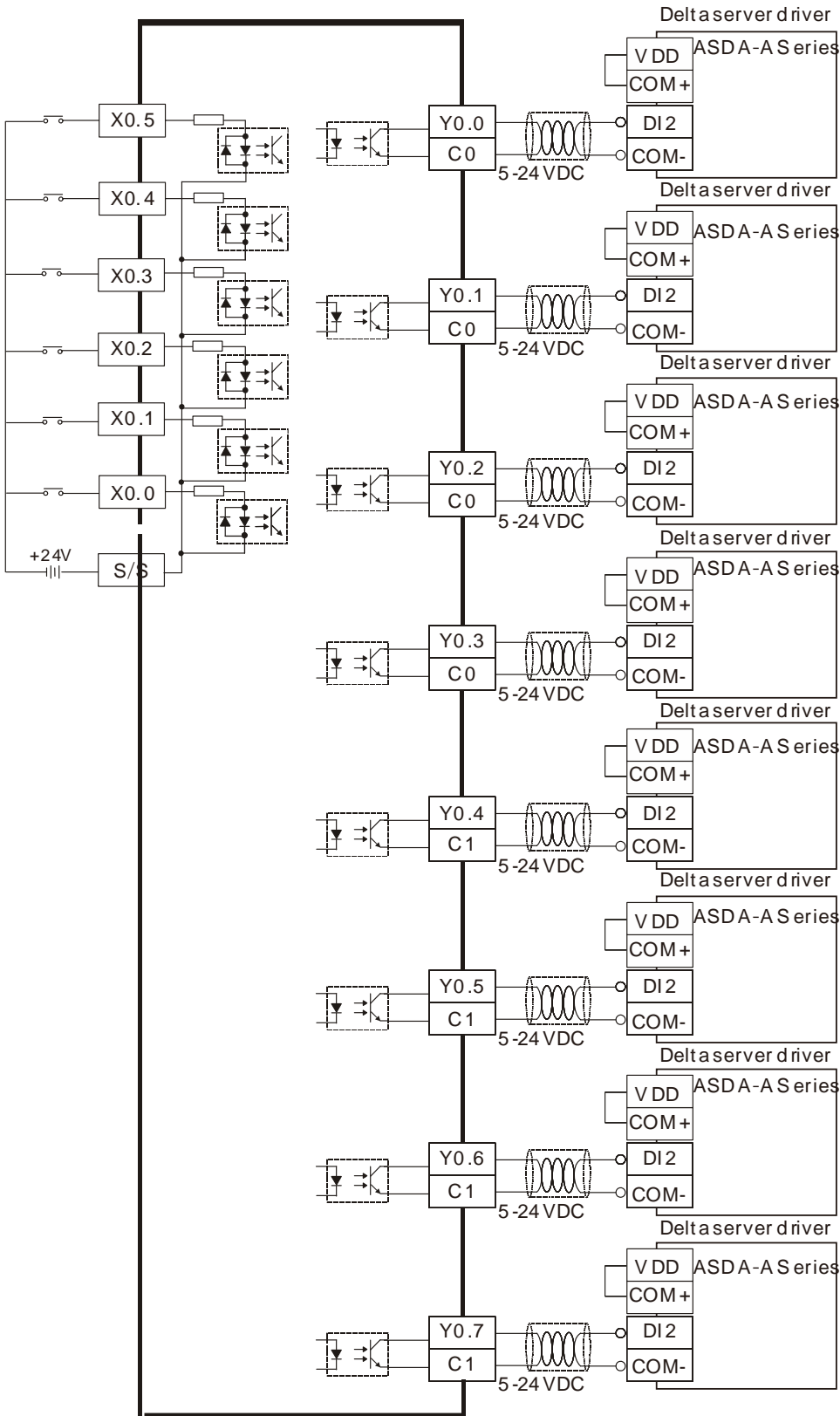
5.9 Load Cell Modules

5.9.1 Wiring AS02LC-A
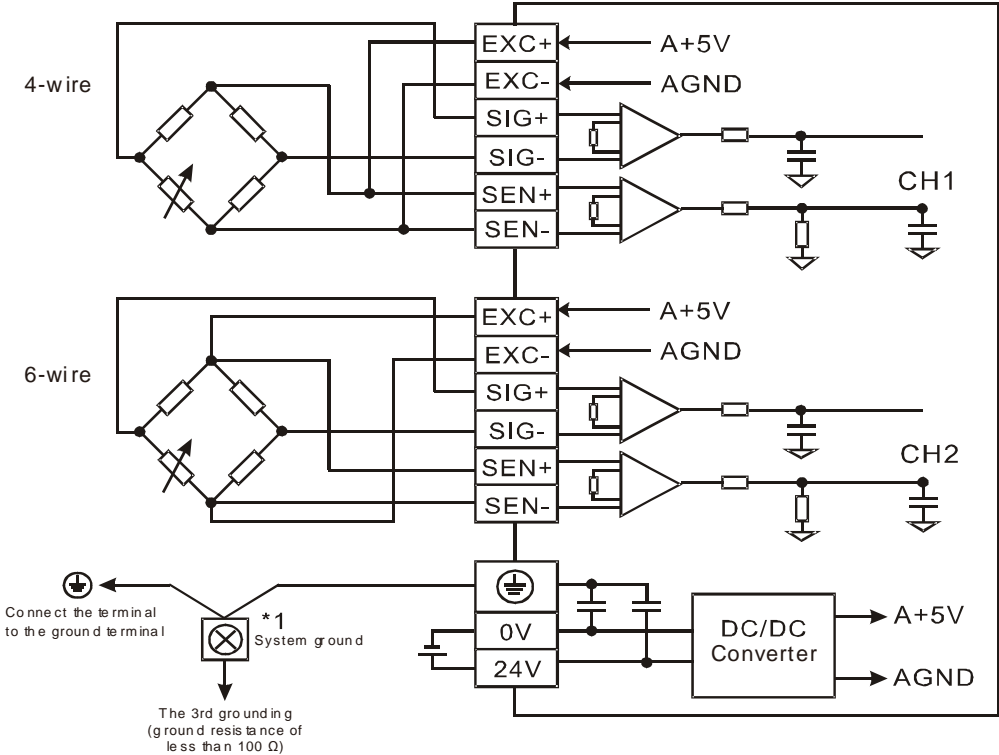
● Multiple load cells connected to one load cell module:
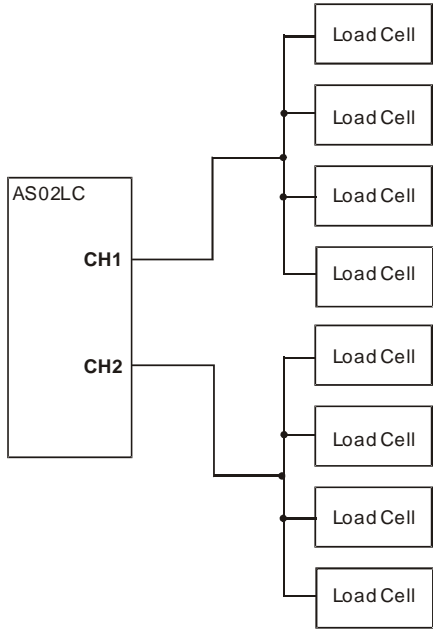
*1. Connect the ⏚ of the power module and the ⏚of the load cell module to the system ground terminal. Use the system ground as the third grounding or connect it to the control box.

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

5.10 Wiring Network Modules

5.10.1 AS00SCM-A
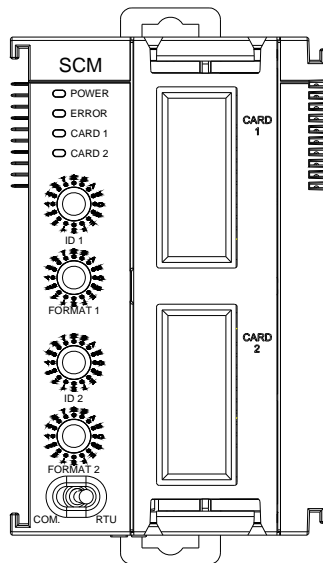
5.10.2 Wiring AS00SCM-A

5.10.2.1 AS00SCM-A module wiring for communication

● COM communication mode

AS00SCM-A module has with two function card slots, CARD1 and CARD2, supporting function cards AS-F232, AS-F422, and AS-F485. Refer to Section 5.11 for wiring.

● RTU remote control mode

The card slot CARD2 supports AS-FCOPM and both CARD1 & CARD2 support AS-FEN02. Refer to Section 5.11 for wiring.

5.10.2.2 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. To avoid errors, do not supply extra power to this module.

● RTU remote control mode

Switch the dip switch of the AS00SCM-A module to RTU. This module uses an independent direct-current power supply. Note the following when wiring.

(1) Keep the input cables, the output cables, and the power cable separate from 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. Do not bundle 110 VAC cable, 220 VAC cable, 24 VDC cable, the (high-voltage high-current) main circuit,

and the I/O signal cable together. The distance between adjacent cables should be more than 100 millimeters.

(3) Use single-wire cables or two-wire cables with a diameter of 20 AWG~14 AWG. Only use copper conducting wires with a temperature rating of 60/75°C.
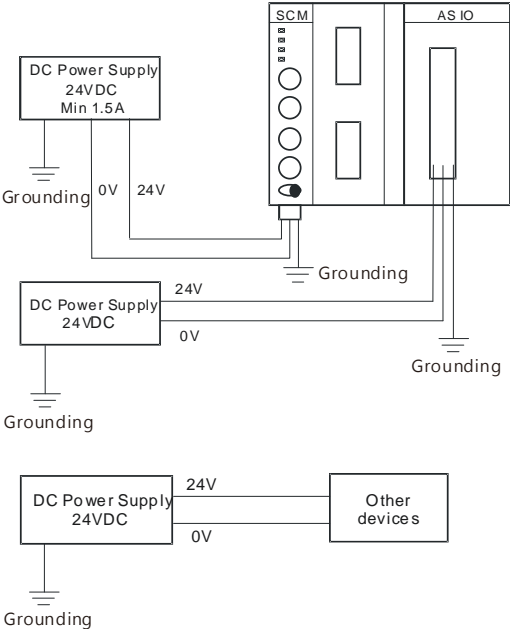
5.10.3 AS01DNET-A
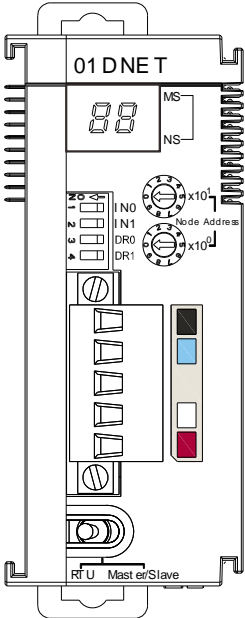
5.10.4 Wiring AS01DNET-A

The network requires one or multiple supply powers to supply the power to each piece of network equipment via the bus cable. Delta DeviceNet communication cable consists of five wires, among which the power cable and signal cable occupy two wires respectively and the one on the left is the shielded wire as the above figure shows. The supply power for the bus is optional and could be a single supply power or multiple supply powers according to the actual demand.

● **Single Supply Power**

● **Multiple Supply Powers**

Wiring of multiple supply powers on the network
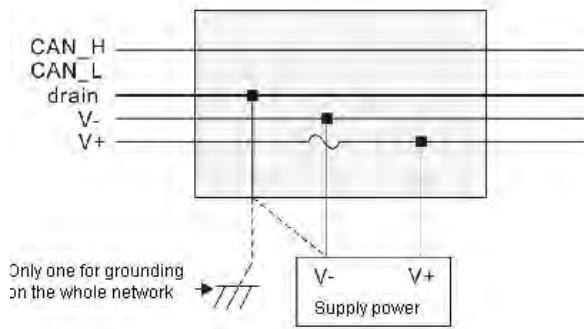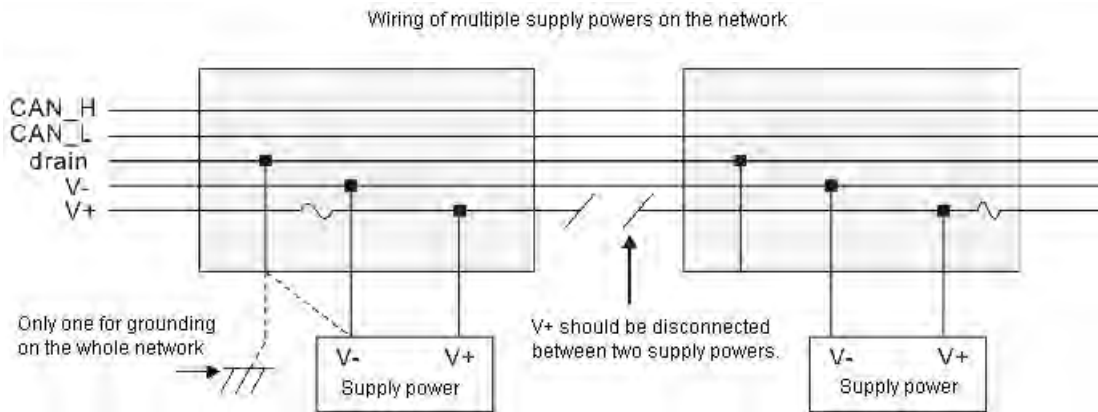
5.11 Wiring Function Cards
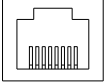
5.11.1 Communicational Function Card Profiles and the Pin Definitions

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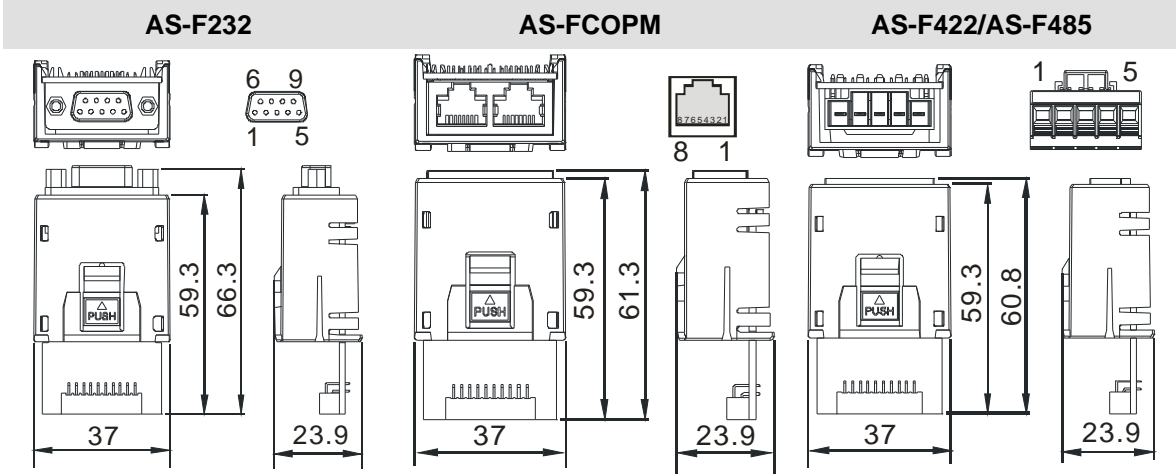
Pin no.	AS-F232	AS-FCOPM	AS-F422	AS-F485
1	-	CAN_H	R+	-
2	TX	CAN_L	R-	-
3	RX	GND	T+	D+
4	-	-	T-	D-
5	GND	-	SG	SG
6-9	-	-		

AS-FEN02
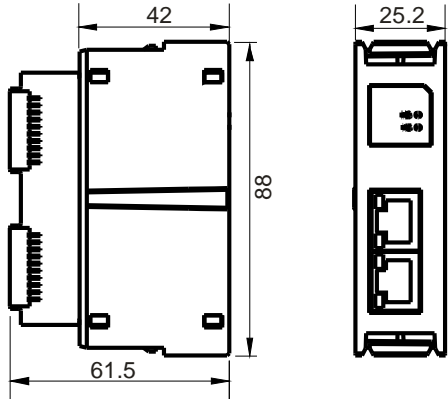
1 TX+	2 TX-	3 RX+	4 N/C
5 N/C	6 RX-	7 N/C	8 N/C

5.11.2 Wiring the Communicational Function Cards

■ **AS-F232 wiring example:**

DB9 male to DB9 female (standard cable)
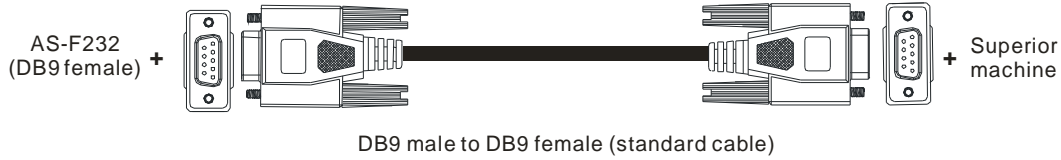
■ **AS-F422 wiring example:**
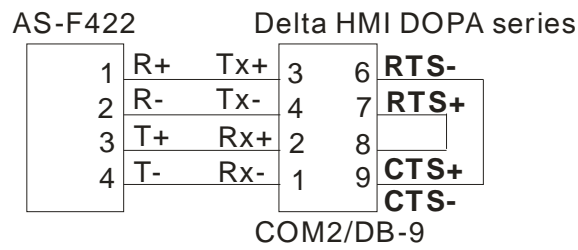
■ **AS-F485 wiring example:**
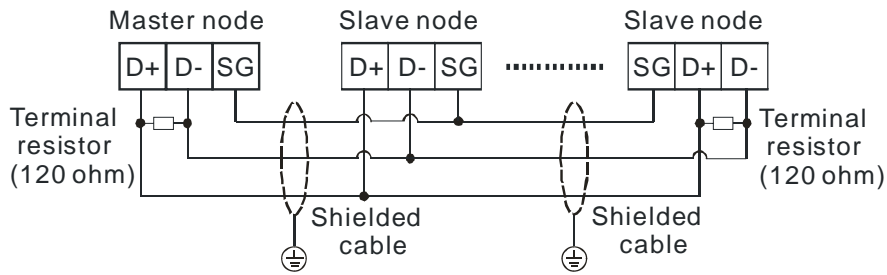
■ **AS-FCOPM wiring example:**
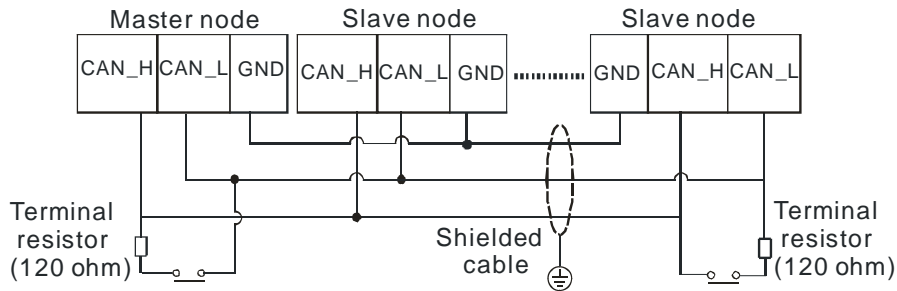
■ AS-FEN02 wiring example:
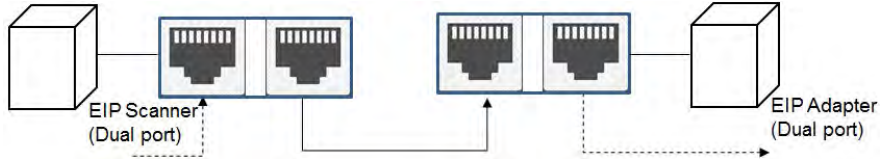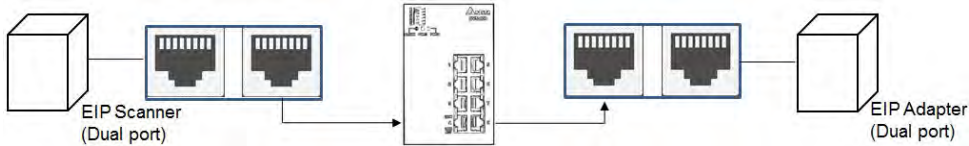
5-69

● **Linear Topology**

● **Star Topology**

● **Ring Topology**

A DLR function is required to create a ring topology.

When a switch is needed for topology, the switch should support the DLR function. If not, the connection might fail.
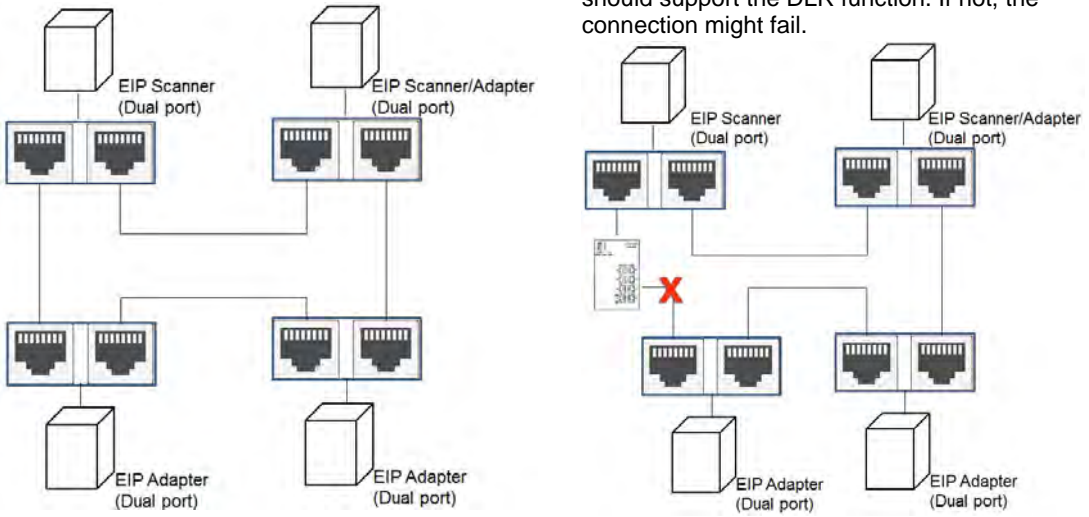
5.11.3 Analog Function Card Profiles and the Pin Definitions
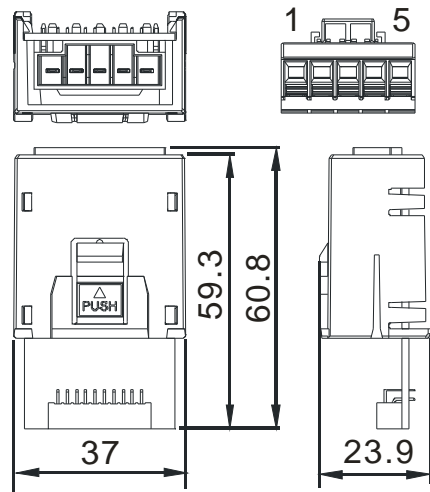
Pin no.	AS-F2AD	AS-F2DA
1	V1+	VO1
2	I1+	IO1
3	V2+	VO2
4	I2+	IO2
5	COM	COM

5.11.4 Wiring AS-F2AD
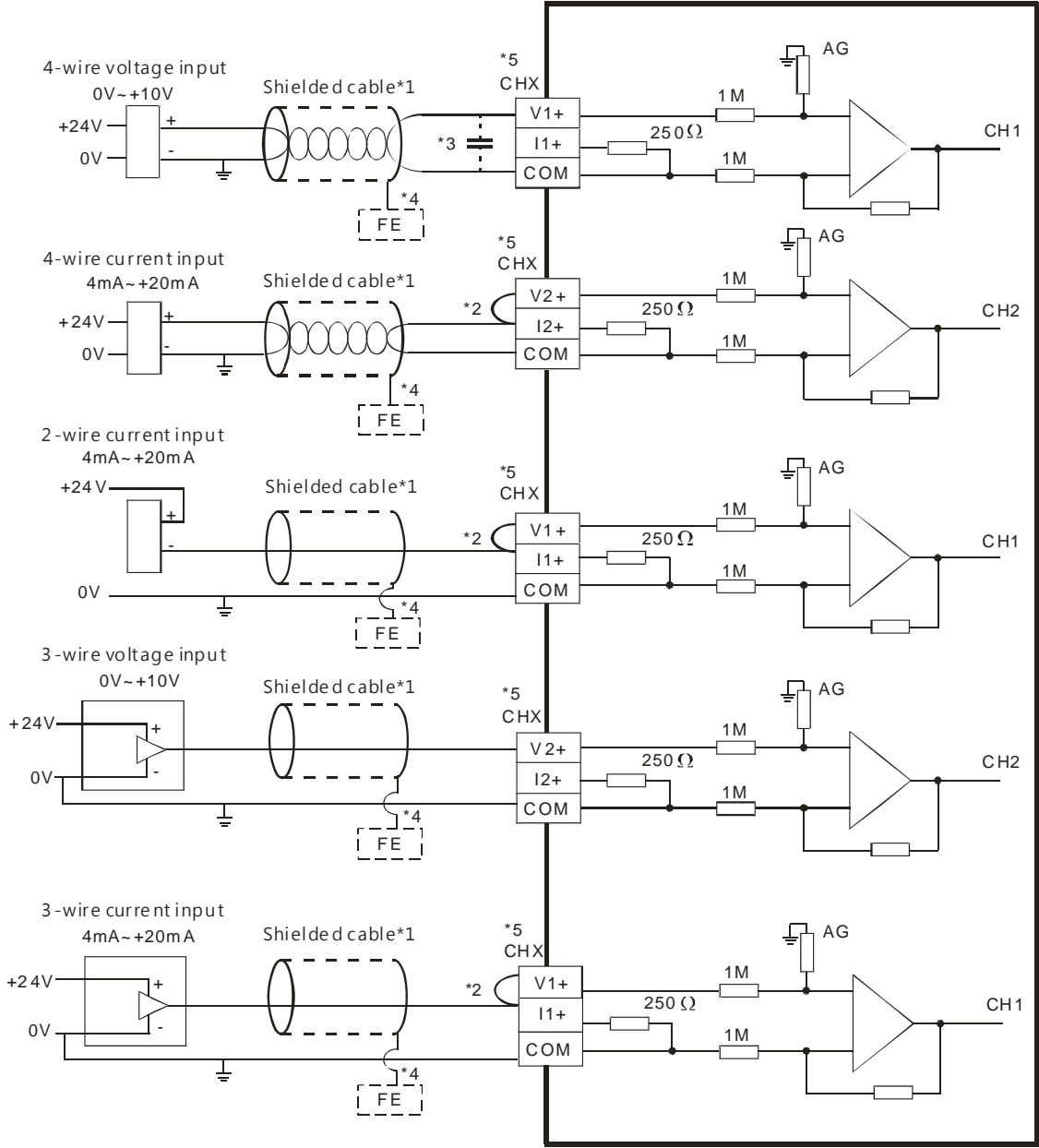
*1. Use shielded cables to isolate the analog input signal cable from other power cables.

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

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

*4. Connect FE of the shielded cable to ground.

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

5.11.5 Wiring AS-F2DA
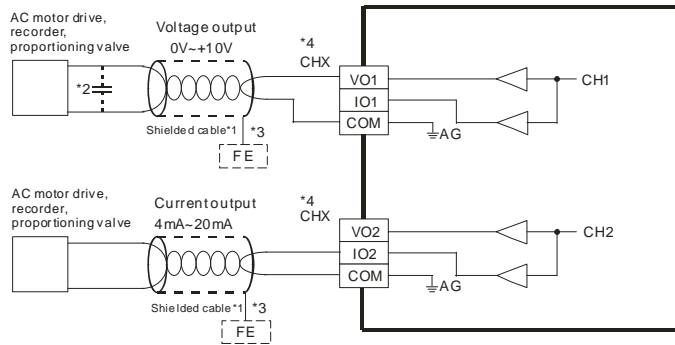
*1. Use shielded cables to isolate the analog input signal cable from other power cables.

*2. If noise in the input voltage results in noise interference in the wiring, Connect the module to a capacitor with a capacitance between 0.1–0.47 μF with a working voltage of 25 V.

*3. Connect FE of the shielded cable to ground.

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

5

Memo

5-73

Chapter 6   Memory Card

Table of Contents

6.1 Memory Card Overview

The AS Series CPU modules support standard MicroSD cards that meet the specifications in this chapter. This chapter describes the specifications and usage for the MicroSD cards supported by the AS series CPU modules. You can also refer to Chapter 7 of the AS Series Operation Manual for more information on memory cards.

6.1.1 Memory Card Appearances

SD cards are classified into three types according to size: SD cards, MiniSD cards, and MicroSD cards. AS Series CPU modules support MicroSD cards.
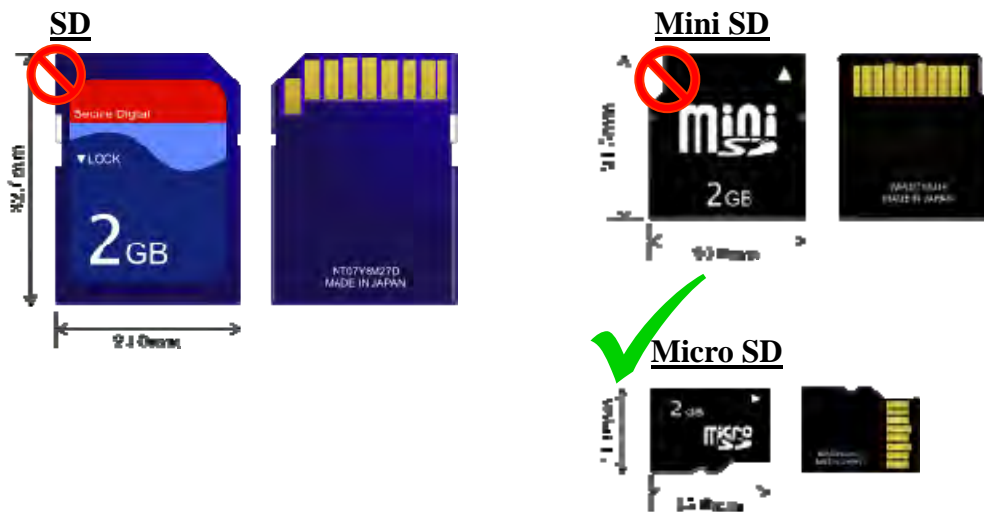
6.1.2 Memory Card Specifications

SD cards are also classified into three types according to capacity: SD cards, SDHC cards, and SDXC cards. The AS Series currently only supports a maximum of 32GB in FAT32 format. SD card families are shown in the table below. The Micro SDHC in the SDHC column indicates the specifications supported by the AS Series. Be sure to purchase products that meet these specifications.

● SD card families

Type	SD		SDHC		SDXC	
Capacity	32 MB~2 GB		4 GB~32 GB		32 GB~2 TB	
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. 2 MB/Sec.) CLASS 4 (Min. 4 MB/Sec.) CLASS 6 (Min. 6 MB/Sec.) CLASS 10 (Min. 10 MB/Sec.)		CLASS 2 (Min. 2 MB/Sec.) CLASS 4 (Min. 4 MB/Sec.) CLASS 6 (Min. 6 MB/Sec.) CLASS 10 (Min. 10 MB/Sec.)	

6.2 Before using a Memory Card

6.2.1 Formatting a Memory Card

You may need to format a new SDHC memory card with the FAT32 file system before you use it for the first time.   You cannot use an unformatted SDHC memory card in an AS Series CPU module.

The following example introduces the most common way to format an SDHC card: formatting an SDHC card through a card reader. Also carefully read the documents provided by the SDHC card manufacturer.

⚠ When you format a memory card, you also delete all the data in the memory card. Verify whether you need to back up the data in a memory card before you format the memory card.

(1)   Insert the SDHC card into a card reader. The operating system detects a new storage device.

(2)   Right-click the new storage device, and then click **Format**.

(3)   You must format the memory card with the FAT32 file system. Do not change any other default settings. Click **Quick Format**, and then click **Start**.

(4)   After you click **OK** in the warning window, the SDHC card formats.

6.3 Installing and Removing a Memory Card

6.3.1 Memory Card Slot in a CPU Module

The memory card slot is on the front side of the AS Series PLC.

Memory Card Slot

6.3.2 Installing a Memory Card

Insert a memory card into the CPU module memory card slot and push it in until it clicks. Be sure the memory card is fixed firmly in the slot; if the memory card is loose, it is not installed correctly. The memory card can only be inserted in one direction. Do not force the memory card or you may damage the CPU module. The correct way to insert the memory card is shown below.

6.3.3 Removing a Memory Card

You can remove a memory card by pushing it in. The card then springs from the slot.

7

Chapter 7   EMC Standards

Table of Contents

7.1 EMC Standards for an AS Series System

7.1.1 AS Series System EMC Standards

The EMC standards that are applicable to an AS series system are listed in the following tables.

● **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	10 V
	Unshielded cable	1 kV	1 kV CM	10 V
Digital and analog I/O	AC I/O (unshielded)	2 kV	2 kV CM 1 kV DM	10 V
	Analog or DC I/O(unshielded)	1 kV	1 kV CM	10 V
	All shielded lines (to the earth)	1 kV	1 kV CM	10 V
Equipment power	AC power	2 kV	2 kV CM 1 kV DM	10 V
	DC power	2 kV	0.5 kV CM 0.5 kV DM	10 V
I/O power and auxiliary power output	AC I/O and AC auxiliary power	2 kV	2 kV CM 1 kV DM	10 V
	DC I/O and DC auxiliary power	2 kV	0.5 kV CM 0.5 kV DM	10 V

7

7.1.2 Installation Instructions to meet EMC Standards

You must install an AS Series PLC in a control box. The control box protects the PLC and isolates electromagnetic interference generated by the PLC.

(1) Control box

- Use a conductive control box. Remove the paint on the plate bolts to ensure good contact between the inner plate and the control box.

- Connect the control box with a thick wire to ensure that the control box is well-grounded, even if there is high-frequency noise.

- The diameter of holes in the control box must be less than 10 millimeters (3.94 inches). Radio frequency noise may be emitted if the hole diameter is larger than 10 millimeters.

- Minimize the distance between the door of the control box and the PLC to prevent radio waves from leaking. You can also prevent radio waves from leaking by putting an EMI gasket on the painted surface.

(2) Connecting a power cable and a ground

Connect the PLC system power cable and the ground as described below.

- Provide a ground point near the power supply module. Use thick, short wires to connect the terminals LG and FG with the ground. The length of the wire should be less than 30 centimeters (11.18 inches). Noise generated by the PLC system is passed to the ground through LG and FG; therefore, the impedance should be as low as possible. Although the wires are used to reduce noise, they themselves carry a lot of noise. Using short wires can prevent the wires from acting as antennas.

- Twist the ground and the power cable together; the noise flowing through the power cable is then passed to the ground. The ground and the power cable do not need to be twisted if you install a filter on the power cable.

7.1.3 Cables

Grounding a shielded cable

Cables drawn from the control box carry high-frequency noise. When they are outside of the control box, they are like antennas emitting noise. The cables connected to digital input/output modules, analog input/output modules, temperature measurement modules, network modules, and motion control modules should all be shielded cables to prevent the emission of noise. Using shielded cables also increases the resistance to external noise. You improve the resistance to noise if the signal cables that are connected to the digital input/output modules, analog input/output modules, temperature measurement modules, network modules, and motion control modules are all shielded cables that are grounded properly. If you do not use shielded cables or ground the shielded cables correctly, noise resistance will not improve. Make sure the shield of any connected cable contacts the control box.   You must scrape any paint off of the control box at the contact point. All fastening must be metal, and the shield must contact the surface of the control box. Use washers to correct any unevenness or use an abrasive to level the surface.

Ground the shield of a shielded cable as close to a module as possible. Ensure that there is no electromagnetic induction between grounded cables.

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7

8

Chapter 8 Maintenance and Inspection

Table of Contents

8

8.1 Cautions

Observe the following precautions before performing maintenance and inspection. **Incorrect or careless operation will lead to injury or equipment damage.**

⚠ ● To prevent a breakdown of an AS Series system or a fire, ensure that the ambient environment does not contain corrosive substances such as chloride gas, sulfide gas or flammable substances such as oil mist, cutting powder, or dirt.

⚠ ● To prevent the connectors from oxidizing and to prevent electric shock, do not touch the connectors.

⚠ ● To prevent electric shock, turn off the power before pulling the connectors or loosening the screws.

⚠ ● To prevent cable damage, and to prevent the connectors from being loosened, do not put weight on the cables or pull on them.

⚠ ● Ensure that the input voltage is within the rated range.

⚠ ● To prevent product breakdown, fire, or injury, do not disassemble or alter the modules.

● To prevent a controlled element from malfunctioning, ensure that the program and parameters are written into a new CPU module before restarting the AS Series system.

● To prevent incorrect output or equipment damage, refer to the related manuals for more information about operating the modules.

● To prevent damage to the modules, touch grounded metal or wear an antistatic wrist strap to release static electricity from your body before working on a module.

● To prevent noise from causing system breakdown, keep a proper distance from the system when using a cell phone or communication device.

● Do not install an AS Series system in direct sun or in a humid environment.

● To prevent the temperature of an element from being too high, maintain a proper distance between the AS Series system and heat sources such as coils, heating devices, and resistors.

● To protect an AS Series system, install an emergency stop switch and an overcurrent protection device.

● Inserting and pulling a module several times can loosen the contact between the module and the backplane.

● To prevent an unexpected shock from resulting in damage to the AS Series system and a controlled element, ensure that the modules are correctly and firmly installed.

8.2 Daily Maintenance

To keep an AS series system operating normally, ensure that the ambient environment and the AS series system conform to the cautions listed in section 8.1. You can then perform the daily inspection described below. If you find any problems, follow the solution and perform any necessary maintenance.

8.2.1 Required Inspection Tools

● 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	Installing of a backplane	Check whether the set screws are loose.	The backplane must be installed firmly.	Tighten the screws.
		Check whether the backplane is installed on the DIN rail properly.		Install the backplane on the DIN rail properly.
3	Installing of a module	Check whether the module is loose that the projection is inserted into the hole on the backplane, and that 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.
		Check whether the connector is loose.	The connector must not be loose.	Tighten the screws on the connector.

8

No.	Item		Inspection	Criterion	Remedy
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 is operating normally.	

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

8.3　Periodic Maintenance

In addition to daily inspection, you should perform periodic maintenance depending on 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, perform the periodic inspection described below. If you find any problems, follow the solution and perform any necessary maintenance.

8.3.1　Required Inspection Tools

- 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 priority.	To ensure that the system operates in a stable environment, determine why the environment varies, and resolve the issue.
		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 on 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.	Tighten the screws.
		Looseness of connectors	Pull the connectors.	The connectors must not be loose.	Tighten the screws on the connectors.
5	PLC system diagnosis		Check the error logs.	No new error occurs.	Please refer to Section 9.1.3 for more information.

No.	Item	Inspection	Criterion	Remedy
6	Maximum scan time	Check the states of SR413 and SR414 through the device monitoring table in ISPSoft.	The maximum scan cycle must be within the range specified in the system specifications.	Determine why the scan time exceeds specifications.

8

9

Chapter 9   Troubleshooting

Table of Contents

9

9.1 Troubleshooting

9.1.1 Basic troubleshooting steps

This chapter includes the possible errors the can occur during operation, their causes, and corrective actions.

(1) Check the following:

- The PLC should be operated in a safe environment (consider environmental, electronic, and vibration safeties).

- Connect power supply correctly to the PLC.

- Secure the module, terminal, and cable installations.

- All LED indicators show correctly.

- Set all switches correctly.

(2) Check the following operational functions:

- Switch the RUN/STOP state

- Check the settings for the AS Series to RUN/STOP

- Check and eliminate errors from external devices

- Use the System Log function in ISPSoft to check system operation and logs

(3) Identify possible causes:

- AS Series or external device

- CPU or extension modules

- Parameters or program settings

9.1.2 Clear the Error States

Use the following methods to clear the error states. If the error source is not corrected, the system continues to show errors.

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

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

(3) Use ISPSoft to clear the error logs.

(4) Reset the CPU to the default settings and download the program again.

9

9.1.3 Troubleshooting SOP

An error occurred

Basic troubleshooting steps done — No → Refer to section 9.1.1 for Basic troubleshooting steps

Yes ↓

CPU module error or modules error — Module error →
1. Refer to section 9.1.4 for the system log
2. Refer to section 9.4 for error codes and LED indicators for CPU modules
3. Refer to section 9.3 for troubleshooting for I/O modules

CPU module error ↓

ERROR LED ON — Yes →
1. Refer to section 9.1.4 for the system log
2. Refer to section 9.4 for error codes and LED indicators for CPU modules
3. Refer to section 9.2 for troubleshooting for CPU modules

No ↓

ERROR LED blinking normally (every 0.5 sec.) — Yes →
1. Refer to section 9.1.4 for the system log
2. Refer to section 9.4 for error codes and LED indicators for CPU modules
3. Refer to section 9.2 for troubleshooting for CPU modules

No ↓

ERROR LED blinking fast (every 0.2 sec.) — Yes →
1. Refer to section 9.1.4 for the system log
2. Refer to section 9.4 for error codes and LED indicators for CPU modules
3. Refer to section 9.2 for troubleshooting for CPU modules

No ↓

ERROR LED blinking slowly (every 1 sec., stop for 3 sec.) — Yes →
1. Refer to section 9.1.4 for the system log
2. Refer to section 9.4 for error codes and LED indicators for CPU modules
3. Refer to section 9.2 for troubleshooting for CPU modules

No ↓

Other LED blinking — Yes →
1. Refer to section 9.1.4 for the system log
2. Refer to section 9.4 for error codes and LED indicators for CPU modules
3. Refer to section 9.2 for troubleshooting for CPU modules

No ↓

After going through troubleshooting steps, the issues are still not resolved. — Yes → If the problem persists, please contact support.

No ↓

The system runs normally.

9

9.1.4 System Log

If ISPSoft is connected to an AS Series, you can view actions and errors in the AS Series by clicking **System Log** on the **PLC** menu. The CPU can store up to 20 error log sets. After the 20 sets are stored, the 1st log is replaced with the 21st if there are new logs coming in, and the old logs are replaced with the new ones sequentially. When the memory card is installed in the CPU module, 20 sets of the old logs are backed up in the memory card and up to 1000 logs can be recorded. If the stored logs exceed 1000, the oldest 20 logs are replaced with the newest 20 logs in the memory card.

(1) On the **PLC** menu, click **System Log**.
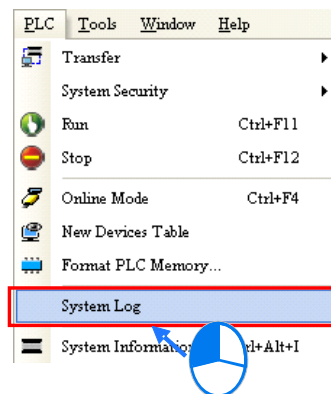
(2) The **System Log** window appears. Click **Clear Log** to clear the error log in the window and the error log in the CPU module, and reset the CPU module.
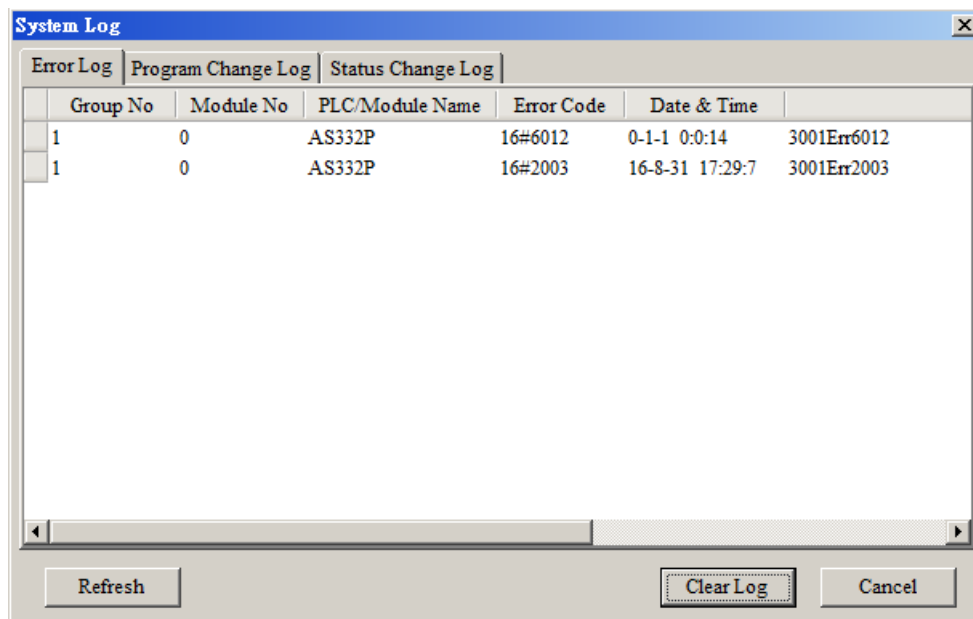
- Group No.: The number 1 indicates that the error occurred in the CPU module or the right-side module 1. The numbers 2–16 indicate the error occurred in the remote modules 1–15.

- Module No.: The number 0 indicates that the error occurred in the CPU module or the remote module. The numbers 1–32 indicate the error occurred in the right-side module 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 from the CPU module or the remote module. Note: up to eight extension modules can be connected to the right-side of the remote module.

- PLC/Module name: Model names of the CPU, remote, and extension modules.

- Error Code: Error codes in the error log.

- Date & Time: The date and time the error occurred. The most recently occurring error is listed on the top.

- The last column shows the 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 is recorded in the log. X in the Log column indicates the error is not recorded in the log. H in the Log column indicates whether or not you can set recording the error in the log in HWCONFIG.

9.2.1   ERROR LED Indicators Are 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 a long scan time	SM8	V

9.2.2   ERROR LED Indicators 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	CPU memory is denied.	Contact the factory.	SM9	V
002E	CPU external memory access is denied.	Contact the factory.	SM9	V
002F	PLC programs are not consistent with the system logs.	Download the program again.	SM34	V
0070	The arrangement of the function cards is not consistent with the settings.	Check whether the settings in HWCONFIG are consistent with the 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
1300 - 130F	Errors occurred in the remote modules	Refer to Section 12.3.4 for more information on the error codes for the remote modules.	SM30	V

9

Error Code (16#)	Description	Solution	Flag	Log
1402	The arrangement of the I/O modules is not consistent with the settings.	Check whether the settings in HWCONFIG are consistent with the arrangement of the I/O modules.	SM10	V
140B	More than four communication modules.	Check the total number of communication modules (maximum is four).	SM10	V
140D	More than 32 extension modules.	Check the total number of extension modules (maximum is 32).	SM10	V
140E	More than eight remote modules on the right side of the CPU module.	Check the total number of remote modules on the right side of the CPU module (maximum is 8).	SM30	V
1600	The extension module ID exceeds the range.	1. Make sure the module is properly connected to the CPU module and turn the modules on again. 2. If the error still occurs, contact the factory.	SM10	V
1601	The extension module ID cannot be set.	1. Make sure the module is properly connected to the CPU module and turn the modules on again. 2. If the error still occurs, contact the factory.	SM10	V
1602	The extension module ID is duplicated.	1. Make sure the module is properly connected to the CPU module and turn the modules on again. 2. If the error still occurs, contact the factory.	SM10	V
1603	The extension module cannot be operated.	1. Make sure the module is properly connected to the CPU module and turn the modules on again. 2. If the error still occurs, contact the factory.	SM10	V
1604	Extension module communication timeout	1. Make sure the module is properly connected to the CPU module and turn the modules on again. 2. If the error still occurs, contact the factory.	SM10	V
1605	Hardware failure	Contact the factory.	SM10	V
1606	Errors on the communication module function card	Make sure the function card is properly connected to the CPU module and turn the modules on 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.	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 MODBUS TCP connections exceeds the range.	Check the number of superior devices (maximum is 32).	SM 1092	V
6011	The number of EtherNet/IP connections exceeds the range.	Check the number of connections (maximum is 16).	SM 1093	V
C000 - CFFF	The program syntax is incorrect.	Save the PLC program and hand the file to the company or the technicians.		

9

9.2.3 ERROR LED Indicators Blinking Rapidly Every 0.2 Seconds

This happens when the power supply 24 VDC of the CPU module is disconnected, or the power supply is not sufficient, not stable or abnormal.

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 Indicators 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	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 remote module error codes.	SM30	V
1800 - 180F	Errors occurred in the extension modules	Refer to Section 12.3 for more information on the extension module error codes.	SM10	V
1900 - 191C	Heartbeat errors occurred in the slave for the Delta ASD-A2 control.	1. Check the CANopen connection cable. 2. Check if the specific slave is working properly. Note: The last 2 digits of the error code represent the ID number of the slave (convert hexadecimal to decimal).	-	V

9.2.5 BAT. LOW LED Indicators Are ON

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

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

9.2.6 BAT. LOW LED Indicators 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	Contact the factory.	SM218	V

9

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

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 RUN and LED Indicators are Blinking One After Another Every 0.5 Seconds.

This happens when the CPU module memory card 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.	Check the PLC ID.	SM34	V
0012	The PLC password is incorrect.	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, 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, 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, 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, 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, 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	Check that the memory card is inserted correctly	SM453	V

9

	memory card.	into the CPU module.		
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 is malfunctioning.	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 the 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 slave is working properly. 3. If nothing is wrong, initialize the Delta ASD-A2 again.	-	V
2001	Not using the FCOMP card or not in the right mode for the ASDA-A2 while using the CANopen communication instruction.	Use the FCOMP card in the function card slot to 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 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 that 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 the TKON or YKOFF instruction 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 loop.	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	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. Solve the problem by means of the related flag in the program.	SM1113	X

9

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 sending of the email later. This error does not cause the PLC to stop running. Solve the problem 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

9

6208	The data 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 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 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	Check whether operational sequence in the	-	X

9

	socket.	program is correct.		
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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 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 slave. 2. Check the communication cable.	-	H

9

7042	The device communication address used in the USB is incorrect.	1. Check the communication setting in the master and the 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 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 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 slave. 2. Check the communication cable.	-	H
70B1	The device communication function code in function card 1 is incorrect.	1. Check the communication setting in the master and the slave. 2. Check the communication cable.	-	H
70B2	The device communication address used in function card 1 is incorrect.	1. Check the communication setting in the master and the 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 slave. 2. Check the communication cable.	-	H
70B4	The device length of the communication data in function card 1 exceeds the limit.	1. Check the communication setting in the master and the slave. 2. Check the communication cable.	-	H
70B7	The device checksum for the communication serial port of function card 1 is incorrect.	1. Check the communication setting in the master and the slave. 2. Check the communication cable.	-	H
70C1	The device communication function code in function card 2 is incorrect.	1. Check the communication setting in the master and the slave. 2. Check the communication cable.	-	H
70C2	The device communication address used in function card 2 is incorrect.	1. Check the communication setting in the master and the slave. 2. Check the communication cable.	-	H
70C3	The device used in function card 2 exceeds the device range.	1. Check the communication setting in the master and the slave. 2. Check the communication cable.	-	H
70C4	The device length of the communication data in function card 2 exceeds the limit.	1. Check the communication setting in the master and the slave. 2. Check the communication cable.	-	H
70C7	The device checksum for the communication serial port of function card 2 is incorrect.	1. Check the communication setting in the master and the slave. 2. Check the communication cable.	-	H
7203	Invalid communication function code	1. Refer to the function codes defined by the communication protocols. 2. Check if the product firmware and the software used are the most updated versions. 3. Make a note of the operation procedures and screenshots of the error windows and hand this note to the company or the technicians from the agents.	-	H

9

8105	The contents of the program downloaded are incorrect. The program syntax is incorrect.	1. Download the program and parameters again. 2. Check the communication cable. 3. Save all the projects and compress the projects into one compressed file and then hand this file to the company or the technicians from the agents.	-	H
8106	The contents of the program downloaded are incorrect. The length of the execution code exceeds the limit.	1. Download the program and parameters again. 2. Save all the projects and compress the projects into one compressed file and then hand this file to the company or the technicians from the agents.	-	H
8107	The contents of the program downloaded are incorrect. The length of the source code exceeds the limit.	1. Download the program and parameters again. 2. Save all the projects and compress the projects into one compressed file and then hand this file to the company or the technicians from the agents.	-	H
8000 - 8FFF	Errors occur between software and PLC.	1. Check if the product firmware and the software used are the most updated versions. 2. Make a note of the operation procedures and screenshots of the error windows and hand this note to the company or the technicians from the agents.		

9.3 Troubleshooting for I/O Modules

● **Introduction to troubleshotting modules**

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

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

9.3.1.1 ERROR LED Indicators Are ON

The following errors are specified as warnings. You can set up HWCONFIG to make them appear as errors when the following errors occur.

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

9

9.3.1.2 ERROR LED Indicators Blinking Every 0.5 Seconds

The following errors are specified as warnings to ensure that the CPU module can still run even when the warnings are triggered by its AIO modules. You can set up HWCONFIG to have the following first 4 error codes appear as errors when they occur.

Error Code	Description	Solution
16#1801	The external voltage is abnormal.	Check the power supply.
16#1802	Hardware failure	Contact the factory.
16#1804	The factory calibration is abnormal.	Contact the factory.
16#1807	The CJC is abnormal.	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
16#180C	The signal received by channel 5 exceeds the range of analog inputs (temperature).	Check the signal received by channel 5
16#180D	The signal received by channel 6 exceeds the range of analog inputs (temperature).	Check the signal received by channel 6
16#180E	The signal received by channel 7 exceeds the range of analog inputs (temperature).	Check the signal received by channel 7
16#180F	The signal received by channel 8 exceeds the range of analog inputs (temperature).	Check the signal received by channel 8

9.3.2 Troubleshooting for the Load Cell Module AS02LC

9.3.2.1 ERROR LED Indicators Are ON

You can set up HWCONFIG to have the following appear as errors when they occur.

Error Code	Description	Solution
16#1605	Hardware failure (that is, the driver board)	Contact the factory.
16#1607	The external voltage is abnormal.	Check the power supply.

9.3.2.2 ERROR LED Indicators 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. You can set up HWCONFIG to have the following first 3 error codes appear as errors when they occur.

Error Code	Description	Solution
16#1801	The external voltage is abnormal.	Check the power supply.
16#1802	Hardware failure	Contact the factory.
16#1807	Diver board failure	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.

9

Error Code	Description	Solution
16#1809	The signal received by channel 1 exceeds the weight limit.	Check the value input to channel 1 and the maximum weight setting.
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 input to channel 2 and the maximum weight setting.
16#180D	The factory calibration in channel 2 is incorrect.	Check the weight calibration in channel 1.

9.3.3 Troubleshooting for the Module AS00SCM as a Communication Module

9.3.3.1 ERROR LED Indicator Are ON

The following error codes identify possible errors 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 that the module is securely installed. 2. Install a new AS00SCM or contact the factory.
16#1606	The function card setting is incorrect.	1. Check if the function card is securely installed. 2. Install a new function card or contact the factory. 3. Check if the setting in HWCONFIG is consistent with the function card setting. 4. Install a new AS00SCM or contact the factory.

9.3.3.2 ERROR LED Indicators Blinking Every 0.5 Seconds

The following error codes identify possible errors 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. Download the parameter again.
16#1803	Communication timeout	1. Check whether the communication cable is properly connected. 2. Check if the station number and the communication format are correctly set. 3. Check if the connection with the function card is working correctly.
16#1804	The UD Link setting is incorrect.	1. Check the settings of the UD Link. 2. Check the warning settings in the PLC.

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

9

Error Code	Description	Solution
16#0107	The settings in HWCONFIG and manual settings are not consistent with function card 1.	Check the settings in HWCONFIG and manual settings for function card 1.
16#0108	The settings in HWCONFIG and manual settings are not consistent for function card 2.	Check the settings in HWCONFIG and manual settings for function card 2.
16#0201	Incorrect parameters	Check the parameter in HWCONFIG. 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 correctly.
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 correctly.
16#0400	Invalid UD Link Group ID for function card 1	1. Check the UD Link settings. 2. Check the warning settings in the PLC.
16#0401	Invalid UD Link Group ID for function card 2	1. Check the UD Link settings. 2. Check the warning settings in the PLC.
16#0402	Invalid UD Link Command for function card 1	1. Check the UD Link settings. 2. Check the warning settings in the PLC.
16#0403	Invalid UD Link Command for function card 1	1. Check the UD Link settings. 2. Check the warning settings in the PLC.

9.3.4   Troubleshooting for the Module AS00SCM as a Remote Module

Errors from the remote modules are regarded as warnings for AS Series CPU modules. The LED indicator of the CPU module blinks and the CPU module can still operate. Use flag SM30 to manage error presentation in the remote modules.

9.3.4.1   ERROR LED Indicators Are ON

Error codes:

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 function card setting 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 function card setting. 4. Install a new AS00SCM or contact the factory.

9

9.3.4.2 ERROR LED Indicators Blinking Every 0.5 Seconds

Error codes:

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

9.3.4.3 ERROR LED Indicators Blinking Every 0.2 Seconds

This happens when the 24 VDC power supply for the remote module is not sufficient. 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. Error codes:

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

9.3.5 Troubleshooting for AS01DNET Modules

Refer to sections 9.4.6 and 9.4.7 for more details.

9.4 Error Codes and LED Indicators for CPU Modules

A. Columns

    a. Error code: If an error occurs in the system, an 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 shows the status you defined for the error.

        ➢ 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: System error

● **Descriptions**

Module Type	LED indicator	Descriptions
CPU	Error LED	There are five types of error indicator states for of the CPU module errors, including LED indicator ON, OFF, blinking fast, blinking normally, and blinking slowly. When the LED indicator is ON, blinking fast/normally, 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. Clear the problems when the module is powered off. Error type: ON: A serious error occurs in the module.

9

Module Type	LED indicator	Descriptions
		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 one second and off for three seconds): a warning is triggered, but the system can still run. OFF: a warning is triggered, but the system can still run. You 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 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
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 low-voltage for less than 10 ms.	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

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
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 arrangement of the I/O modules is not consistent with the settings.	Stop			V		
140B	Number of communication modules exceeds the limit of four.	Stop			V		
140D	Number of extension modules exceeds the limit of 32.	Stop			V		
140E	Number of remote modules exceeds the limit of eight on the right side of the CPU module.	Stop			V		
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 communication module function card	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	

9

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
1900 - 191C	Heartbeat errors occurred in the slave of the Delta ASD-A2 control.	Continue				V	
1950	The initialization of the Delta ASD-A2 control has not yet been completed, the CANopen instructions cannot be executed.	Continue					V
2001	Not 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 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 the TKON or YKOFF instruction is incorrect, or exceeds the range.	Continue					V
2017	The instruction BREAK is written outside of the FOR-NEXT loop.	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 too big.	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

9

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
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 that receives the data in the TCP socket function is illegal.	Continue					V
6208	The data that 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 that receives the data in the UDP socket function is illegal.	Continue					V
6210	The data that 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

9

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
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 Ethernet is incorrect.	Continue					V
7032	The device communication address used in Ethernet is incorrect.	Continue					V
7033	The device used in Ethernet exceeds the device range.	Continue					V
7034	The device length of the communication data in Ethernet exceeds the limit.	Continue					V
7037	The device checksum for the communication serial port of Ethernet is incorrect.	Continue					V
7041	The device communication function code in USB is incorrect.	Continue					V
7042	The device communication address used in USB is incorrect.	Continue					V
7043	The device used in USB exceeds the device range.	Continue					V
7044	The device length of the communication data in USB exceeds the limit.	Continue					V
7047	The device checksum for the communication serial port of USB is incorrect.	Continue					V
70B1	The device communication function code in function card 1 is incorrect.	Continue					V
70B2	The device communication address used in function card 1 is incorrect.	Continue					V
70B3	The device used in function card 1 exceeds the device range.	Continue					V
70B4	The device length of the communication data in function card 1 exceeds the limit.	Continue					V
70B7	The device checksum for the communication serial port of function card 1 is incorrect.	Continue					V
70C1	The device communication function code in function card 2 is incorrect.	Continue					V
70C2	The device communication address used in function card 2 is incorrect.	Continue					V
70C3	The device used in function card 2 exceeds the device range.	Continue					V
70C4	The device length of the communication data in function card 2 exceeds the limit.	Continue					V
70C7	The device checksum for the communication serial port of function card 2 is incorrect.	Continue					V
7203	Invalid communication function code	Continue					V

9

Error code	Description	CPU status	ERROR LED indicator status				
			ON	Blinking fast	Blinking normally	Blinking slowly	OFF
8105	The contents of the downloaded program are incorrect. The program syntax is incorrect.	Continue					V
8106	The contents of the downloaded program are incorrect. The length of the execution code exceeds the limit.	Continue					V
8107	The contents of the downloaded program are incorrect. The length of the source code exceeds the limit.	Continue					V
8000 - 8FFF	Errors occur between software and PLC.	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
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).		
16#180C	The signal received by channel 5 exceeds the range of analog inputs (temperature).		
16#180D	The signal received by channel 6 exceeds the range of analog inputs (temperature).		
16#180E	The signal received by channel 7 exceeds the range of analog inputs (temperature).		
16#180F	The signal received by channel 8 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

9

triggered by its AIO modules. You can set up HWCONFIG to have the following first 4 error codes appear as errors when they occur.

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. You can set up HWCONFIG to have the following first 3 error codes appear as errors when they occur.

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	24 VDC 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	

9.4.6 Error Codes and LED Indicators for Module AS01DNET (Master/Slave Mode)

Code	Explanation	Correction
0~63	Node address of AS01DNET-A (in normal operation)	--
80	AS01DNET-A is in STOP status.	Turn the PLC to RUN and start I/O data exchange
F0	The node ID of AS01DNET is the same as that of other node or exceeds the allowed range.	1. Ensure that the node address of AS01DNET is unique. 2. Re-power AS01DNET.
F1	No slave is configured in Scan List.	Configure the scan list and then download the configuration to AS01DNET.
F2	Too low voltage of the work power	Check if the power supply for AS01DNET and the PLC is normal.
F3	AS01DNET enters the test mode	Switch the function switch IN1 from On to Off and re-power AS01DNET-A.
F4	BUS-OFF	1. Check if the network cable is normal and the shielded cable is grounded. 2. Check if the baud rates of all nodes in the network are same. 3. Check if the start and end of the network cable are both connected with a 121Ω terminal resistor. 4. Re-power AS01DNET-A.

Code	Explanation	Correction
F5	No network power	1. Check if the network cable is normal. 2. Ensure that the network power is normal.
F6	Internal error; Flash or RAM check error	If the error still exists after re-power, send AS01DNET-A back to the factory for repair.
F8	Error produced in factory manufacturing	If the error still exists after re-power, send AS01DNET-A back to the factory for repair.
F9	Internal error; EEPROM access failure	If the error still exists after re-power, send AS01DNET-A back to the factory for repair.
FA	Invalid configuration data	1. Configure the network correctly and re-download it to AS01DNET-A. 2. Check if the node address of one slave in the scan list is the same as that of AS01DNET-A.
E0	Identification parameters returned from the slave do not match the configuration data.	1. Check if there is any change in node ID of the slave in the network. 2. Check if some node device in the network is replaced. 3. Re-configure the network.
E1	I/O Data size returned does not match that in the scan list.	Re-configure I/O data size of the slave, download the configuration to AS01DNET-A and run the PLC.
E2	The slave device in the scan list does not exist or is offline when AS01DNET-A is in master mode. The I/O connection between the slave AS01DNET-A and the master is broken when AS01DNET-A is in slave mode.	1. Check if there is a change in the node address of the slave. 2. Check if the communication cable is disconnected or connected loosely. 3. Check if the bus cable length exceeds the maximum transmission distance. If so, the system may not be stable.
E3	AS01DNET-A fails to transmit data.	1. Make sure that the connection between AS01DNET-A and the network is normal. 2. Check if the baud rate of AS01DNET-A is the same as that of other node in the network.
E4	Error detected in sequence of fragmented I/O data from the slave device.	Check if the slave is operating normally.
E5	The slave device returns error when AS01DNET-A attempts to communicate with it.	Check if the slave is operating normally.
E6	IO data size returned from the slave is bigger than that configured in Scan List.	Check that the IO data size of the slave should be the same as that configured in Scan List.
E7	AS01DNET-A is checking MAC ID.	If the code is displayed long, do the troubleshooting according to the following steps. 1. Make sure that at least two nodes work normally in the network. 2. Check if either end of the network is connected with the terminal resistor of 121Ω. 3. Check if the baud rates of the node devices in the network are same. 4. Check if the communication cable is normal so as to avoid that the cable is disconnected or connected loosely. 5. Check if the bus cable length exceeds the maximum transmission distance. If so, the system may not be stable.

9

Code	Explanation	Correction
		6. Check if the shielded wire of the network cable is grounded. 7. Re-power AS01DNET-A scanner module.

9.4.7 Error Codes and LED Indicators for Module AS01DNET (RTU Mode)

Code	Indication	How to deal with
0~63	Node ID of the scanner module (When in RUN state)	No correction needed
F0	The node ID is repeated or exceeds allowed range.	1. Ensure that the node ID of AS01DNET (RTU) is unique in the DeviceNet network within the range of 0~63. 2. Repower it on after changing the node ID.
F1	No I/O module is configured to AS01DNET (RTU) in the DeviceNet Builder software.	Add I/O modules in AS01DNET (RTU) in the DeviceNet Builder software and download the configuration data to AS01DNET (RTU) after the configuration is finished.
F2	The work voltage of AS01DNET (RTU) is too low.	Check if the power supply for AS01DNET (RTU) works normally.
F3	AS01DNET (RTU) enters the test mode.	Repower AS01DNET (RTU).
F4	AS01DNET (RTU) is the Bus-Off state.	1. Check if the network communication cable is normal and the shielded cable is grounded. 2. Ensure the baud rates of all network nodes are same. 3. Check if the two ends of the network are both connected with a 120Ω terminal resistor. 4. Repower the scanner module.
F5	No network power supply for AS01DNET(RTU)	1. Check if the network cable is normal. 2. Check if the network power supply is normal. (The external 24V DC network power supply is connected between red V+ and black V- of AS01DNET (RTU) .)
F6	Internal error; An error in the internal storage units of AS01DNET (RTU)	Return the product to factory for repair if the error still exists after re-power on.
F7	Internal error; An error in the data exchange units of AS01DNET (RTU)	Return the product to factory for repair if the error still exists after re-power on.
F8	Manufacture error	Return the product to factory for repair if the error still exists after re-power on.
F9	Internal error; An error in the access of the Flash of AS01DNET (RTU)	Return the product to factory for repair if the error still exists after re-power on.
E4	Module error	Check if an error occurs in the modules connected to the right side of AS01DNET (RTU); Check if the module exists; Check if current module matches that configured in the software; Check if the unconfigured module is added.

9

Code	Indication	How to deal with
E7	Repeated node ID detection	If the code has emerged for a long time, please shoot troubles in the methods below. 1. Ensure that there are at least two nodes working normally in the network. 2. Check if the two ends of the network are both connected with a 121Ω terminal resistor. 3. Ensure that the baud rates of all network nodes are same. 4. Check if the network cable has a problem such as being disconnected and loosened. 5. Check if the bus communication cable length exceeds maximum transmission distance. If the maximum transmission distance is exceeded, the stability of the system can not be ensured. 6. Check if the shielded wire of the network communication cable is grounded. 7. Turn on the power of AS01DNET (RTU) again.
E9	The number of I/O modules connected to AS01DNET (RTU) exceeds the maximum 8.	Check if the number of I/O modules connected to AS01DNET (RTU) is more than 8.
80	AS01DNET (RTU) is in STOP state.	1. Check if the RUN/STOP switch of the PLC connected to the DeviceNet master is turned to RUN. 2. Check if the value of control word of AS01DNET (RTU) is 1. For details, refer to section 10.5.4.3.4.
83	The AS01DNET (RTU) configuration in the software is being downloading.	Wait until the download of AS01DNET (RTU) configuration data is completed.

9