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AH500 Hardware Manual

AH500 Hardware Manual

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Chapter 1 Product Introduction

Table of Contents

1.1 Overview

This manual introduces the programming of the AH500 series programmable logic controllers, the basic instructions, and the applied instructions. This manual introduces the electrical specifications for the AH500 series programmable logic controllers, the appearances, the dimensions, and etc.

1.1.1 Related Manuals

The related manuals of the AH500 series programmable logic controllers are composed of the following.

- AH500 Quick Start
  It guides users to use the system before they read the related manuals.
- AH500 Programming Manual
  It introduces the programming of the AH500 series programmable logic controllers, the basic instructions, and the applied instructions.
- ISPSoft User Manual
  It introduces the use of ISPSoft, the programming language (Ladder, IL, SFC, FBD, and ST), the concept of POUs, and the concept of tasks.
- AH500 Hardware Manual
  It introduces electrical specifications, appearances, dimensions, and etc.
- AH500 Operation Manual
  It introduces functions of CPUs, devices, module tables, troubleshooting, and etc.
- AH500 Module Manual
  It introduces the use of special I/O modules. For example, network modules, analog I/O modules, temperature measurement modules, motion control modules, and etc.
- AH500 Motion Control Module Manual
  It introduces the specifications for the motion control modules, the wiring, the instructions, and the functions.
- PMSoft User Manual
  It introduces the use of PMSoft, including the editing mode, the connection, and the password setting.

1.1.2 Model Description

Classification	Model Name	Description
Power supply module	AHPS05-5A	100~240 V AC 50/60 Hz
CPU module	AHCPU500-RS2	It is a basic CPU module with two built-in RS-485 ports, one built-in USB port, and one built-in SD interface. It supports 768 inputs/outputs. The program capacity is 16 ksteps.
	AHCPU500-EN	It is a basic CPU module with one built-in Ethernet port, one built-in RS-485 port, one built-in USB port, and one built-in SD interface. It supports 768 inputs/outputs. The program capacity is 16 ksteps.
	AHCPU510-RS2	It is a basic CPU module with two built-in RS-485 ports, one built-in USB port, and one built-in SD interface. It supports 1280 inputs/outputs. The program capacity is 64 ksteps.
	AHCPU510-EN	It is a basic CPU module with one built-in Ethernet port, one built-in RS-485 port, one built-in USB port, and one built-in SD interface. It supports 1280 inputs/outputs. The program capacity is 64 ksteps.
	AHCPU520-RS2	It is a basic CPU module with two built-in RS-485 ports, one built-in USB port, and one built-in SD interface. It supports 2304 inputs/outputs. The program capacity is 128 ksteps.

Classification	Model Name	Description
CPU module	AHCPU520-EN	It is a basic CPU module with one built-in Ethernet port, one built-in RS-485 port, one built-in USB port, and one built-in SD interface. It supports 2304 inputs/outputs. The program capacity is 128 ksteps.
	AHCPU530-RS2	It is a basic CPU module with two built-in RS-485 ports, one built-in USB port, and one built-in SD interface. It supports 4352 inputs/outputs. The program capacity is 256 ksteps.
	AHCPU530-EN	It is a basic CPU module with one built-in Ethernet port, one built-in RS-485 port, one built-in USB port, and one built-in SD interface. It supports 4352 inputs/outputs. The program capacity is 256 ksteps.
Main backplane	AHBP04M1-5A	Four-slot main backplane for a CPU /RTU rack
	AHBP06M1-5A	Six-slot main backplane for a CPU/RTU rack
	AHBP08M1-5A	Eight-slot main backplane for a CPU/RTU rack
	AHBP12M1-5A	Twelve-slot main backplane for a CPU/RTU rack
Extension backplane	AHBP06E1-5A	Six-slot extension backplane for a CPU/RTU extension rack
	AHBP08E1-5A	Eight-slot extension backplane for a CPU/RTU extension rack
Digital input/output module	AH16AM10N-5A	24 V DC 5 mA 16 inputs Terminal block
	AH32AM10N-5B	24 V DC 5 mA 32 inputs DB37 connector
	AH64AM10N-5C	24 V DC 3.2 mA 64 inputs Latch connector
	AH16AM30N-5A	100~240 V AC 4.5 mA/9 mA (100 V and 50 Hz) 16 inputs Terminal block
	AH16AN01R-5A	240 V AC/24 V DC 2 A 16 outputs Relay Terminal block
	AH16AN01T-5A	12~24 V DC 0.5 A 16 outputs Sinking output Terminal block
	AH16AN01P-5A	12~24 V DC 0.5 A 16 outputs Sourcing output Terminal block

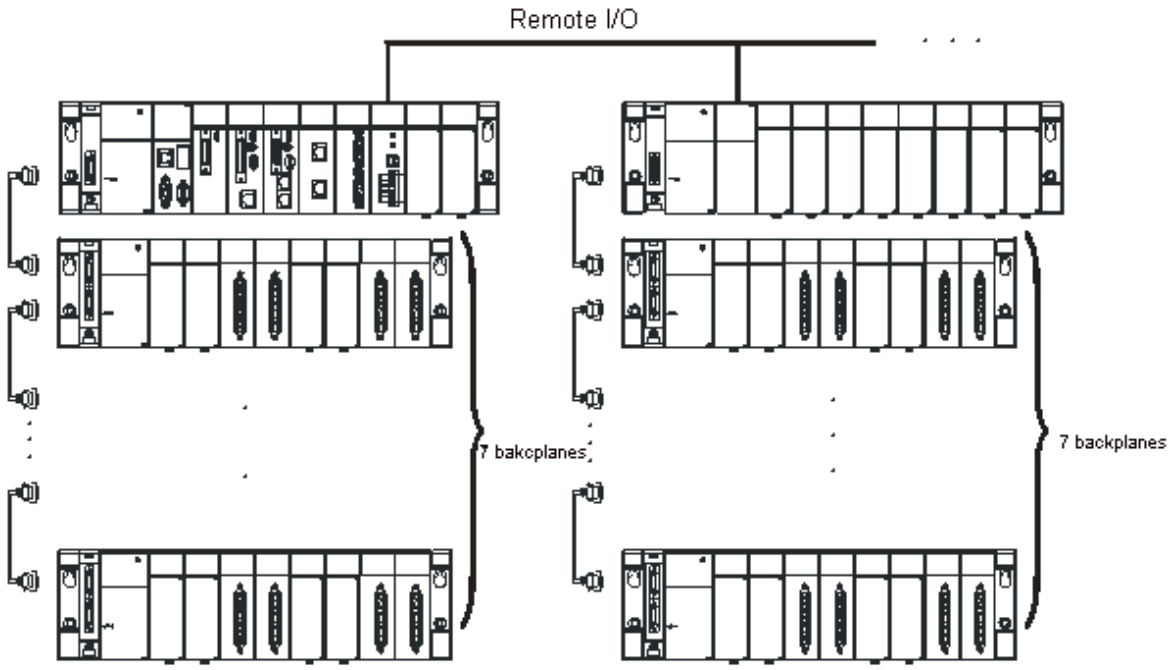
Classification	Model Name	Description
Digital input/output module	AH32AN02P-5B	12~24 V DC 0.1 A 32 outputs Sinking output DB37 connector
	AH32AN02T-5B	12~24 V DC 0.1 A 32 outputs Sourcing output DB37 connector
	AH64AN02T-5C	12~24 V DC 0.1 A 64 outputs Sinking output Latch connector
	AH64AN02P-5C	12~24 V DC 0.1 A 64 outputs Sourcing output Latch connector
	AH16AN01S-5A	110/220 V AC 0.5 A 16 outputs TRIAC Terminal block
	AH16AP11R-5A	24 V DC 5 mA 8 inputs 240 V AC/24 V DC 2 A 8 outputs Relay Terminal block
	AH16AP11P-5A	24 V DC 5 mA 8 inputs 12~24 V DC 0.5 A 8 outputs Sinking output Terminal block
	AH16AP11T-5A	24 V DC 5 mA 8 inputs 12~24 V DC 0.5 A 8 outputs Sourcing output Terminal block

Classification	Model Name	Description
Analog input/output module	AH04AD-5A	Four-channel analog input module 16-bit resolution 0~10 V, 0/1~5 V, -5~+5 V, -10~+10 V, 0/4~20 mA, and -20~+20 mA Conversion time: 150 us/channel
	AH08AD-5B	Eight-channel analog input module 16-bit resolution 0~10 V, 0/1~5 V, -5~+5 V, and -10~+10 V Conversion time: 150 us/channel
	AH04DA-5A	Four-channel analog output module 16-bit resolution -10~10 V, and 0/4~20 mA Conversion time: 150 us/channel
	AH08DA-5B	Eight-channel analog output module 16-bit resolution -10~+10V, 0~10V, -5~+5V, and 0/1~5V Conversion time: 150 us/channel
	AH06XA-5A	Four-channel analog input module 16-bit resolution 0~10 V, 0/1~5 V, -5~+5 V, -10~+10 V, 0/4~20 mA, and -20~+20 mA Conversion time: 150 us/channel Two-channel analog output module 16-bit resolution -10~10 V, and 0/4~20 mA Conversion time: 150 us/channel
Temperature measurement module	AH04PT-5A	Four-channel four-wire/three-wire RTD temperature sensor Sensor type: Pt100/Pt1000/Ni100/Ni1000 sensor, and 0~300 Ω input impedance 16-bit resolution: 0.1 ℃/0.1 ℉ Four-wire conversion time: 150 ms/channel Three-wire conversion time: 300 ms/channel
	AH04TC-5A	Four-channel thermocouple temperature sensor Sensor type: J, K, R, S, T, E, N, and -150~+150 mV 24-bit resolution: 0.1 ℃/0.1 ℉ Conversion time: 200 ms/channel
	AH08TC-5A	Eight-channel thermocouple temperature sensor Sensor type: J, K, R, S, T, E, N, and -150~+150 mV 24-bit resolution: 0.1 ℃/0.1 ℉ Conversion time: 200 ms/channel
Motion control module	AH02HC-5A	Two-channel high-speed counter module 200 kHz
	AH04HC-5A	Four-channel high-speed counter module 200 kHz
	AH05PM-5A	Two-axis pulse train motion control module (1 MHz)
	AH10PM-5A	Six-axis pulse train motion control module (Four axes: 1 MHz; Two axes: 200 kHz)
	AH20MC-5A	Twelve-axis DMCNET (Delta Motion Control Network) motion control module (10 Mbps)

Classification	Model Name	Description
Network module	AH10EN-5A	It is an Ethernet master module with two built-in Ethernet ports, and supports a Modbus TCP master.
	AH10SCM-5A	It is a serial communication module with two RS-485/RS-422 ports, and supports Modbus and the UD link protocol. There is isolation between two parts of communication, and there is isolation between two parts of power.
	AH10DNET-5A	It is a DeviceNet network module. It can function as a master or a slave. The maximum communication speed is 1 Mbps.
RTU module	AHRTU-DNET-5A	RTU module for DeviceNet
Extension cable	AHACAB06-5A	0.6 meter extension cable for connecting an extension backplane
	AHACAB10-5A	1.0 meter extension cable for connecting an extension backplane
	AHACAB15-5A	1.5 meter extension cable for connecting an extension backplane
	AHACAB30-5A	3.0 meter extension cable for connecting an extension backplane
I/O extension cable	DVPACAB7A10	1.0 meter I/O extension cable (latch connector) for AH64AM10N-5C
	DVPACAB7B10	1.0 meter I/O extension cable (latch connector) for AH64AN02T-5C and AH64AN02P-5C
	DVPACAB7C10	1.0 meter I/O extension cable (DB37)
	DVPACAB7D10	1.0 meter I/O extension cable for AH04HC-5A and AH20MC-5A
	DVPACAB7E10	1.0 meter I/O extension cable (latch connector) for AH10PM-5A
External terminal module	DVPAETB-ID32A	I/O external terminal module for AH64AM10N-5C 32 inputs
	DVPAETB-OR16A	I/O external terminal module for AH64AN02T-5C 16 relay outputs
	DVPAETB-OR16B	I/O external terminal module for AH64AN02P-5C 16 relay outputs
	DVPAETB-ID32B	I/O external terminal module for AH32AM10N-5B 32 inputs
	DVPAETB-OR32A	I/O external terminal module for AH32AN02T-5B 32 relay outputs
	DVPAETB-OR32B	I/O external terminal module for AH32AN02P-5B 32 relay outputs
	DVPAETB-OT32B	I/O external terminal module for AH32AN02T-5B and AH32AN02P-5B 32 relay outputs
	DVPAETB-IO16C	I/O external terminal module for AH04HC-5A and AH20MC-5A
	DVPAETB-IO24C	I/O external terminal module for AH10PM-5A
Space module	AHASP01-5A	Space module used for an empty I/O slot

1.2 Characteristics

AH500 system



The characteristics of the AH500 series CPU module are as follows.

(1) High efficiency

- The AH500 series CPU module adopts a 32-bit high-speed processor. The instructions are executed at a speed of 0.3 milliseconds per 1 ksteps. (Fifty percent of the instructions are basic instructions, and fifty percent of the instructions are applied instructions.)

(2) Supporting more inputs and outputs

- The AH500 series CPU module supports up to 4,352 local digital I/O or 512 analog I/O.
- A complete AH500 system consists of eight backplanes at most, including a main backplane. Eight I/O modules at most can be installed on a backplane. Therefore, for the AH500 series CPU, 64 digital input/output modules at most or 64 analog input/output modules at most can be installed.
- Eight RTU modules at most can be installed on the main backplane. 128,000 remote digital I/O, or 4,000 remote analog I/O at most are supported.

(3) Multiple I/O modules

- The I/O modules supported by the AH500 series CPU module are digital input/output modules, analog input/output modules, temperature measurement modules, network modules, motion control modules, and RTU modules.

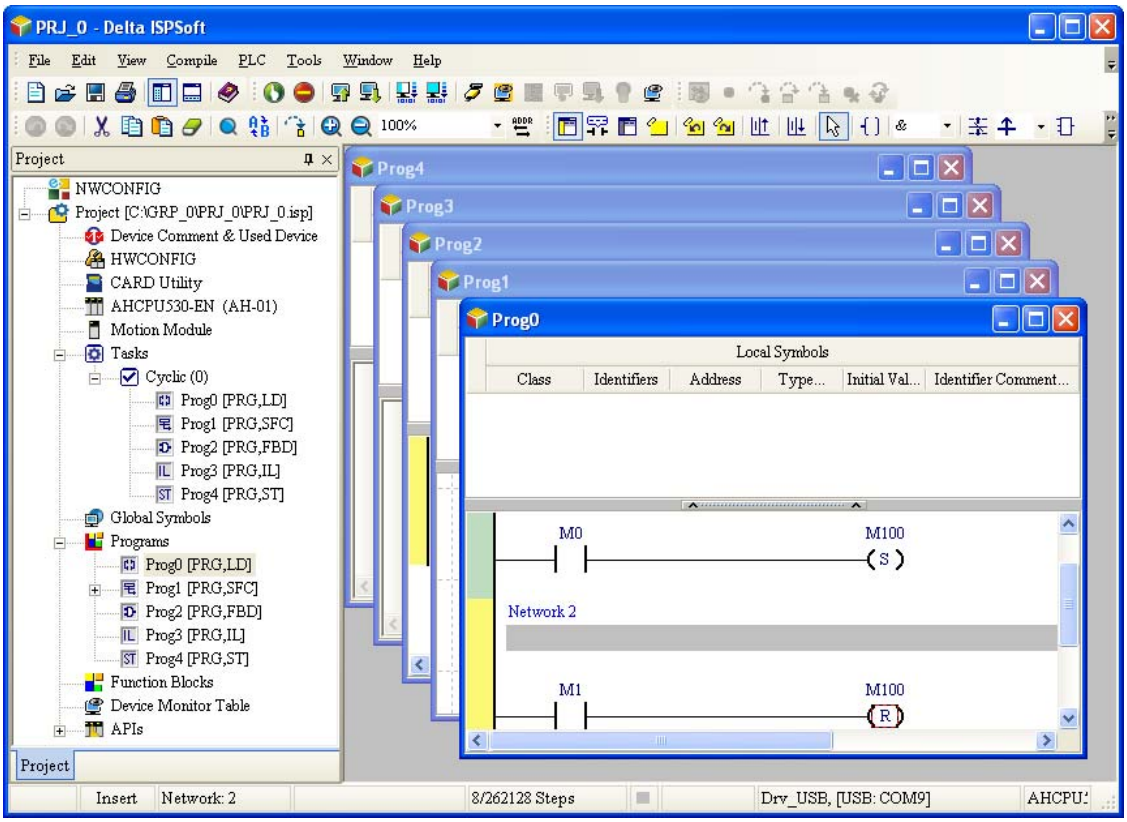
Module	Description
Digital input/output module	Digital input/output AH16AM10N-5A, AH32AM10N-5B, AH64AM10N-5C, AH16AM30N-5A, AH16AN01R-5A, AH16AN01T-5A, AH16AN01P-5A, AH32AN02T-5B, AH32AN02P-5B, AH64AN02T-5C, AH64AN02P-5C, AH16AN01S-5A, AH16AP11R-5A, AH16AP11T-5A, and AH16AP11P-5A
Analog input/output module	Analog input/output AH04AD-5A, AH08AD-5B, AH04DA-5A, AH08DA-5B, and AH06XA-5A

Module	Description
Temperature measurement module	Measuring the temperature AH04PT-5A, AH04TC-5A, and AH08TC-5A
Motion control module	Controlling the motion AH02HC-5A, AH04HC-5A, AH05PM-5A, AH10PM-5A, and AH20MC-5A
Network module	Extending the communication interface (*There are multiple interfaces. All network modules can be installed on the main backplane except AH10SCM-5A.) AH10EN-5A, AH10SCM-5A, and AH10DNET-5A
RTU module	It is installed on the main backplane as a remote terminal unit. (*It supports multiple communication interfaces.) AHRTU-DNET-5A

(4) Larger program capacity and memory

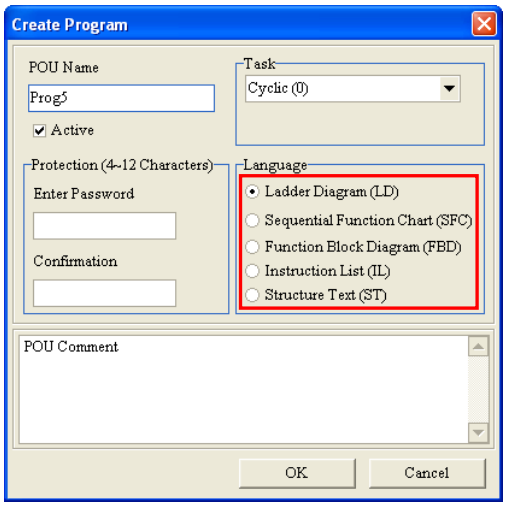
- The program capacity of the AH500 series CPU modules can be up to 256 ksteps. Users do not need to use a more advanced CPU if the program capacity becomes large.
- The AH500 series CPU module has 64 kwords of memory. Besides, users can declare up to 1024 function blocks.

(5) Supporting IEC 61131-3



- The AH500 series CPU module supports IEC 61131-3.

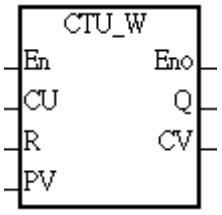
- The programming languages which are supported are instruction lists (IL), structured texts (ST), ladder diagrams (LD), sequential function charts (SFC), and function block diagrams (FBD).



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

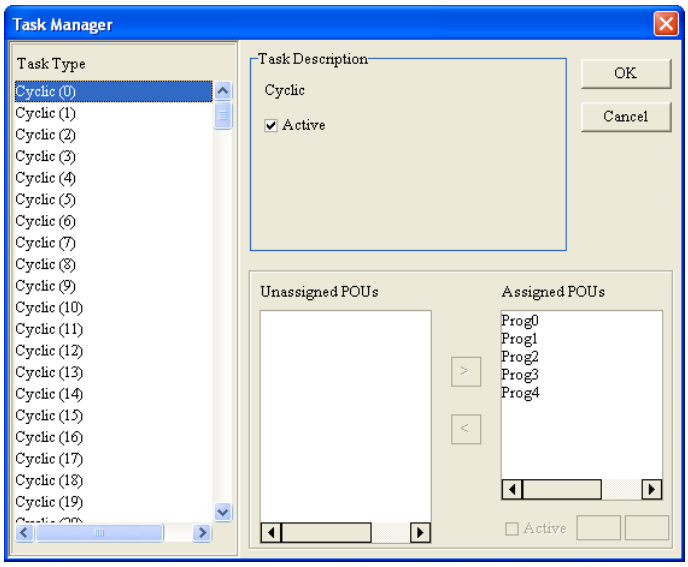
(6) Strong function block

- Not only the standard IEC61131-3 function blocks are supported, but also the convenient function blocks provided by Delta Electronics, Inc. are supported. Users can write the program frequently executed in a function block so that the program becomes more structured and can be executed more conveniently.
- The symbol for a function block in a ladder diagram is like an Integrated circuit (IC) in a circuit diagram. Owing to the fact that the ladder diagram is based on the traditional circuit diagram, the operation of a function block is quite similar to the function of an integrated circuit. Users only need to send the signal to the corresponding input of the function block, and they can receive the signal or state which is required. During the whole process, users do not need to consider the processing procedure inside the function block.



- A function block is a program element equipped with the operation function. It is similar to a subroutine, and is a type of POU (Program Organization Unit). It can not operate by itself, and has to be called through the program POU. After the related parameters are transmitted, the function defined by a function block is executed. Besides, the final operation result can be sent to the device or variable used in the superior POU after the execution of the function block is complete.
- The encryption function supported by ISPSoft provides the secrecy of function blocks for special businesses. The program inside a function block can not be learned, and the patent of a business will not be infringed.

(7) Task

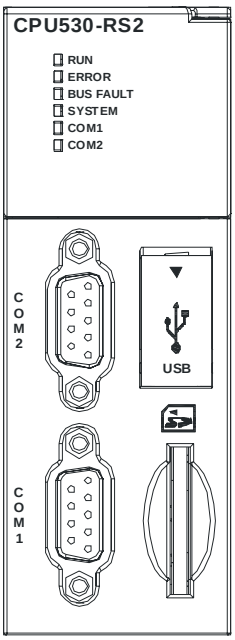


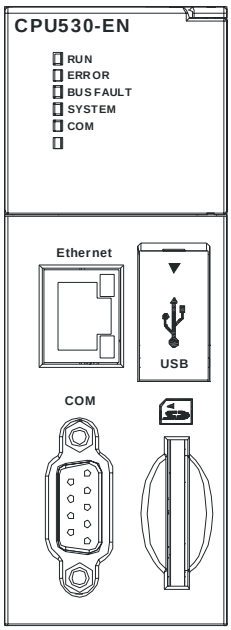
- The programs can be assigned to 283 tasks at most. Among the 288 tasks, 32 tasks are cyclic tasks, 32 tasks are I/O interrupts, 4 tasks are timed interrupts, 2 tasks are communication interrupts, 1 task is an external 24 V low-voltage interrupt, and 212 tasks are user-defined tasks.
- Users can enable and disable a task during the execution of a program by means of TKON and TKOFF.

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

- The AH500 series CPU module provides a standard USB 2.0 interface. USB 2.0 increases the data transfer rate, and decreases the time it takes to download the program, monitor the program and configure the hardware. Besides, users do not need to buy a communication cable for the CPU module. They can use a general USB cable to connect to the AH500 series CPU module.

(9) Serial control interface with multiple functions





- AHCPU500/510/520/530-RS2 provides two DB9 serial control interfaces, i.e. COM1 and COM2.
- AHCPU500/510/520/530-EN provides one DB9 serial control interface, i.e. COM.

- Users can set the DB9 serial control interface to RS232, RS485, or RS422 according to the application environment. The data transfer rate can be increased from 9600 bps to 1 Mbps.
- After users set the PLC Link in ISPSoft, they can exchange the data with a device on the RS-485 network through the RS-485 serial control interface, and do not need to write any program.

(10) High-speed Ethernet communication interface

- AHCPU500/510/520/530-EN is equipped with a 10/100 M Ethernet communication interface, and supports emails, webs, and socket services.
- After users set the Ether Link in ISPSoft, they can exchange the data with a device in the Ethernet network through the Ethernet communication interface, and do not need to write any program.
- The status or the error message related to the system is sent to users' email boxes immediately. Users do not need to be on the spot to understand the problem.

(11) Memory card

- The memory card has the following functions.

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

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

  Parameter storage: The value in the device

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

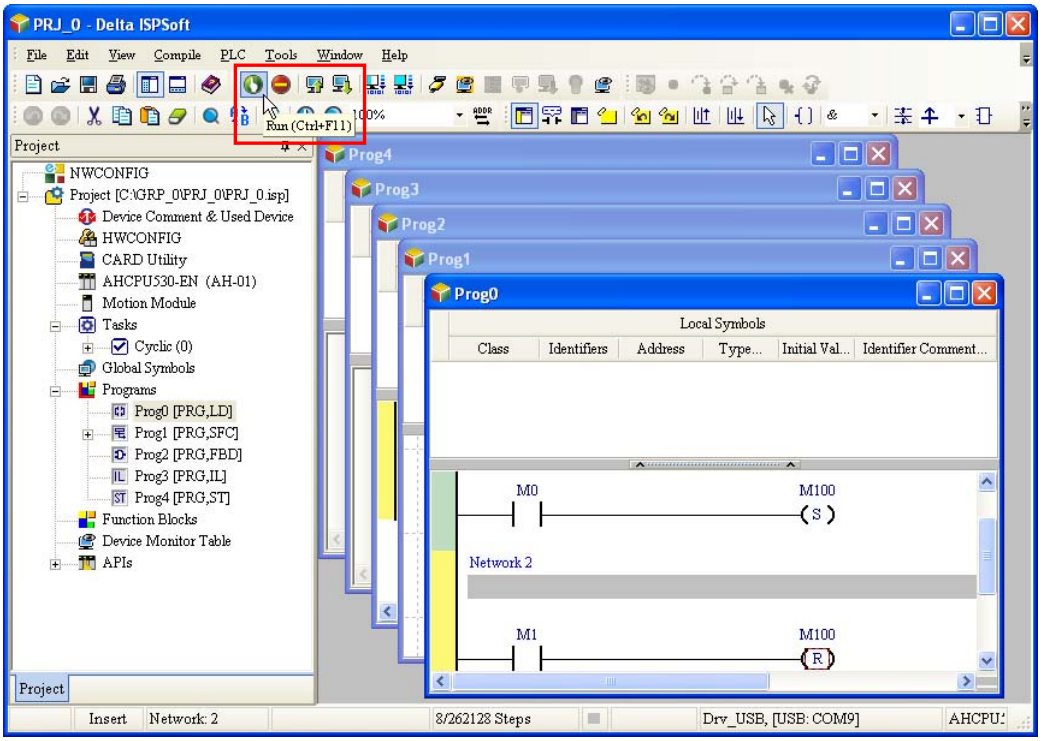
(12) Hot swap

- The AH500 series I/O modules support the on-line uninterruptible hot swap. When the system runs, users can replace the module which breaks down without disconnecting the module. After the module is replaced, the new module runs normally. Users do not need to set the module manually or switch the state.

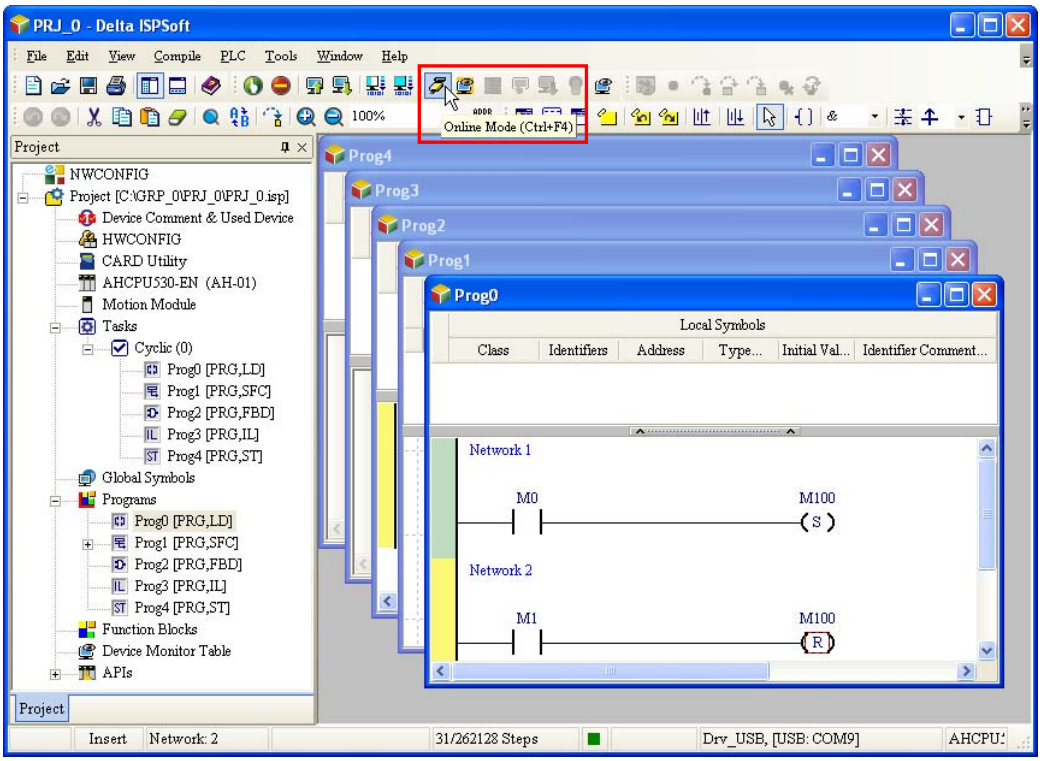
(13) Supporting the on-line debugging mode

- After a single instruction step has been complete, or after a breakpoint is specified, users can easily find the bug in the program by means of the on-line debugging mode supported by the AH500 series CPU module.
- If users want to enter the debugging mode, the CPU module must run. After users enable the on-line monitoring function, they have to click  . The debugging screen varies from programming language to programming language, but the same operation applies to these programming languages. For the AH500 series PLC, structured texts do not support the debugging mode, and sequential function charts support the debugging mode during the action and the transition.

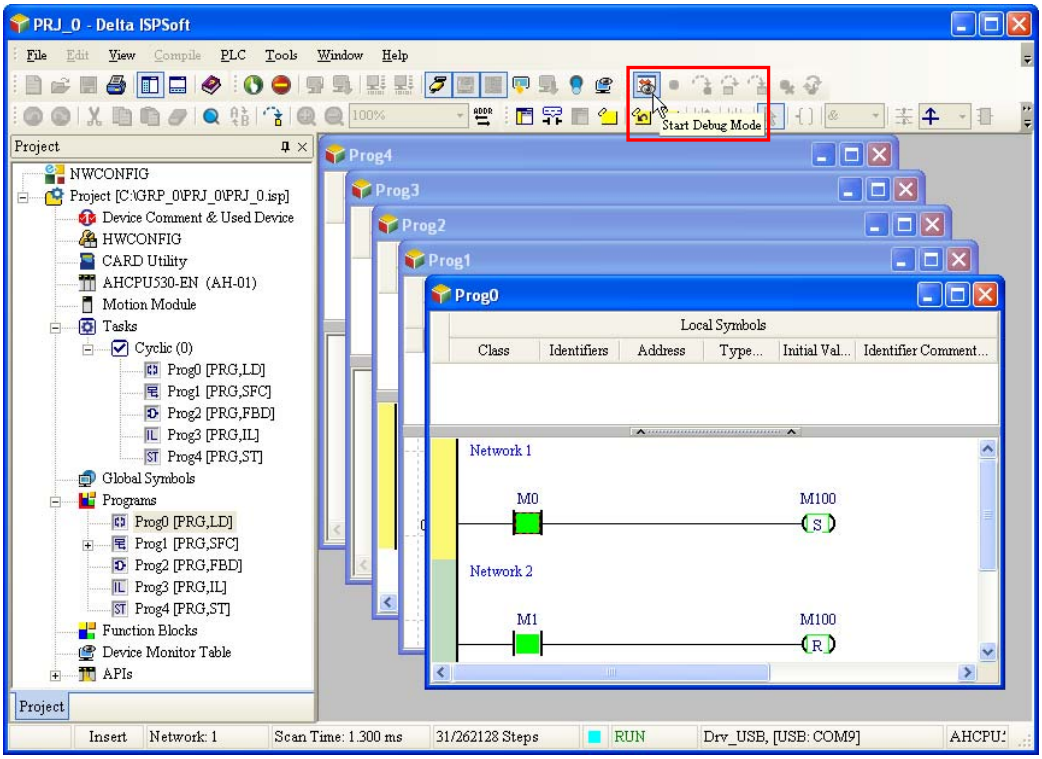
Step 1: Setting the PLC to RUN



Step 2: Entering the on-line mode

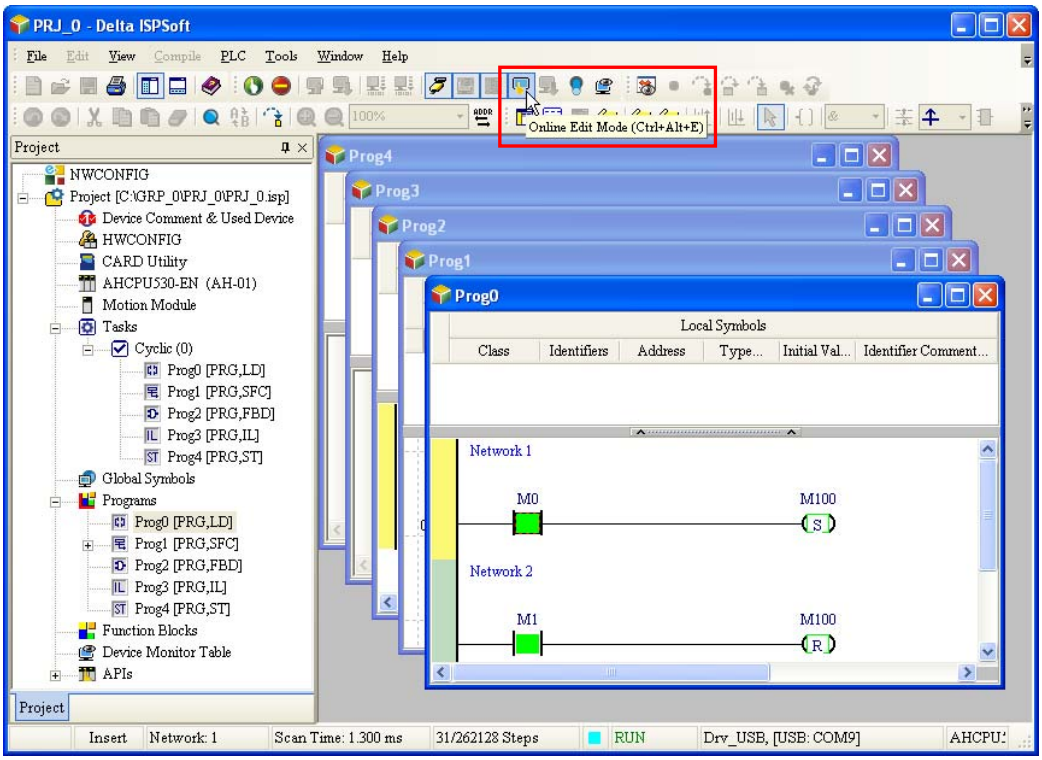


Step 3: Entering the debugging mode



(14) Supporting the on-line editing mode

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



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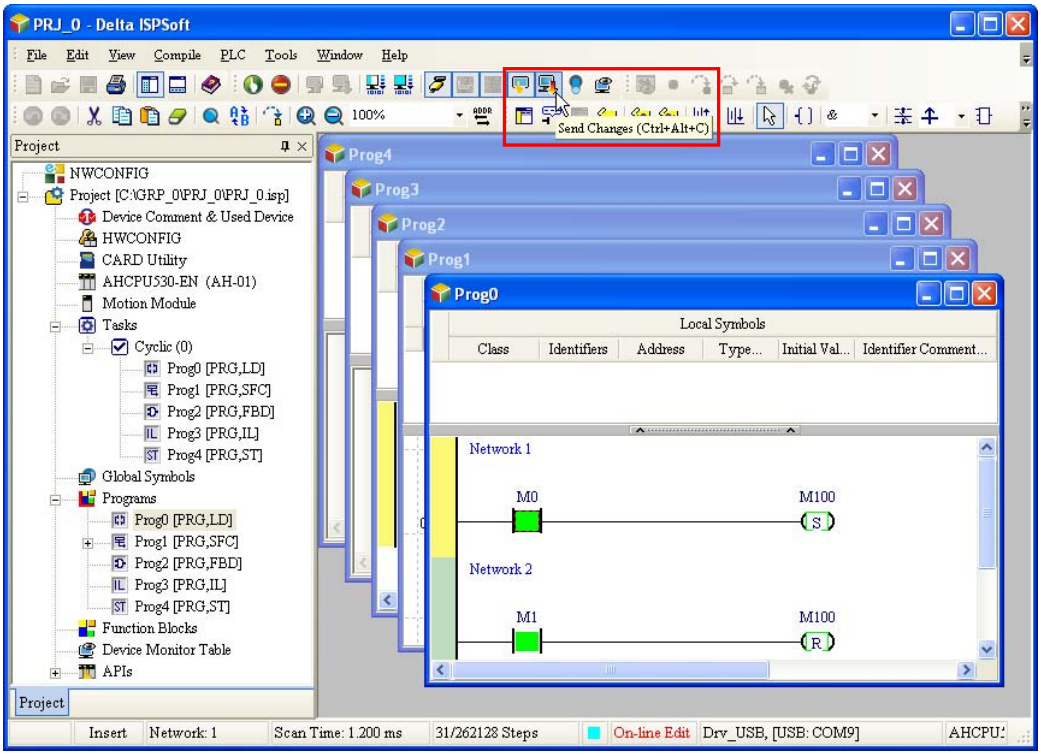
- After the program is modified and compiled, users can update the program in the CPU module by clicking  .



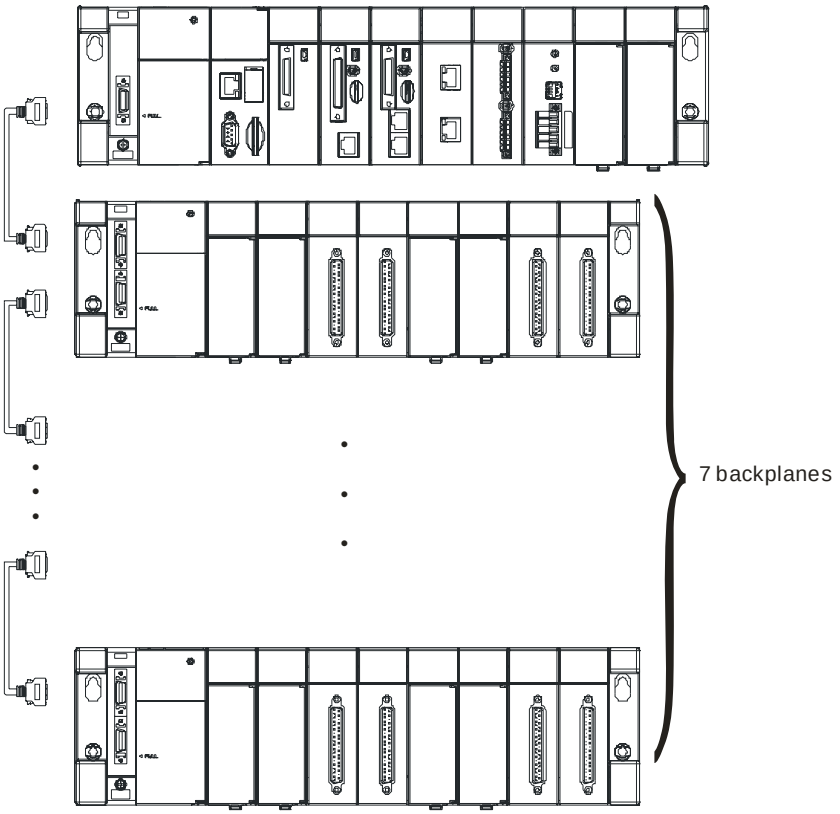
Chapter 2 Installing the Hardware

Table of Contents

2.1 AH500 Hardware Framework

2.1.1 Component Parts of the AH500 Hardware

A complete AH500 system consists of a main backplane, extension backplanes, power supply modules, a CPU module, I/O modules, and extension cables. The basic AH500 system is illustrated below.

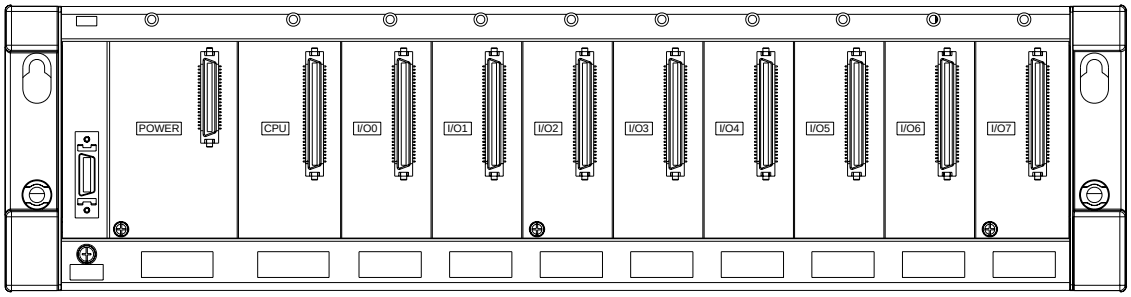


2.1.1.1 Necessary Components

A complete AH500 system consists of the following four necessary components.

- **Main backplane**

  A CPU module and other modules are installed on a main backplane which provides the function of connecting buses. The main backplanes are divided into four types according to the number of I/O modules installed on the main backplanes. These four types are four-slot main backplanes, six-slot main backplanes, eight-slot main backplanes, and twelve-slot main backplanes. Besides, a CPU module installed on a main backplane can be replaced by a RTU module on a control network. Please notice that there is at least one CPU module on a control network.

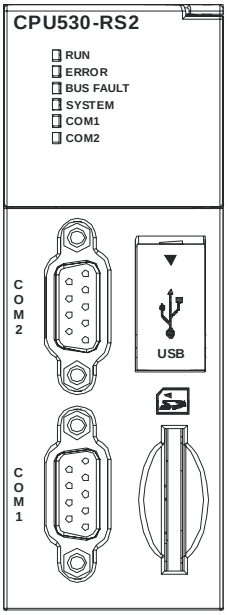


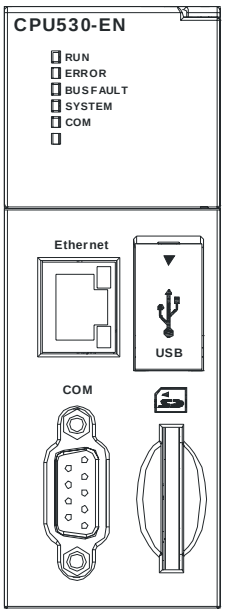
- **Power supply module**

  A power supply module functions to convert alternating current to direct current, and provides power for the modules installed on it. A power supply module has to be installed on the left-most side of a backplane.

- **CPU module**

  A CPU module is the nucleus of a complete AH500 system. It is responsible for controlling and managing the whole system, and is installed in the second slot from the left on the main backplane. Besides, Delta Electronics, Inc. provides businesses with several types of CPU modules. Users can select a CPU module according to their needs.





- **Communication cable**

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

  Please refer to the following table for information about the communication interfaces and the main applications. The specifications for the interface on an extension backplane are defined by Delta Electronics, Inc. itself. The interface is used to connect the backplanes, and users need to use a Delta extension cable.

Interface	Connector	Application
Communication port	DB9	Computer/HMI communication/Industrial control network (RS-232/422/485)
Ethernet	RJ45	Computer/HMI communication/Remote control/Data exchange/Industrial control network
USB	Mini USB	Computer communication
DeviceNet	DeviceNet	Industrial control network The maximum data transmission rate is 1 Mbps.
Interface on an extension backplane	Delta connector	Extension cable for a complete AH500 system

2.1.1.2 Accessories

The following are the accessories for an AH500 system. Users can select them according to their needs.

- **Extension module**

  Apart from the standard communication ports on a CPU module, the CPU module does not equipped with other I/O functions. If users want to use I/O functions, they can select suitable modules according to the actual situation. The modules which can be used with an AH500 system are listed in the table below.

  The digital input/output modules:

AH16AM10N-5A	24 V DC 5 mA 16 inputs Terminal block
AH32AM10N-5B	24 V DC 5 mA 32 inputs DB37 connector
AH64AM10N-5C	24 V DC 3.2 mA 64 inputs Latch connector
AH16AM30N-5A	100~240 V AC 4.5 mA/9 mA (100 V, 50 Hz) 16 inputs Terminal block
AH16AN01R-5A	240 V AC/24 V DC 2 A 16 outputs Relay Terminal block
AH16AN01T-5A	12~24 V DC 0.5 A 16 outputs Sinking output Terminal block

AH16AN01P-5A	12~24 V DC 0.5 A 16 outputs Sourcing output Terminal block
AH16AN01S-5A	110/220 V AC 0.5 A 16 outputs TRIAC Terminal block
AH32AN02T-5B	12~24 V DC 0.1 A 32 outputs Sourcing output DB37 connector
AH32AN02P-5B	12~24 V DC 0.1 A 32 outputs Sinking output DB37 connector
AH64AN02T-5C	12~24 V DC 0.1 A 64 outputs Sinking output Latch connector
AH64AN02P-5C	12~24 V DC 0.1 A 64 outputs Sourcing output Latch connector
AH16AP11R-5A	24 V DC 5 mA 8 inputs 240 V AC/24 V DC 2 A 8 outputs Relay Terminal block
AH16AP11T-5A	24 V DC 5 mA 8 inputs 12~24 V DC 0.5 A 8 outputs Sourcing output Terminal block

AH16AP11P-5A	24 V DC 5 mA 8 inputs 12~24 V DC 0.5 A 8 outputs Sinking output Terminal block

The analog input/output modules:

AH04AD-5A	Four-channel analog input module 16-bit resolution 0~10 V, 0/1~5 V, -5~+5 V, -10~+10 V, 0/4~20 mA, and -20~+20 mA
AH08AD-5B	Eight-channel analog input module 16-bit resolution 0~10 V, 0/1~5 V, -5~+5 V, and -10~+10 V
AH04DA-5A	Four-channel analog output module 16-bit resolution -10~10 V, and 0/4~20 mA
AH08DA-5B	Eight-channel analog output module 16-bit resolution -10~+10V, 0~10V, -5~+5V, and 0/1~5V
AH06XA-5A	Four-channel analog input module 16-bit resolution 0~10 V, 0/1~5 V, -5~+5 V, -10~+10 V, 0/4~20 mA, and -20~+20 mA Two-channel analog output module 16-bit resolution -10~10 V, and 0/4~20 mA

The temperature measurement modules:

AH04PT-5A	Four-channel four-wire/three-wire RTD temperature sensor Sensor type: Pt100, Pt1000, Ni100, Ni1000, and 0~300Ω
AH04TC-5A	Four-channel thermocouple temperature sensor Sensor type: J, K, R, S, T, E, N, and -150~+150 mV
AH08TC-5A	Eight-channel thermocouple temperature sensor Sensor type: J, K, R, S, T, E, N, and -150~+150 mV

The network modules:

AH10EN-5A	It is an Ethernet master module with two built-in Ethernet ports, and supports a Modbus TCP master.
AH10SCM-5A	It is a serial communication module with two RS-485/RS-422 ports, and supports Modbus and the UD link protocol. There is isolation between two parts of communication, and there is isolation between two parts of power.
AH10DNET-5A	DeviceNet scanner module Master 1 Mbps

The motion control modules:

AH02HC-5A	Two-channel high-speed counter module 200 kHz
AH04HC-5A	Four-channel high-speed counter module 200 kHz
AH05PM-5A	Two-axis pulse train motion control module (1 MHz)
AH10PM-5A	Six-axis pulse train motion control module (Four axes: 1 MHz; Two axes: 200 kHz)
AH20MC-5A	Twelve-axis DMCNET (Delta Motion Control Network) motion control module (10 Mbps)

The RTU module:

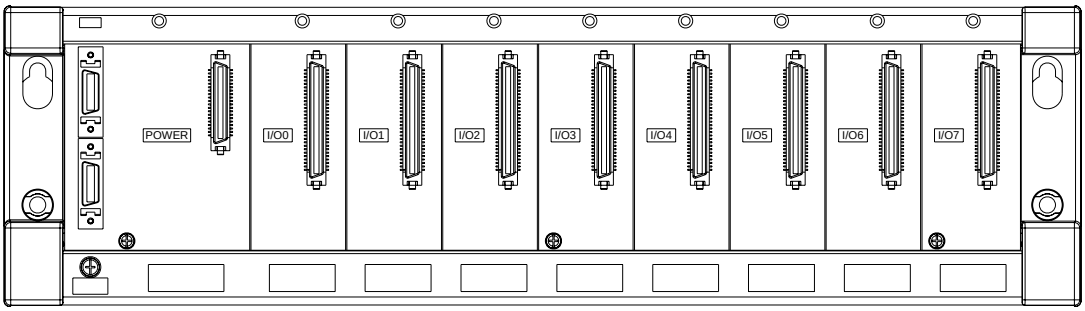
AHRTU-DNET-5A	RTU module for DeviceNet

The space module:

AHASP01-5A	Space module used for an empty I/O slot

- **Extension backplane**

  If the number of slots on the main backplane is not sufficient for the whole system, users can use the extension backplanes to increase the number of extension modules. The extension backplanes are divided into two types according to the number of extension modules installed on the extension backplanes. These two types are six-slot extension backplanes, and eight-slot extension backplanes.

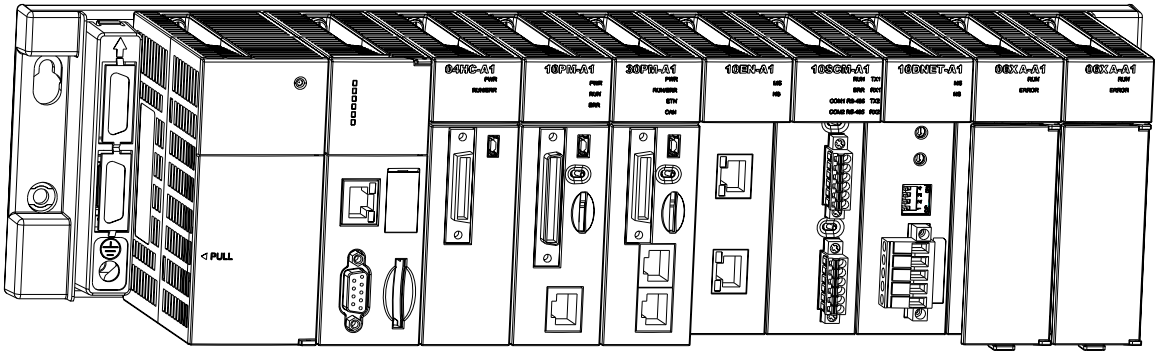


2.1.2 Installing Modules on a Main Backplane

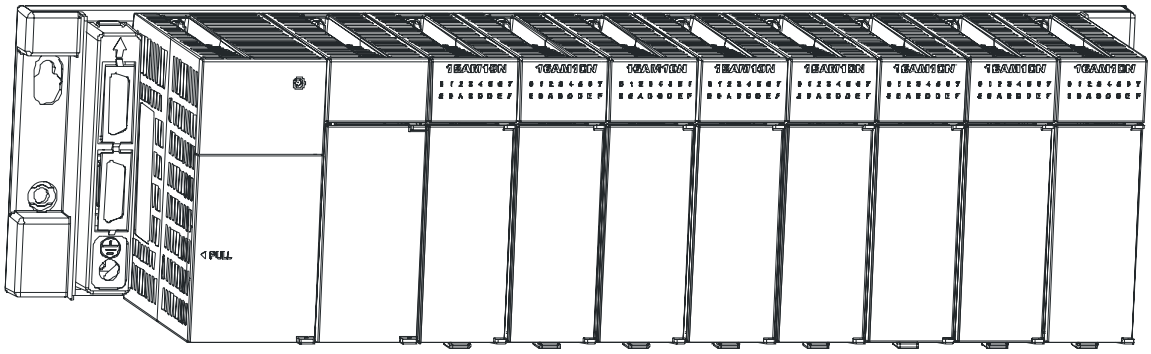
For a main backplane as a master, the first slot from the left is for a power supply module, the second slot is for a CPU module, and the slots following the second slot are for extension modules. All AH500 series extension modules can be installed on a main backplane. Eight AH500 series network modules at most can be installed on a main backplane, but no limits are imposed on the number of other modules which can be installed on a main backplane. No limits are imposed on the installing of modules except that a power supply module and a CPU module have to be installed in the first slot and the second slot respectively. Therefore, users can configure the hardware by themselves. Besides, twelve extension modules at most can be installed on a main backplane.

For a main backplane as a RTU, the second slot is for a RTU module, and only digital input/output modules, analog input/output modules, temperature measurement modules and AH10SCM-5A are supported.

- **Main backplane as a master**



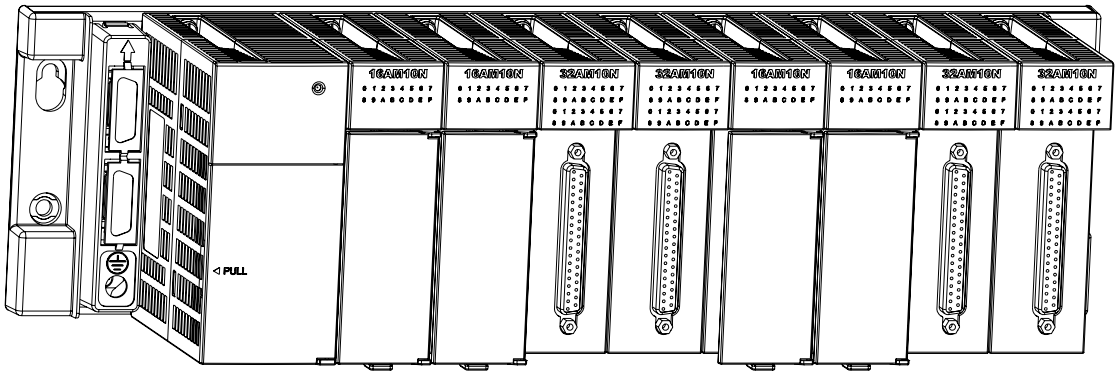
- **Main backplane as a RTU**



2.1.3 Installing Modules on an Extension backplane

For an extension backplane, the first slot from the left is for a power supply module, and the slots following the first slot are for extension modules. Only digital input/output modules, analog input/output modules, temperature measurement modules, and AH10SCM-5A can be installed on an extension backplane. Besides, users do not need to arrange the extension modules in a specific order.

- **Extension backplane**



2.1.4 Connecting a Main Backplane to an Extension Backplane

A main backplane can be connected to an extension backplane through the interface on the left side of the main backplane, the interface on the left side of the extension backplane, and a Delta extension cable. For a CPU module or a RTU, a main backplane can be connected to seven extension backplanes at most through the interfaces on the backplanes. Therefore, if there is a CPU module and there are several RTUs, not only the CPU module can be connected to seven extension backplanes, but also every RTU can connect to seven extension backplanes.

There are two ports on an extension backplane. The upper port is used to connect to a superior backplane, and the lower port is used to connect to an inferior backplane.

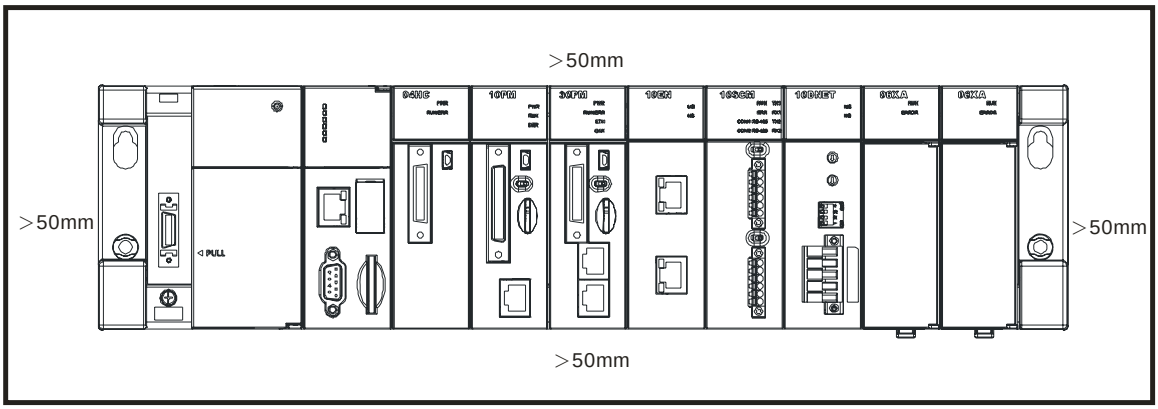
2.2 Warning

- An AH500 system only supports the horizontal installation, and a power supply module has to be installed on the left-most side of a backplane.
- Before a module is installed, please make sure of the size of the module and that of a backplane. To prevent the misestimate from resulting in insufficient installation space, the size of the connector of a communication cable, and the room which needs to be reserved have to be taken into account.
- Please make sure that the work environment conforms to the specifications for the products. It is necessary to take account of the basic temperature/humidity control and the dust/corrosion prevention.
- The electromagnetic interference will result in the wrong action of the whole system. Therefore, users have to do EMC design carefully. Please refer to chapter seven in this manual for more information related to EMC standards.
- If the specifications for the components such as screws and washers are noted specifically in the manual, please use the components conforming to the specifications.
- If a cable is connected to a communication port, please make sure that the connector of the cable is joined to the port on the module properly.
- A backplane has to be mounted on a plane stably instead of being just set on the plane. After it is installed, please make sure that it is fixed on the plane.

2.3 Installation

2.3.1 Installation of Modules in a Control Box

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



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

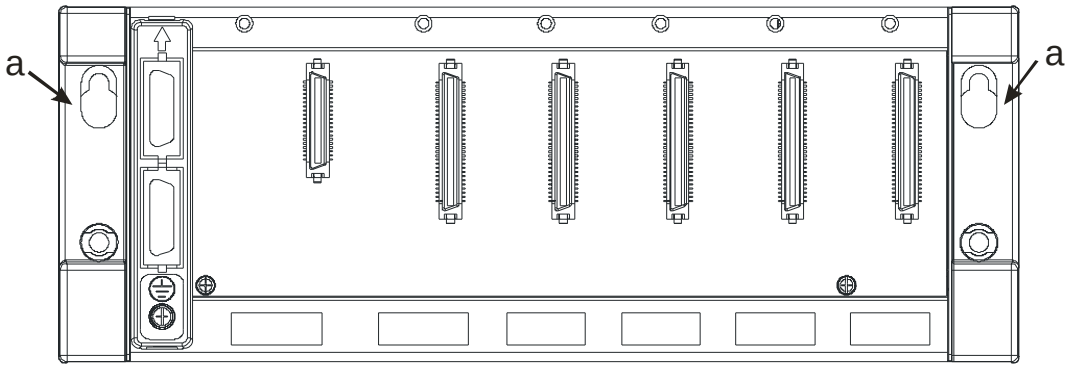
2.3.2 Mounting a Backplane

- **Fixing a backplane by screws**

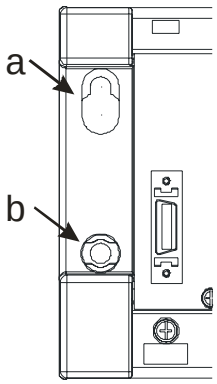
  Please mount a backplane on a plane by means of M5 screws, as illustrated below. To fix the backplane, users need to judge the length of a screw, the size of a thread, and whether to use a

nut according to the actual condition of the plane unless there are specific specifications for a screw which are indicated in the pictures below.

1. Tighten the M5 screws in the holes indicated by **a**.

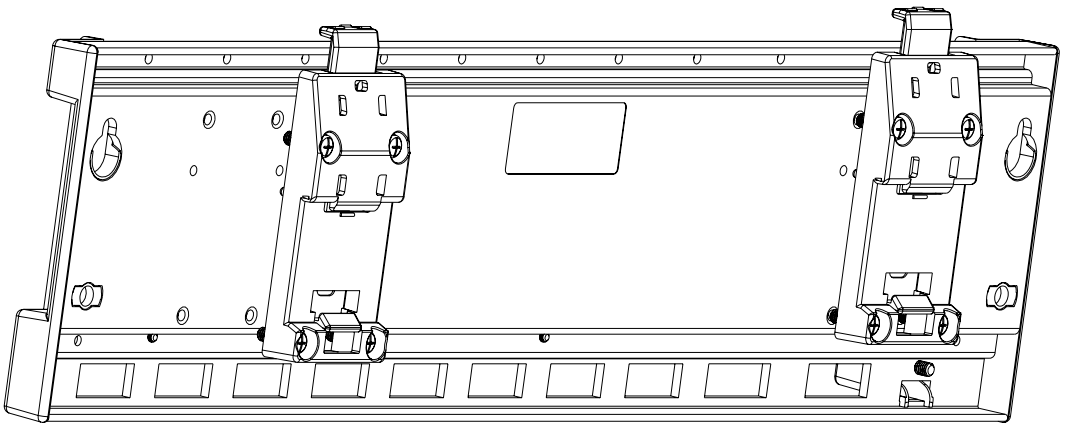


2. Tighten the two screws in the holes indicated by **b**.

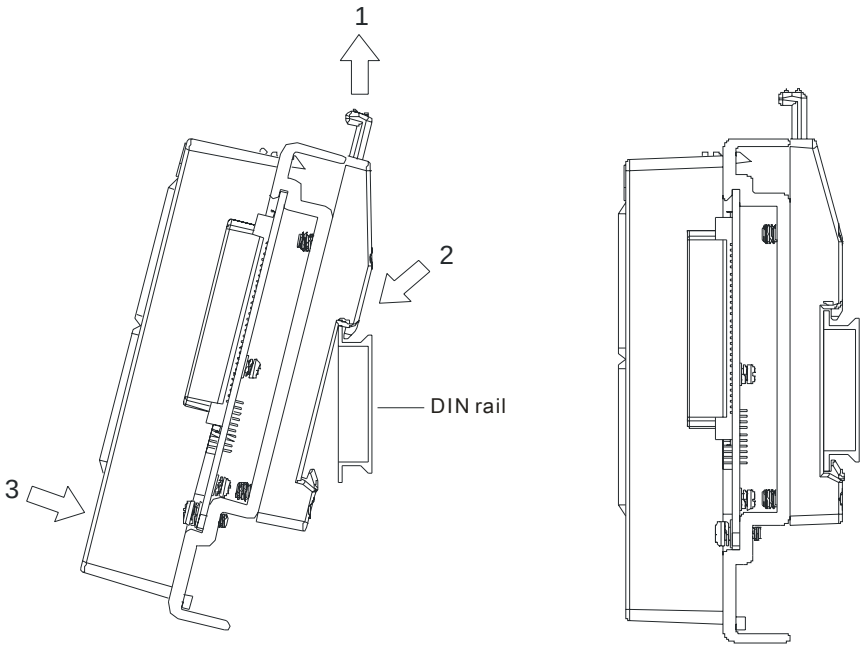


- **Installing a DIN Rail**

1. The installation is applicable to a 35 millimeter DIN rail.
2. Install the mounting clips on a backplane.

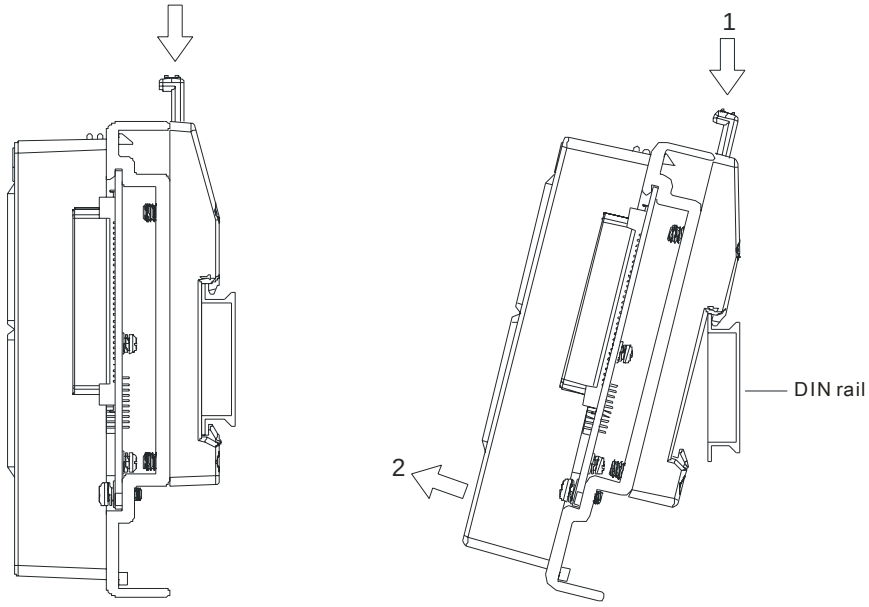


3. Install the backplane on a DIN rail.
   Step 1: Pull the clasp in the direction indicated by the arrow.
   Step 2: Hang the backplane on a DIN rail.
   Step 3: Press the clasp.



- **Removing a DIN rail**

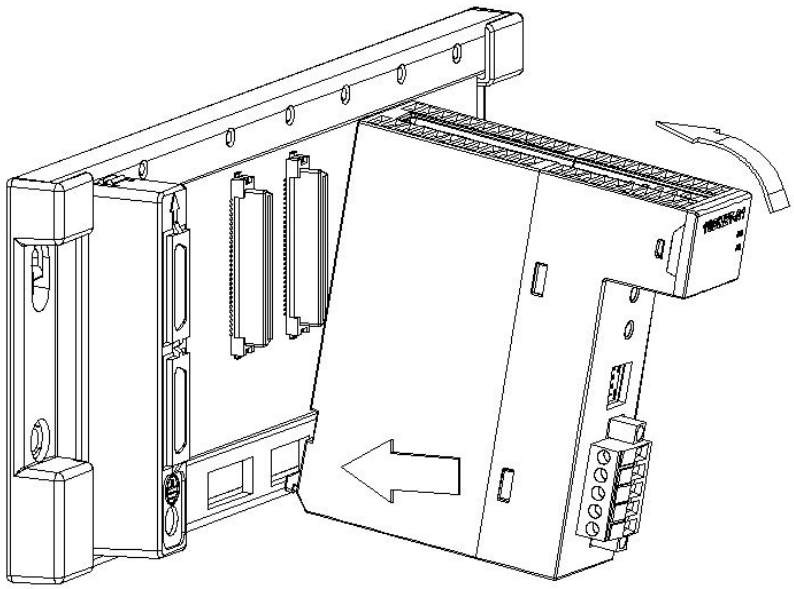
  Step 1: Press the clasp in the direction indicated by the arrow.
  Step 2: Remove the backplane.



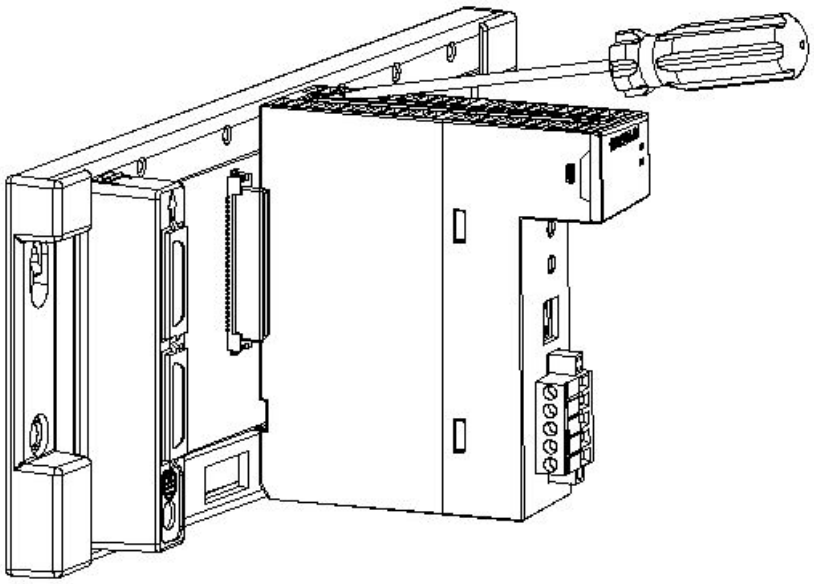
2.3.3 Installing a Module

Insert a module into a slot, make sure that the module is installed on the backplane properly, and tighen the the screw, as illustrated below.

1. Insert the projection under the module into the hole in the backplane.
2. Push the module in the direction indicated by the arrow until it clicks.



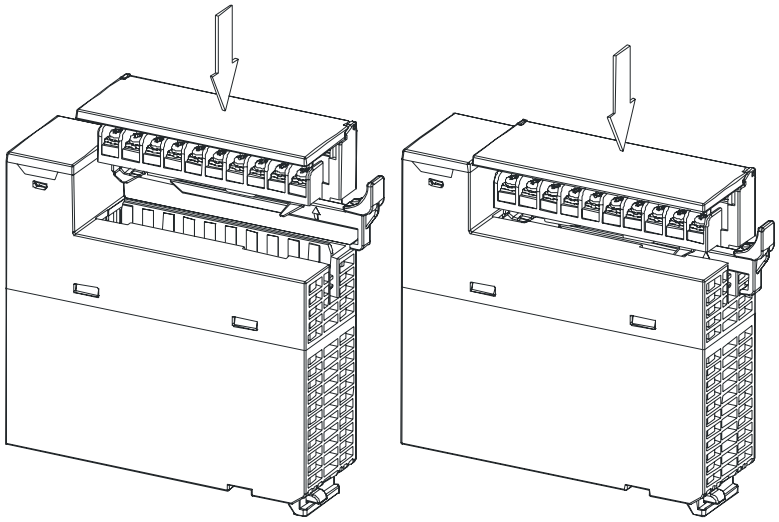
3. Tighten the screw on the module.



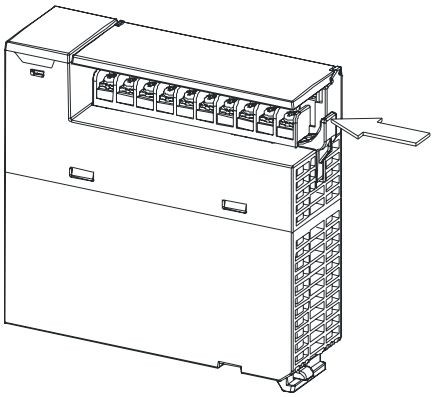
2.3.4 Installing a Removable Terminal Block

- **Installation**

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

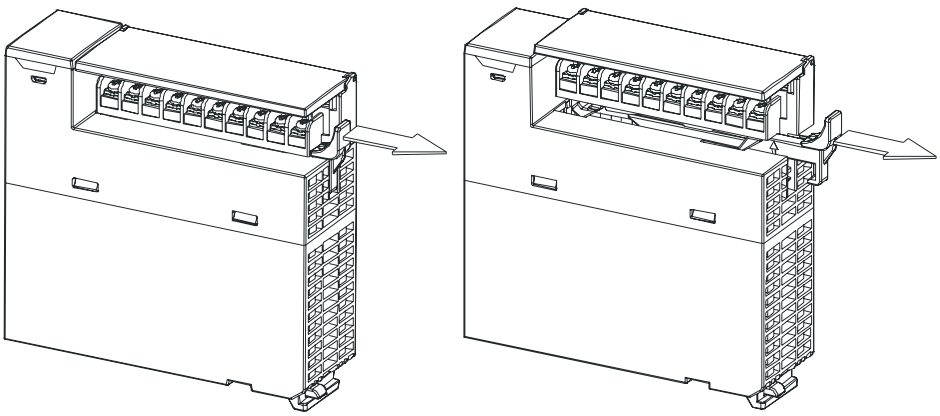


2. Press the clip in the direction indicated by the arrow.

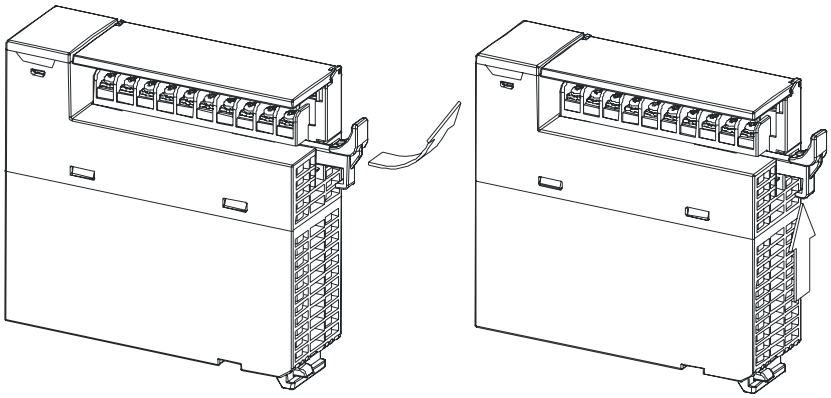


- **Removal**

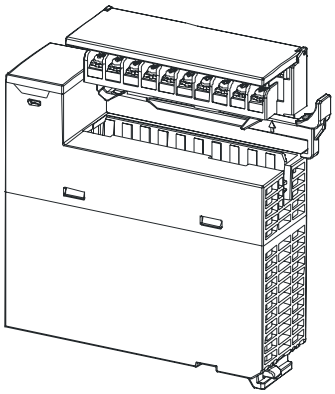
1. Pull the clip in the direction indicated by the arrow.



2. Pull up the clip.

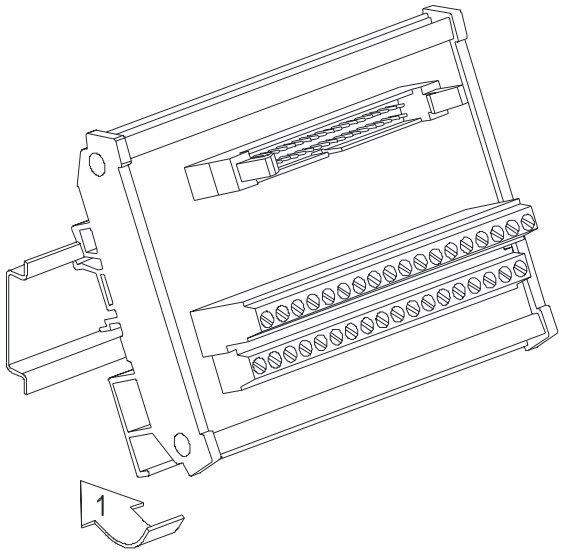


3. The terminal block is removed.



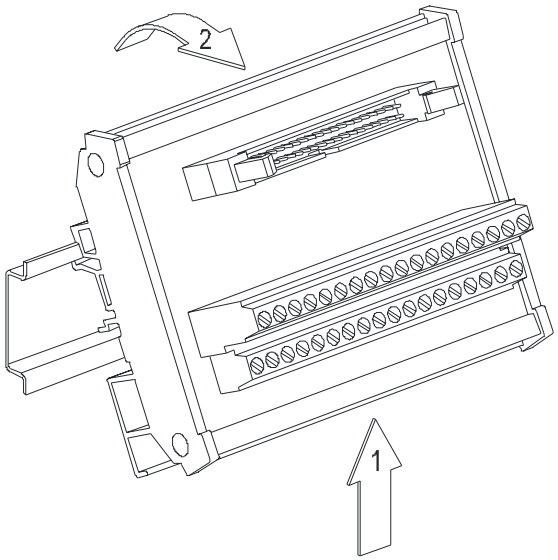
2.3.5 Installing a Wiring Module

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



- **Removal**
  1. Push the wiring module in the direction indicated by arrow 1.

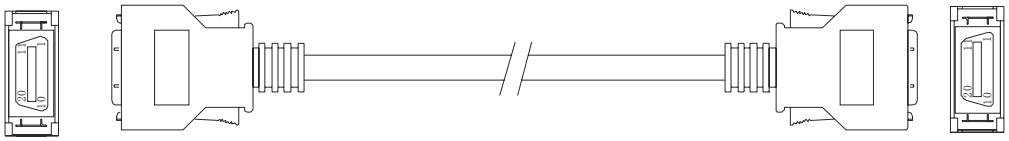
2. Pull the wiring module in the direction indicated by arrow 2.



2.3.6 Connecting Backplanes

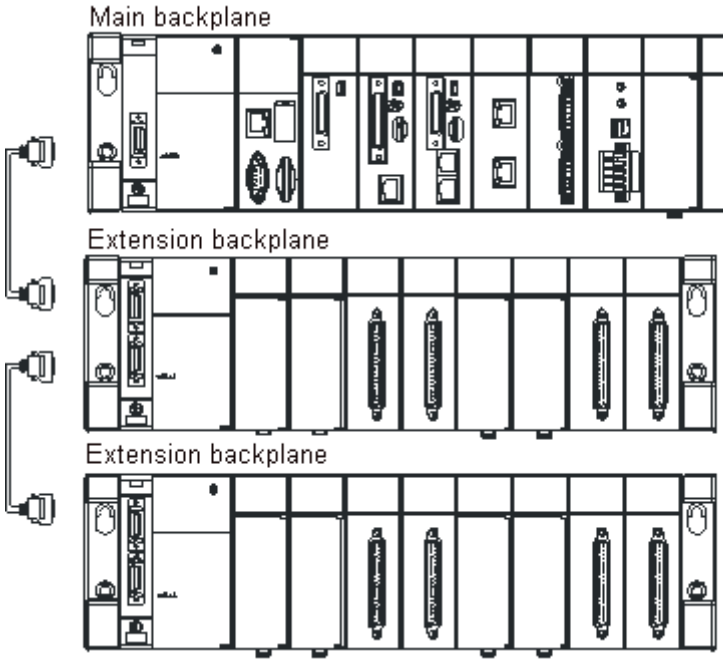
Connect the backplanes through the extension cables, and make sure that the connectors of the cables are joined to the ports properly, as illustrated below.

- Extension cable
  1. AHACAB06-5 A (0.6 m)
  2. AHACAB10-5 A (1.0 m)
  3. AHACAB15-5 A (1.5 m)
  4. AHACAB30-5 A (3.0 m)



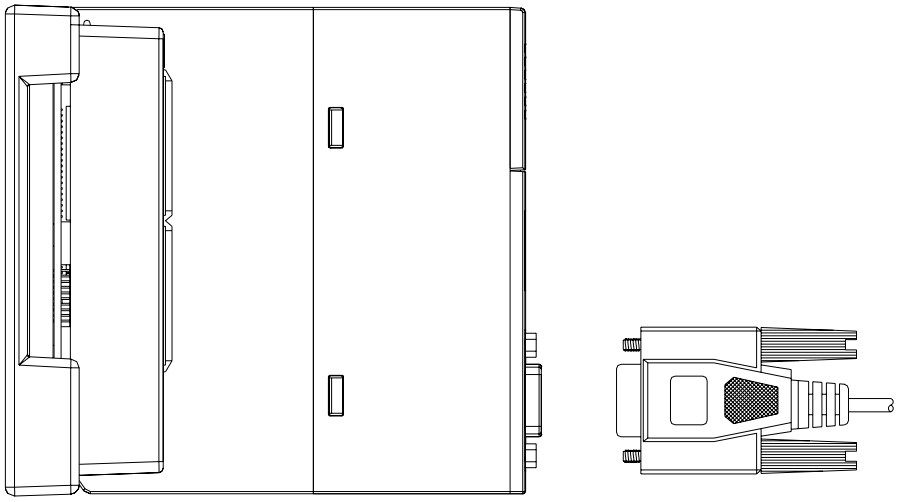
Note: The extension cable longer than 3 meters can be customized.

- Connecting the backplanes



2.3.7 Putting a Communication Cable

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



Chapter 3 Product Specifications

Table of Contents

3.1 General Specifications

Item	Specifications
Operating temperature	-20~60°C
Storage temperature	-40~85°C
Operating humidity	50~95% No condensation
Storage humidity	5~95% No condensation
Vibration/Shock resistance	International standards IEC 61131-2, IEC 68-2-6 (TEST Fc)/ IEC 61131-2 & IEC 68-2-27 (TEST Ea)
Work environment	No corrosive gas exists.
Installation location	In a control box
Pollution degree	2

3.2 Specifications for CPU Modules

3.2.1 General Specifications

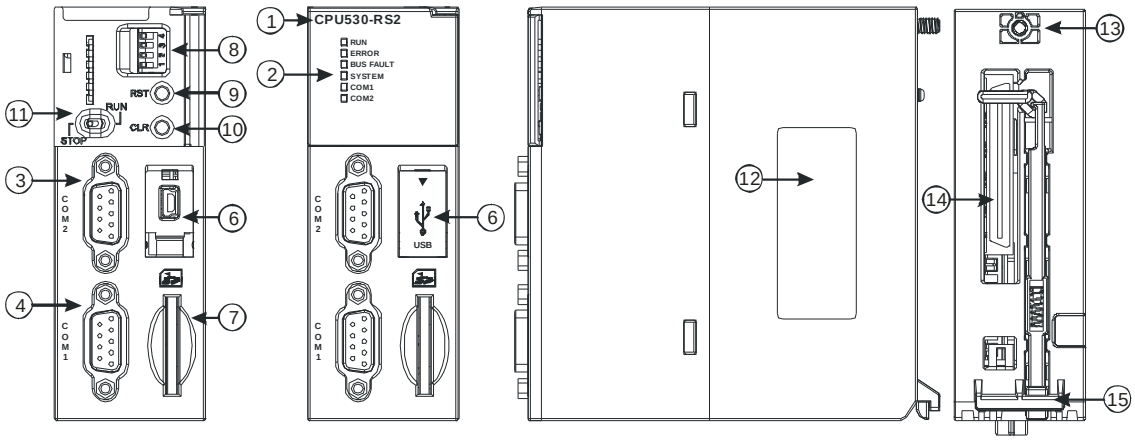
Item	AHCPU500/510/520/530-RS2	AHCPU500/510/520/530-EN	Remark
Execution	The program is executed cyclically.		
Input/Output control	Regenerated inputs/outputs Direct inputs/outputs		The inputs and outputs can be controlled through the direct inputs and direct outputs.
programming language	IEC 61131-3		
	Ladder diagrams, function block diagrams, instruction lists, structured texts, and sequential function charts		
Instruction execution speed	0.3 ms/ksteps		
Number of instructions	Approximately 666 instructions		
Constant scan cycle (ms)	1-32000 (The scan cycle can be increased by one millisecond.)		Setting the parameter
Program capacity (step)	16 ksteps (AHCPU500) 64 ksteps (AHCPU510) 128 ksteps (AHCPU520) 256 ksteps (AHCPU530)		
Installation	DIN rails or screws		
Installation of a module	A module is installed directly on a backplane.		
Connection between two backplanes	An extension cable connects two backplanes.		

Item	AHCPU500/510/520/530-RS2	AHCPU500/510/520/530-EN	Remark
Number of modules	Twelve input/output modules at most can be installed on a main backplane. Eight input/output modules at most can be installed on an extension backplane. Seven extension backplanes at most can be connected. Sixty-eight input/output modules at most can be installed.		
Number of backplanes	Eight backplanes at most (one main backplane and seven extension backplanes)		
Number of tasks	283 tasks (Cyclic: 32; I/O interrupt: 32; timed interrupt: 4; communication interrupt: 2; external 24 V low-voltage interrupt: 1; External interrupt: 212)		
Number of input/output devices	8192 input/output devices (X0.0~X511.15/Y0.0~Y511.15)		Number of devices which can be used in a program
Number of inputs/outputs	768 inputs/outputs (AHCPU500) 1280 inputs/outputs (AHCPU510) 2304 inputs/outputs (AHCPU520) 4352 inputs/outputs (AHCPU530)		Number of inputs/outputs accessible to an actual input/output module
Input relay [X]	8192 (X0.0~X511.15)		
Output relay [Y]	8192 (Y0.0~Y511.15)		
Internal relay [M]	8192 (M0~M8191)		
Link register [L]	AHCPU500: 16384 (L0.0~L16383.15) AHCPU510: 32768 (L0.0~L32767.15) AHCPU520: 65536 (L0.0~L65535.15) AHCPU 530: 65536 (L0.0~L65535.15)		
Timer [T]	2048 (T0~T2047)		
Counter [C]	2048 (C0~C2047)		
32-bit counter [HC]	64 (HC0~HC63)		
Data register [D]	AHCPU500:16384 (D0~D16383) AHCPU510: 32768 (D0~D32767) AHCPU520: 65536 (D0~D65535) AHCPU530: 65536 (D0~D65535)		
Stepping relay [S]	2048 (S0~S2047)		
Index register [E]	32 (E0~E31)		
Special auxiliary relay [SM]	2048 (SM0~SM2047)		
Special data register [SR]	2048 (SR0~SR2047)		
Serial communication port	Two RS-232/RS-485/RS-422 communication ports	One RS-232/RS-485/RS-422 communication port	
Ethernet port	-	10/100 M	
USB port	Mini USB		

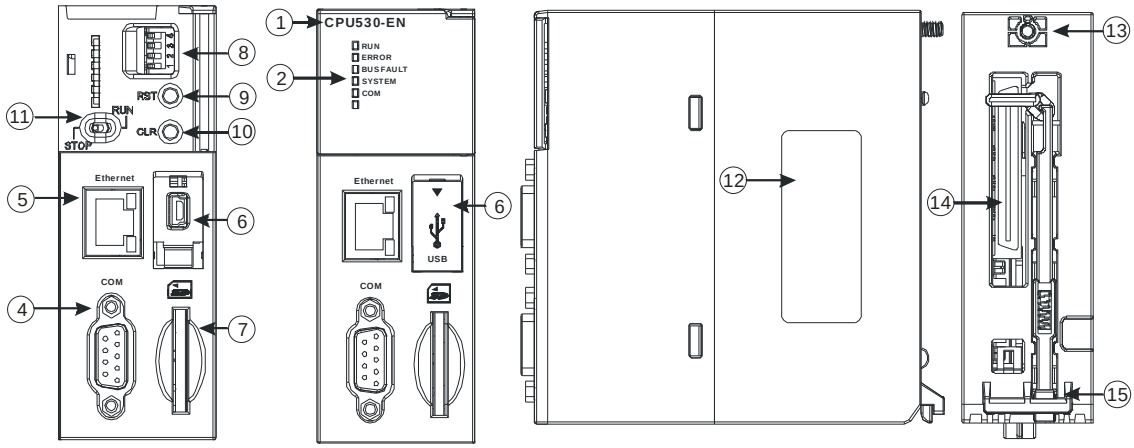
Item	AHCPU500/510/520/530-RS2	AHCPU500/510/520/530-EN	Remark
Storage interface	SD Card (SD 1.0)		
Remote RUN/STOP	The setting range is X0.0~X511.15.		
Real-time clock	Years, months, days, hours, minutes, seconds, and weeks		

3.2.2 Profiles

- **AHCPU500-RS2/AHCPU510-RS2/AHCPU520-RS2/AHCPU530-RS2**



- **AHCPU500-EN/AHCPU510-EN/AHCPU520-EN/AHCPU530-EN**

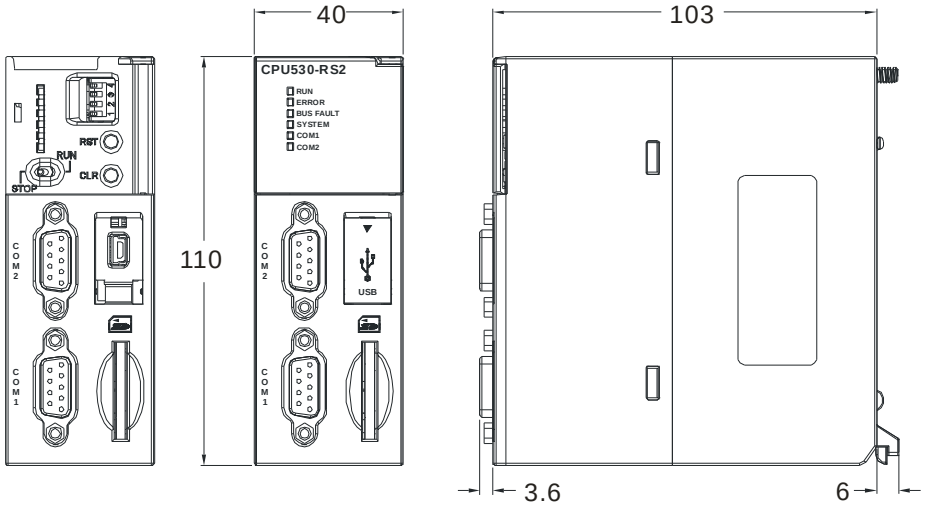


Number	Name	Description
1	Model name	Model name of the CPU module
2	RUN LED indicator	Operating status of the CPU module ON: The user program is being executed. OFF: The execution of the user program stops. Blink: The user program is in a debugging mode.
	ERROR LED indicator	Error status of the CPU module ON: A serious error occurs in the system. OFF: The system is normal. Blink: A slight error occurs in the system.
	BUS FAULT LED indicator	Error status of the I/O bus ON: A serious error occurs in the I/O bus. OFF: The I/O bus is normal. Blink: A slight error occurs in the I/O bus.

Number	Name	Description	
2	SYSTEM LED indicator	System status of the CPU module ON: The external input/output is forced ON/OFF. OFF: The system is in a default status. Blink: The CPU module is being reset./The value in the device is being cleared.	
	COM LED indicator COM1 LED indicator COM2 LED indicator	Communication status of the communication port OFF: There is no communication through the communication port. Blink: There is communication through the communication port.	
3	COM2	Providing the RS-232/RS-485/RS-422 communication interface	
4	COM1/COM	Providing the RS-232/RS-485/RS-422 communication interface	
5	Ethernet port	Providing the Ethernet communication interface	
6	USB port	Providing the mini USB communication interface	
7	SD slot	Providing the SD interface	
8	DIP switch	Function which the system executes	
		SW1	OFF: No action (default) ON: Write protection
		SW2	OFF: No action (default) ON: The system is copied when the CPU module is supplied with powered. (The user program, the CPU paramter, the module table, and the setting values in the devices are copied from the memory card to the CPU module.)
		SW3	OFF: No action (default) ON: It is used with the CLR button to backup the system. (The user program, the CPU paramter, the module table, and the setting values in the devices are backupped from the memory card to the CPU module.)
		SW4	It is used with SW3. OFF: When the system is backupped, the values in the devices are backupped. ON: When the system is backupped, the values in the devices are not backupped.
9	RST button	Resetting the CPU module, and restoring it to the default factory value	
10	CLR button	Clearing the value in the latched device	
11	RUN/STOP switch	RUN: The user program is executed. STOP: The execution of the user program stops.	
12	Label	Nameplate	
13	Set screw	Fixing the module	
14	Connector	Connecting the module and a backplane.	
15	Projection	Fixing the module	

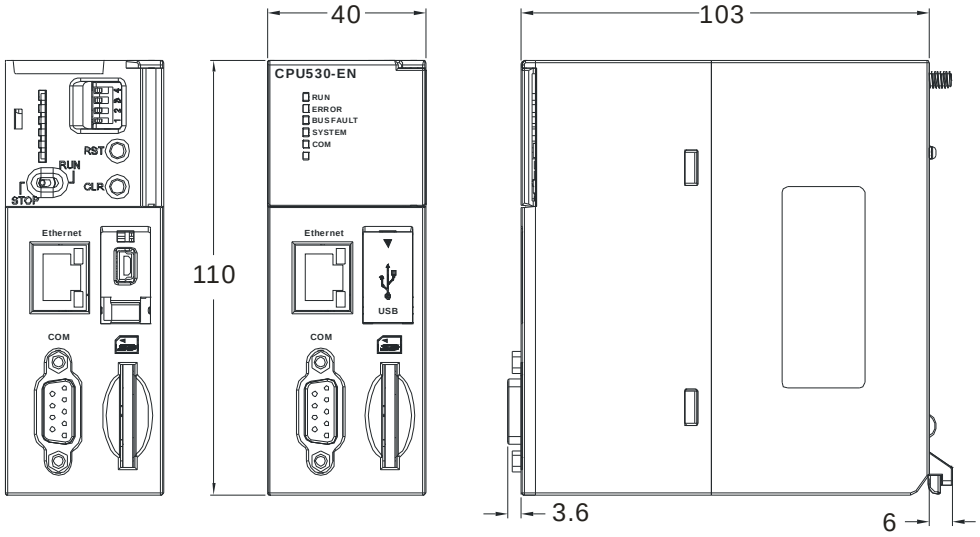
3.2.3 Dimensions

- **AHCPU500-RS2/AHCPU510-RS2/AHCPU520-RS2/AHCPU530-RS2**



Unit: mm

- **AHCPU500-EN/AHCPU510-EN/AHCPU520-EN/AHCPU530-EN**



Unit: mm

3.3 Specifications for Backplanes

3.3.1 General Specifications

- **The specifications for main backplanes**

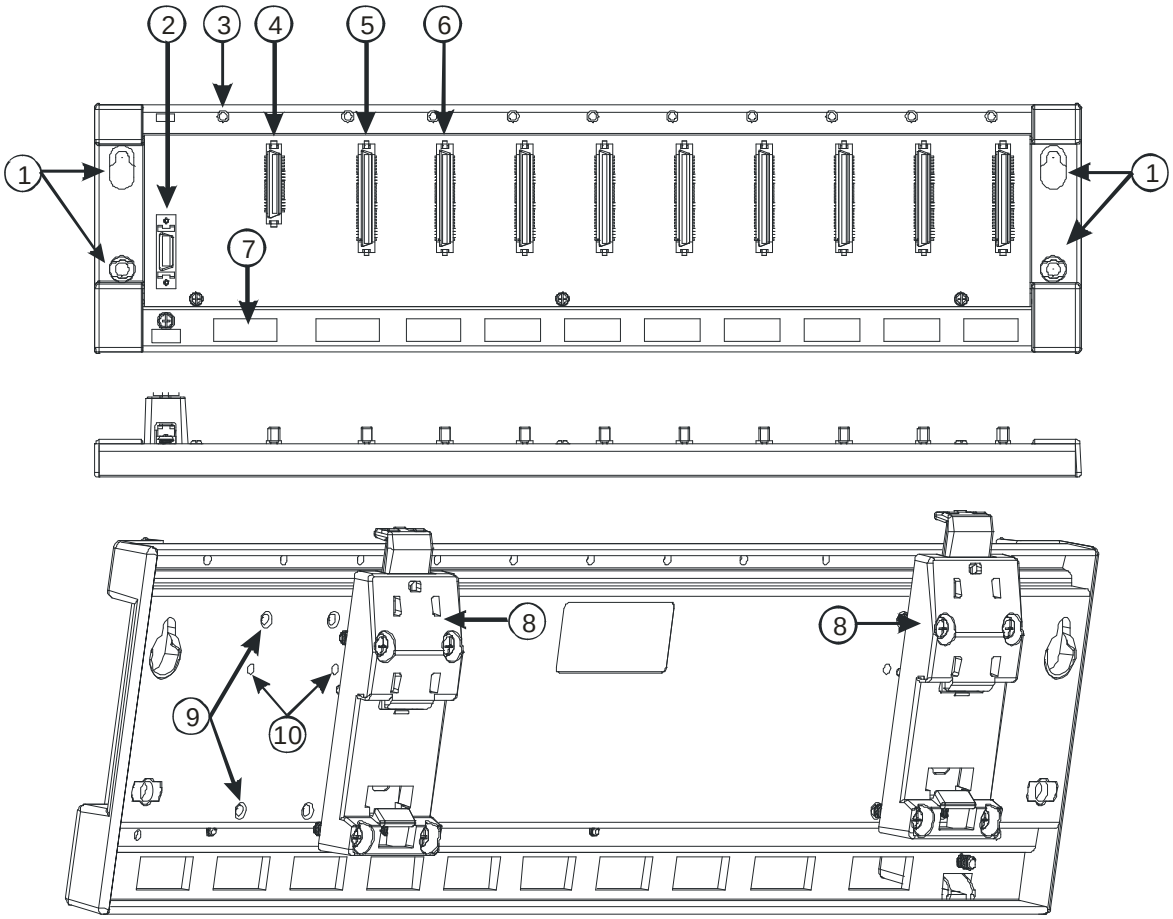
Item \ Model	AHBP04M1-5A	AHBP06M1-5A	AHBP08M1-5A	AHBP12M1-5A
Number of slots	4	6	8	12
Applicable power supply module	AHPS05-5A			
Applicable input/output module	The AH500 series input/output modules can be installed.			

- **The specifications for extension backplanes**

Item \ Model	AHBP06E1-5A	AHBP08E1-5A
Number of slots	6	8
Applicable power supply module	AHPS05-5A	
Applicable input/output module	Digital input/output modules, analog input/output modules, temperature measurement module, and AH10SCM-5A	

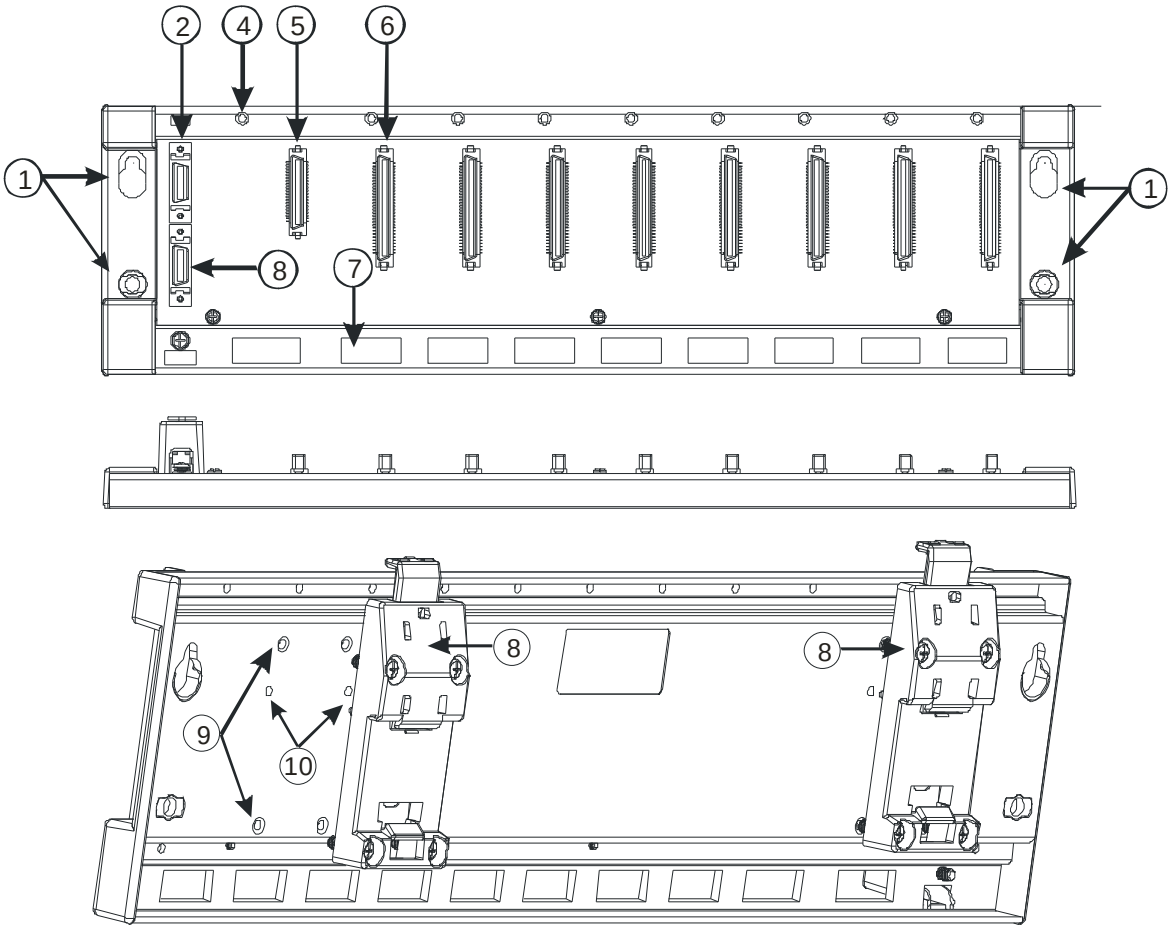
3.3.2 Profiles

- **The profile of the main backplane AHBP08M1-5A**



Number	Name	Description
1	Mounting hole	Fixing the backplane
2	Extension port	It is connected to an inferior backplane.
3	Mounting hole	After a module is installed, it is fixed by a screw.
4	Connector	Connecting the backplane and a power supply module
5	Connector	Connecting the backplane and a CPU module
6	Connector	Connecting the backplane and an input/output module
7	Hole	The projection under a module is inserted into this hole.
8	Mounting clip	Hanging a backplane on a DIN rail
9	Mounting hole	After a mounting clip is installed, it is fixed by screws.
10	Locating hole	A mounting clip is pressed into these locating holes.

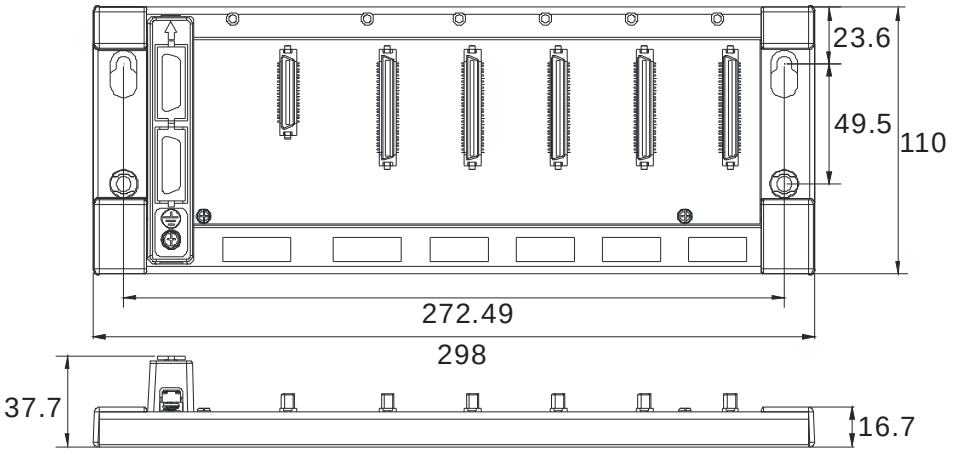
- **The profile of the extension backplane AHBP08E1-5A**



Number	Name	Description
1	Mounting hole	Fixing the backplane
2	Extension port 1	It is connected to a superior backplane.
3	Extension port 2	It is connected to an inferior backplane.
4	Connector	Connecting the backplane and a power supply module
5	Connector	Connecting the backplane and an input/output module
6	Mounting hole	After a module is installed, it is fixed by a screw.
7	Hole	The projection under a module is inserted into this hole.
8	Mounting clip	Hanging a backplane on a DIN rail
9	Mounting hole	After a mounting clip is installed, it is fixed by screws.
10	Locating hole	A mounting clip is pressed into these locating holes.

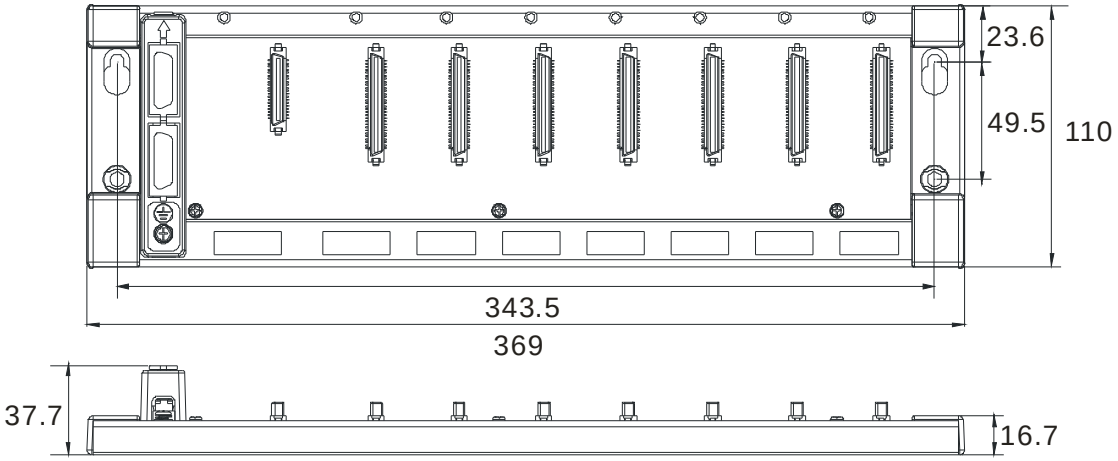
3.3.3 Dimensions

- **The main backplane AHBP04M1-5A**



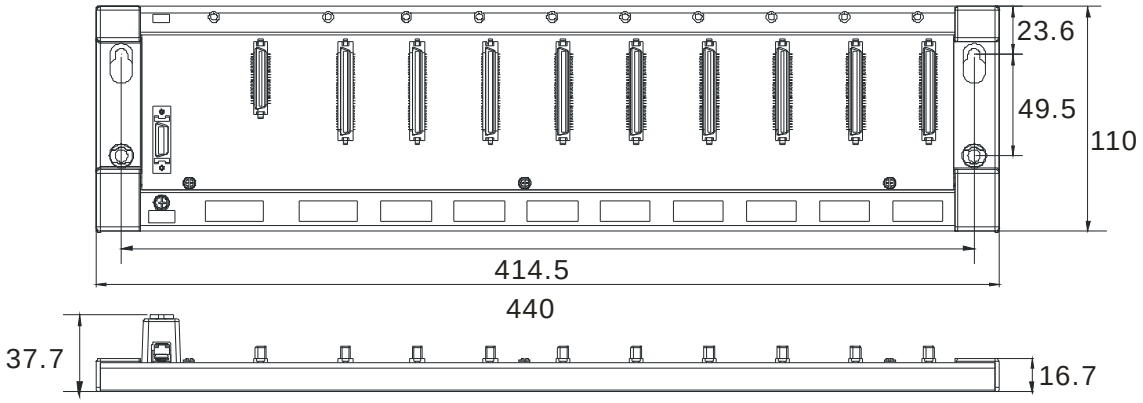
Unit: mm

- **The main backplane AHBP06M1-5A**



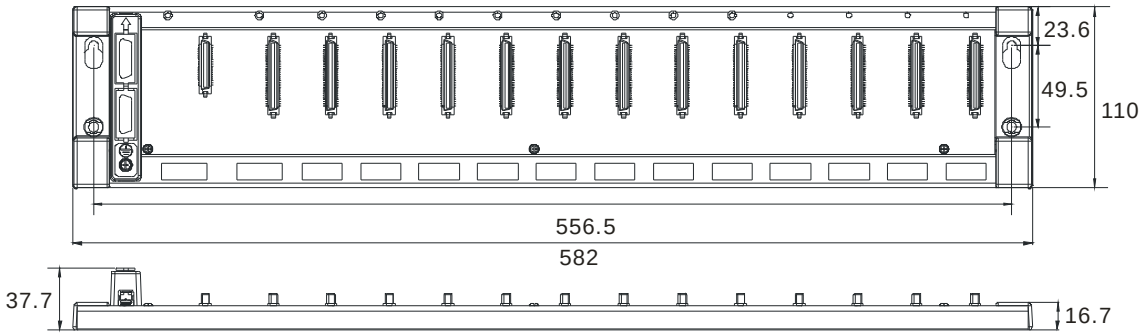
Unit: mm

- **The main backplane AHBP08M1-5A**



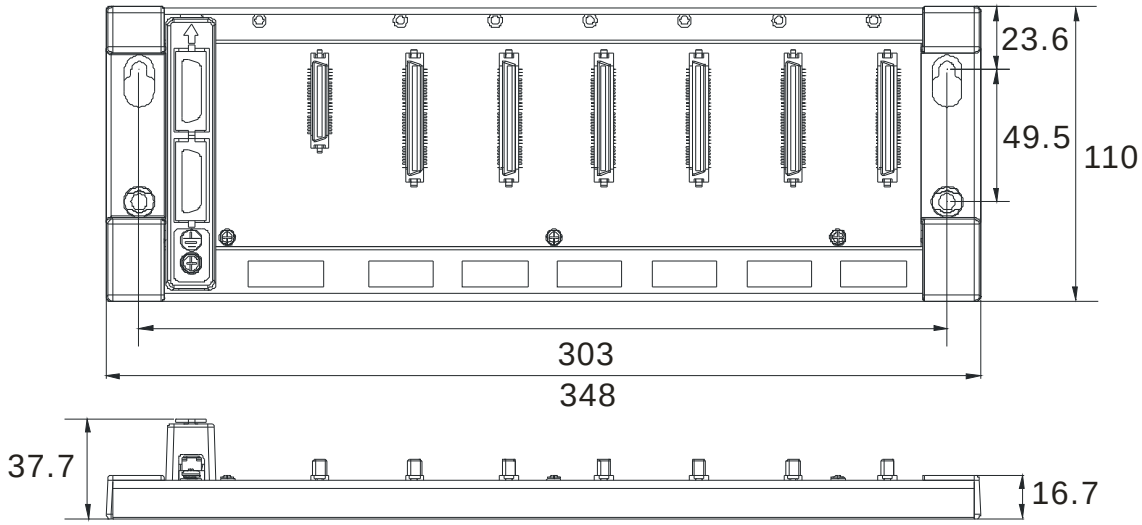
Unit: mm

- **The main backplane AHBP12M1-5A**



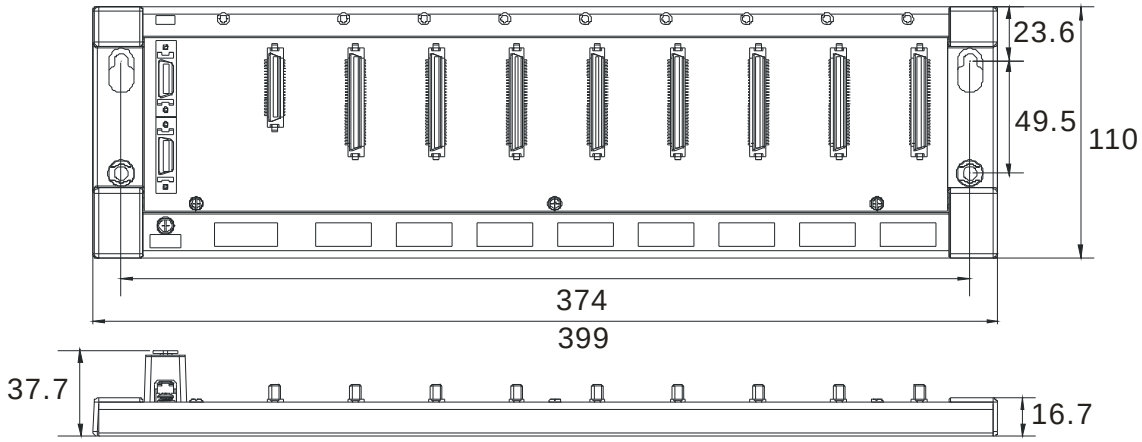
Unit: mm

- **The extension backplane AHBP06E1-5A**



Unit: mm

- **The extension backplane AHBP08E1-5A**



Unit: mm

3.4 Specifications for the Power Supply Module

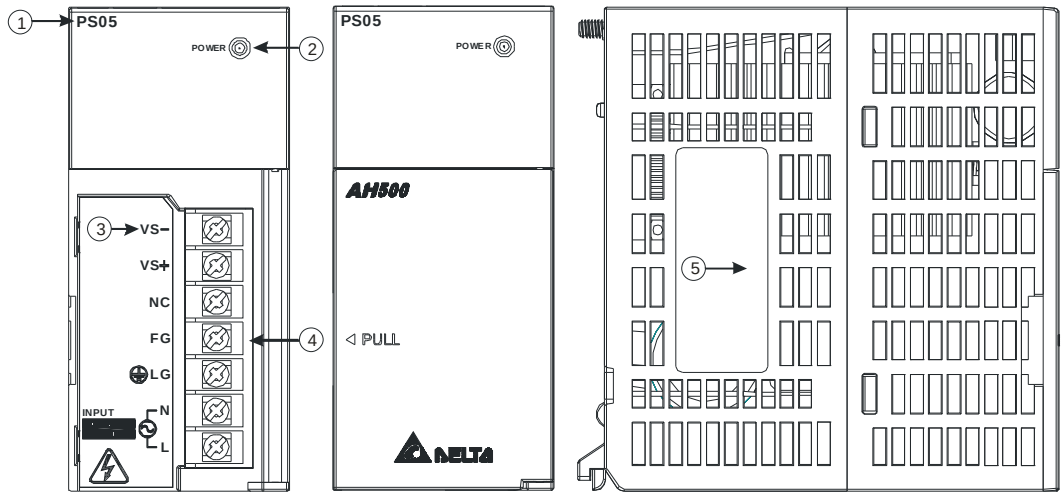
3.4.1 General Specifications

- **AHPS05-5A**

Item	Specifications
Supply voltage	100~240 V AC (-15%~10%) 50/60 Hz±5%
Action specifications	If the input power supply is larger than 85 V AC, the power supply module can function normally.
Allowable instantaneous power failure time	If the instantaneous power failure time is within ten milliseconds, the power supply module keeps running.
Fuse	4 A/250 V AC
Inrush current	45 A within 1 millisecond at 115 V AC
24 V DC output	The maximum current is 2.5 A. It is only for a backplane.
Power protection	The 24 V DC output is equipped with the short circuit protection and the overcurrent protection.
Surge voltage withstand level	1,500 V AC (Primary-secondary), 1,500 V AC (Primary-PE), 500 V AC (Secondary-PE)
Insulation voltage	Above 5 MΩ (The voltage between all inputs/outputs and the ground is 500 V DC.)
Ground	The diameter of the ground should not be less than the diameters of the cables connected to the terminals L and N.

3.4.2 Profile

- **AHPS05-5A**

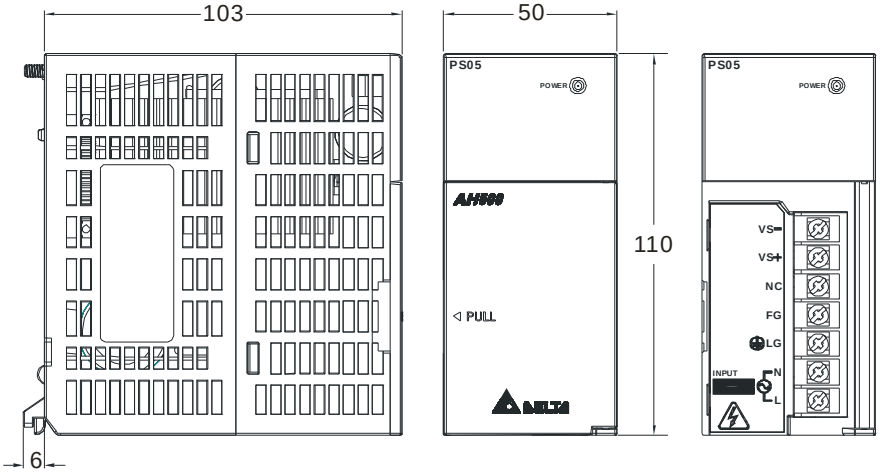


Number	Name	Description
1	Model name	Model name of the power supply module
2	POWER LED indicator (green)	Indicating the status of the power supply

Number	Name	Description
3	Arrangement of the terminals	VS-: It is connected to the negative 24 V DC power supply. VS+: It is connected to the positive 24 V DC power supply. NC: No connection FG: Functional ground LG: Line ground L/N: AC power input
4	Terminal	Terminal for wiring
5	Label	Nameplate

3.4.3 Dimensions

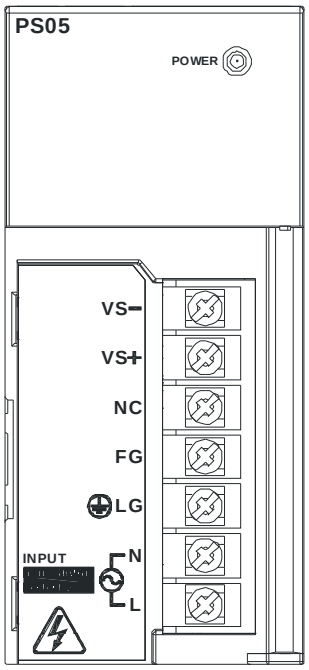
- **AHPS05-5A**



Unit: mm

3.4.4 Arrangement of Terminals

- **AHPS05-5A**



- VS-: It is connected to the negative 24 V DC power supply, and used to detect the external power supply.
- VS+: It is connected to the positive 24 V DC power supply, and used to detect the external power supply.
- NC: No connection
- FG: Functional ground
- LG: Line ground
- L/N: AC power input

3.5 Specifications for Digital Input/Output Modules

3.5.1 General Specifications

- **The inputs through which 24 V DC signals pass**

Item \ Model		AH16AM10N	AH32AM10N	AH64AM10N	AH16AP11R	AH16AP11T	AH16AP11P
Number of inputs		16	32	64	8	8	8
Connector type		Removable terminal block	DB37 connector	Latch connector	Removable terminal block		
Input type		Digital input					
Input form		Direct current (sinking or sourcing)					
Input current		24 V DC 5 mA		24 V DC 3.2 mA	24 V DC 5 mA		
Action level	**OFF→ON**	>15 V DC					
	ON→OFF	<5 V DC					
Response time	**OFF→ON**	10 ms±10%					
	ON→OFF	15 ms±10%					
Maximum input frequency		50 Hz					
Input impedance		4.7 kΩ		7.5 kΩ	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.					

- **The inputs through which the alternating-current signals ranging in voltage from 120 V to 240 V pass**

Item \ Model		16AM30N
Number of inputs		16
Connector type		Removable terminal block
Input type		Digital input
Input form		Alternating current
Input current		120 V AC and 4.5 mA; 240 V AC and 9 mA
Action level	**OFF→ON**	>79 V AC
	ON→OFF	<40 V AC
Response time	**OFF→ON**	15 ms
	ON→OFF	30 ms
Electrical isolation		Optocoupler
Input display		When the optocoupler is driven, the input LED indicator is ON.

- **The digital outputs**

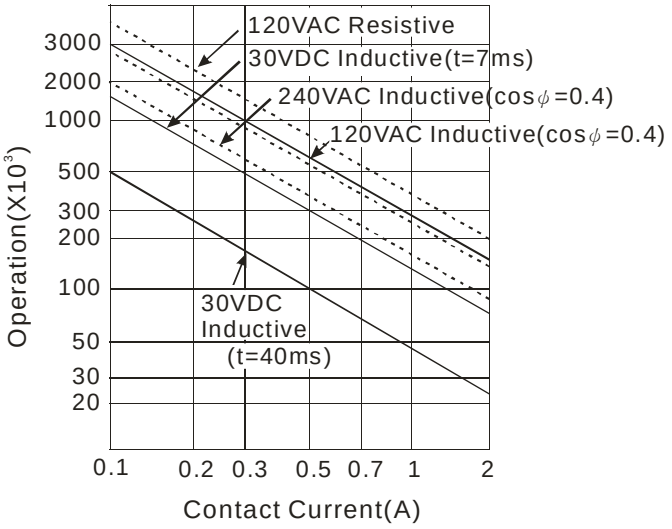
Item \ Model		AH16AN01R	AH16AP11R	AH16AN01T	AH16AP11T	AH16AN01P	AH16AP11P	AH16AN01S
Number of outputs		16	8	16	8	16	8	16
Connector type		Removable terminal block						
Output type		Realy-R		Transistor-T (sinking)		Transistor-P (sourcing)		TRIAC-S
Voltage specifications		250 V AC, and below 30 V DC		12~30 V DC*2		12~30 V DC*2		120/240 V AC
Maximum load	**Resistance**	2 A/output (5 A/COM)		0.5 A/output (4 A/COM)		0.5 A/output (4 A/COM)		0.5 A/output (2 A/COM)
	Inductance	Life cycle curve*3		12 W (24 V DC)		12 W (24 V DC)		Not applicable
	Bulb	20W (24 V DC) 100W (230 V AC)		2 W (24 V DC)		2 W (24 V DC)		60 W AC
Maximum output frequency*1	**Resistance**	1 Hz		100 Hz		100 Hz		10 Hz
	Inductance	0.5 Hz		0.5 Hz		0.5 Hz		-
	Bulb	1 Hz		10 Hz		10 Hz		10 Hz
Maximum Response time	**OFF→ON**	10 ms		0.5 ms		0.5 ms		1 ms+0.5 AC cycles
	ON→OFF							

Item \ Model		AH32AN02T	AH32AN02P	AH64AN02T	AH64AN02P
Number of outputs		32	32	64	64
Connector type		DB37 connector		Latch connector	
Output type		Transistor–T (sinking)	Transistor-P (sourcing)	Transistor-T (sinking)	Transistor-P (sourcing)
Voltage specifications		12~30 V DC*2			
Maximum load	**Resistance**	0.1 A/output (1 A/COM)			
	Inductance	Not applicable			
	Bulb	Not applicable			
Maximum output frequency*1	**Resistance**	100 Hz	100 Hz	100 Hz	100 Hz
	Inductance	-	-	-	-
	Bulb	-	-	-	-
Maximum Response time	**OFF→ON**	0.5 ms	0.5 ms	0.5 ms	0.5 ms
	ON→OFF				

*1: The scan cycle affects the frequency.

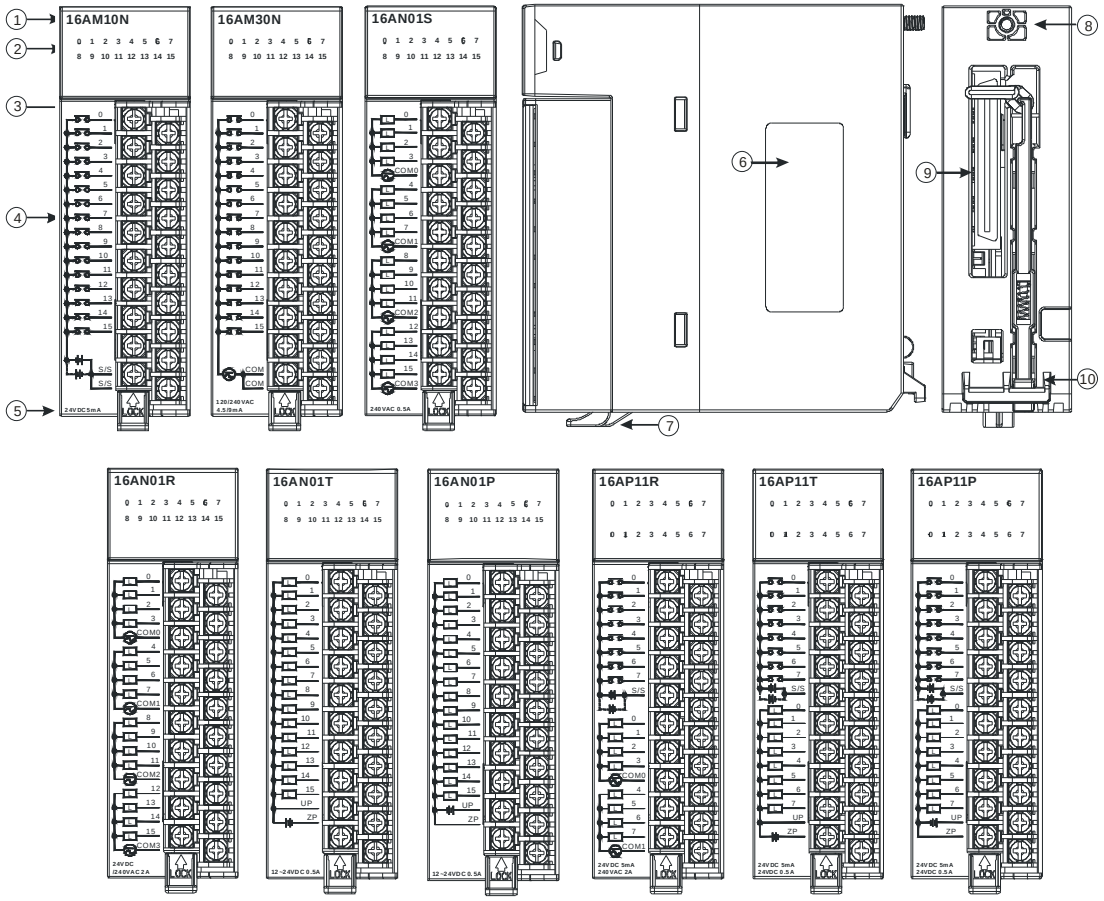
*2: The terminals UP and ZP needs to be connected to the 24 V DC auxiliary power supply (-15%~+20%), and the rated current consumption is 1 mA/output.

*3: The life cycle curve is as follows.



3.5.2 Profiles

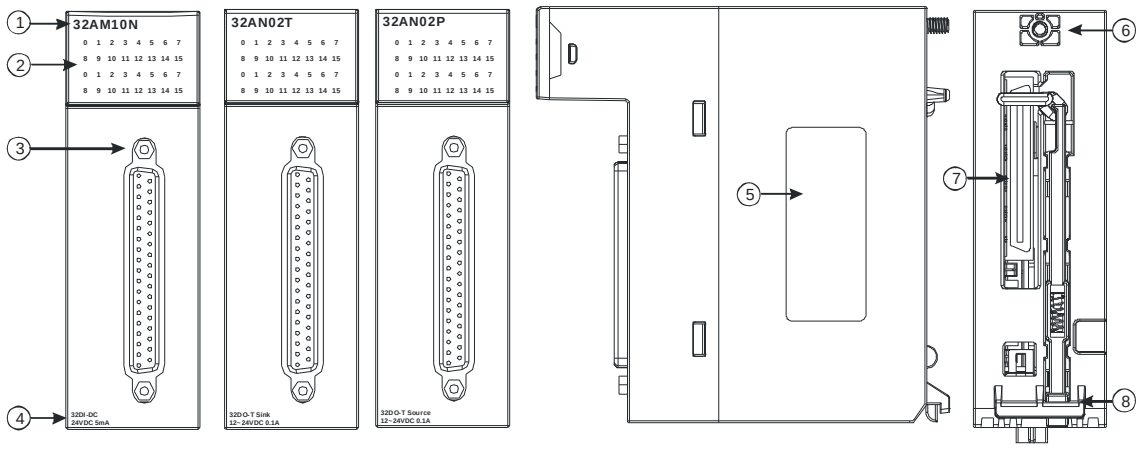
- **16AM10N-5A/16AM30N-5A/16AN01S-5A/16AN01R-5A/16AN01T-5A/16AN01P-5A/ 16AP11R-5A/16AP11T-5A/ 16AP11P-5A**



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.

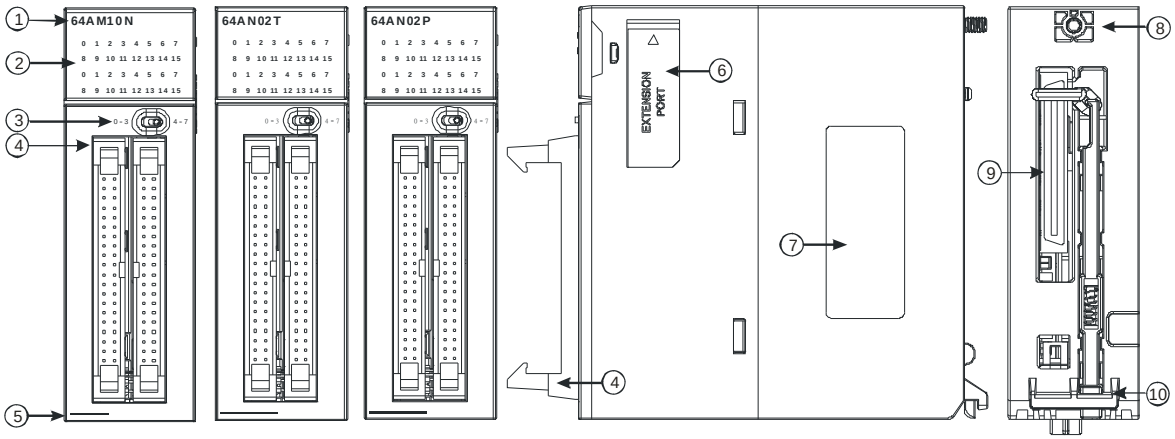
Number	Name	Description
3	Removable terminal block	The inputs are connected to a switch or a sensor. The outputs are connected to a load which will be driven, e.g. a contact, or a solenoid valve.
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Description of the inputs/outputs	Number of inputs/outputs and specifications
6	Label	Nameplate
7	Clip	Fixing the removable terminal block
8	Set screw	Fixing the module
9	Connector	Connecting the module and a backplane
10	Projection	Fixing the module

- **AH32AM10N-5B/AH32AN02T-5B/AH32AN02P-5B**



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	DB37 connector	It is connected to the I/O extension cable DVPACAB7C10.
4	Description of the inputs/outputs	Number of inputs/outputs and specifications
5	Label	Nameplate
6	Set screw	Fixing the module
7	Connector	Connecting the module and a backplane
8	Projection	Fixing the module

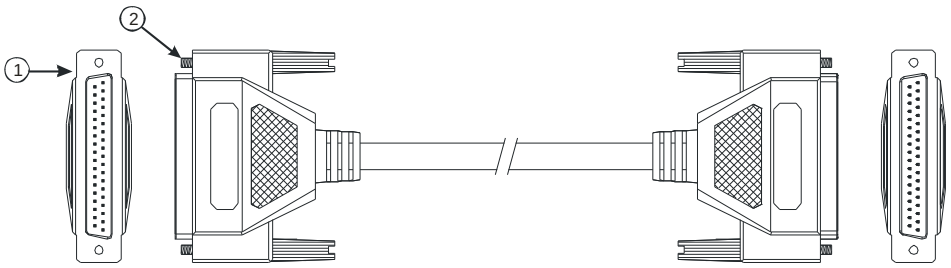
- **AH64AM10N-5C/AH64AN02T-5C/AH64AN02P-5C**



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	LED indicator switch	Left: High 32 bits Right: Low 32 bits
4	Latch connector	It is connected to the I/O extension cable DVPACAB7A10/DVPACAB7B10.
5	Description of the inputs/outputs	Number of inputs/outputs and specifications
6	Extension port	Updating the firmware
7	Label	Nameplate
8	Set screw	Fixing the module
9	Connector	It connects the module and a backplane.
10	Projection	Fixing the module

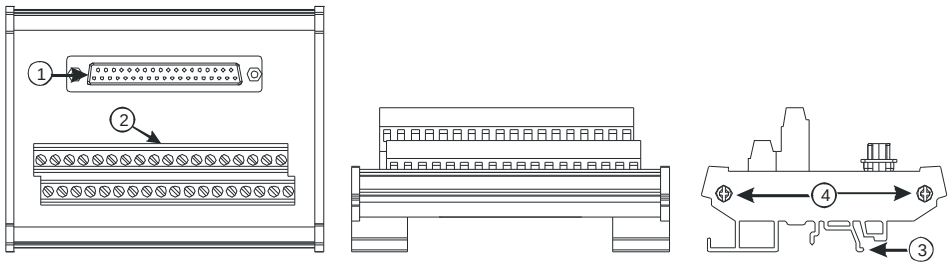
- **The DB37 connector, the I/O extension cable, and the external terminal module**

1. The I/O extension cable DVPACAB7C10

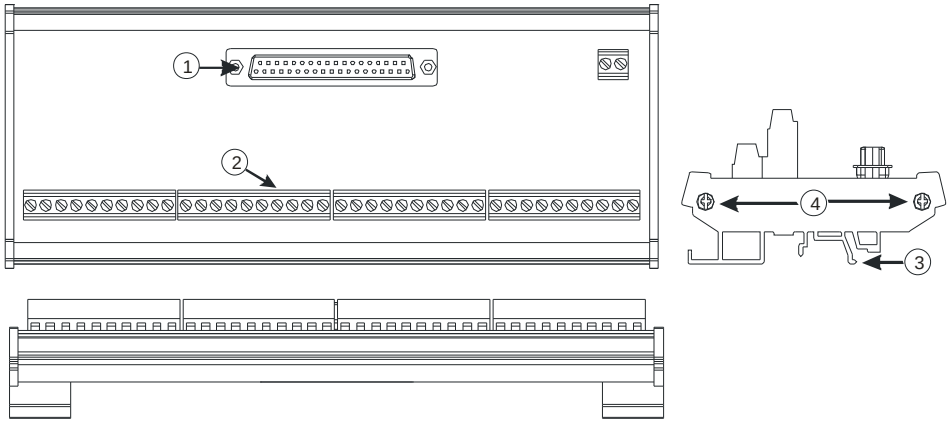


Number	Name	Description
1	DB37 connector	Connecting a digital input/output module and an external terminal module.
2	Set screw	Fixing the connector

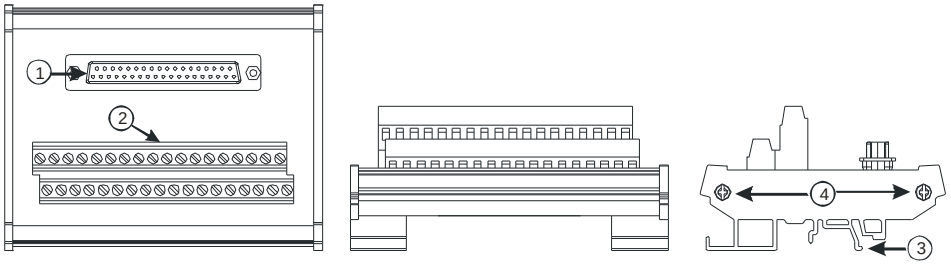
2. The external terminal module for AH32AM10N-5B: DVPAETB-ID32B



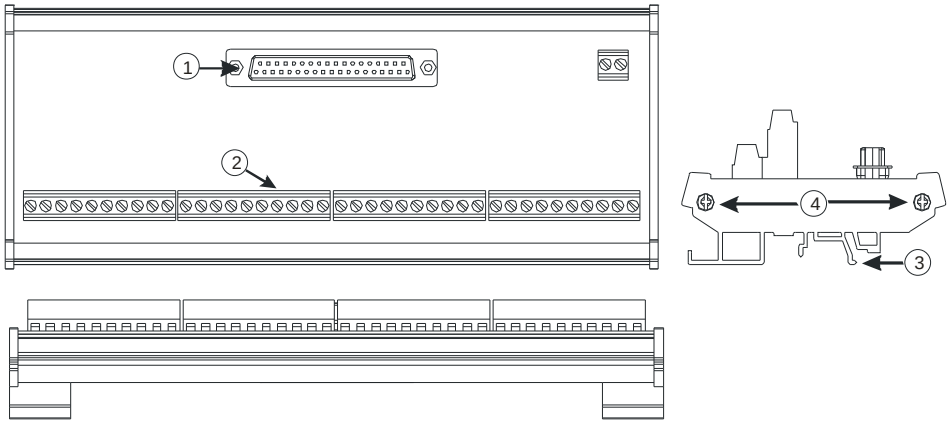
3. The external terminal modules for AH32AN02T-5B
   - DVPAETB-OR32A



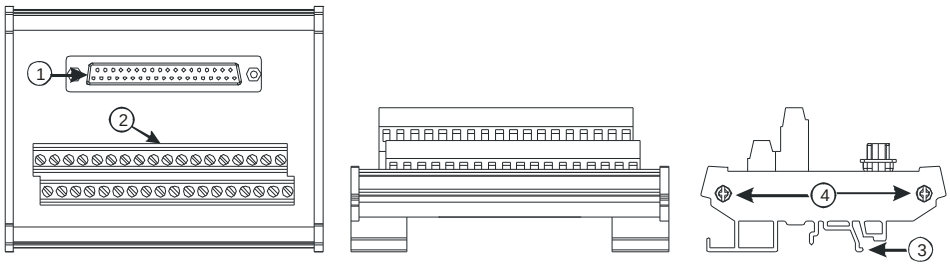
   - DVPAETB-OT32B



4. The external terminal modules for AH32AN02P-5B
   - DVPAETB-OR32B



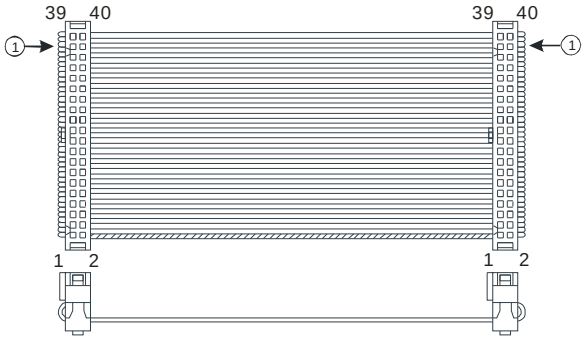
◆ DVPAETB-OT32B



Number	Name	Description
1	DB37 connector	Connecting the external terminal module and a digital input/output module
2	Terminals	Input/Output terminals for wiring
3	Clip	Hanging the external terminal module on a DIN rail
4	Set screw	Fixing the base

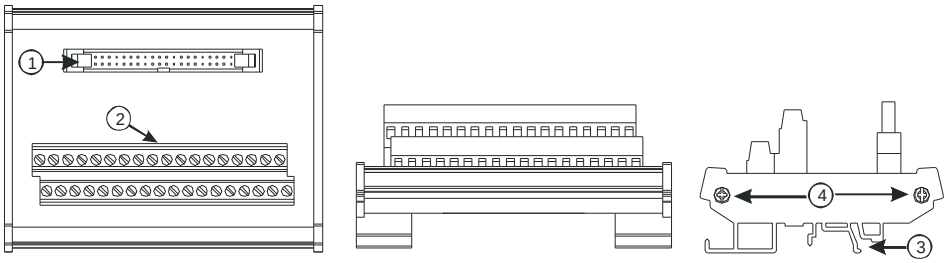
- **The latch connector, the I/O extension cable, and the external terminal module**

1. The I/O extension cable DVPACAB7A10



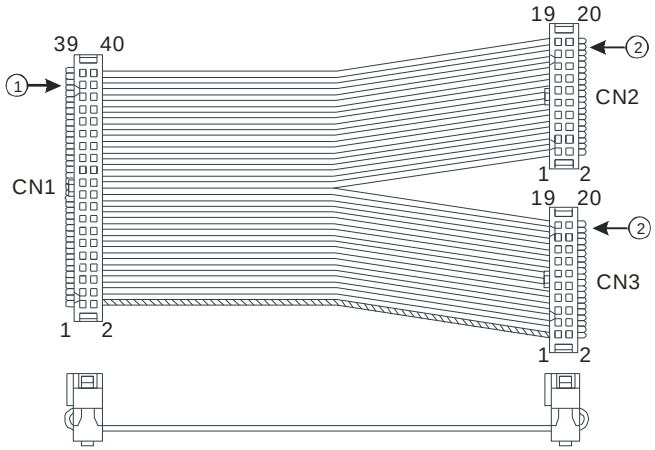
Number	Name	Description
1	40-pin IDC connector	Connecting a digital input/output module and an external terminal module.

2. The external terminal module for AH64AM10N-5C: DVPAETB-ID32A



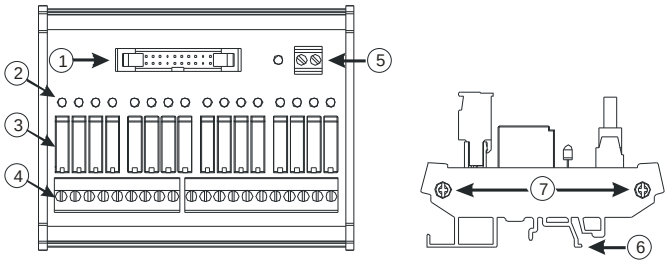
Number	Name	Description
1	40-pin latch connector	Connecting the external terminal module and a digital input/output module
2	Terminals	Input/Output terminals for wiring
3	Clip	Hanging the external terminal module on a DIN rail
4	Set screw	Fixing the base

3. The I/O extension cable DVPACAB7B10

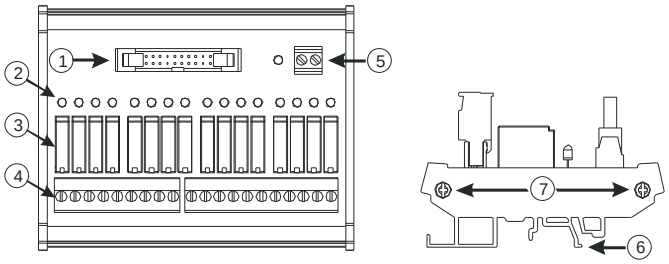


Number	Name	Description
1	40-pin IDC connector	Connecting a digital input/output module and an external terminal module.
2	20-pin IDC connector	Connecting a digital input/output module and the external terminal module DVPAETB-OR16A or DVPAETB-OR16B

4. The external terminal module for AH64AN02T-5C: DVPAETB-OR16A



5. The external terminal module for AH64AN02P-5C: DVPAETB-OR16B

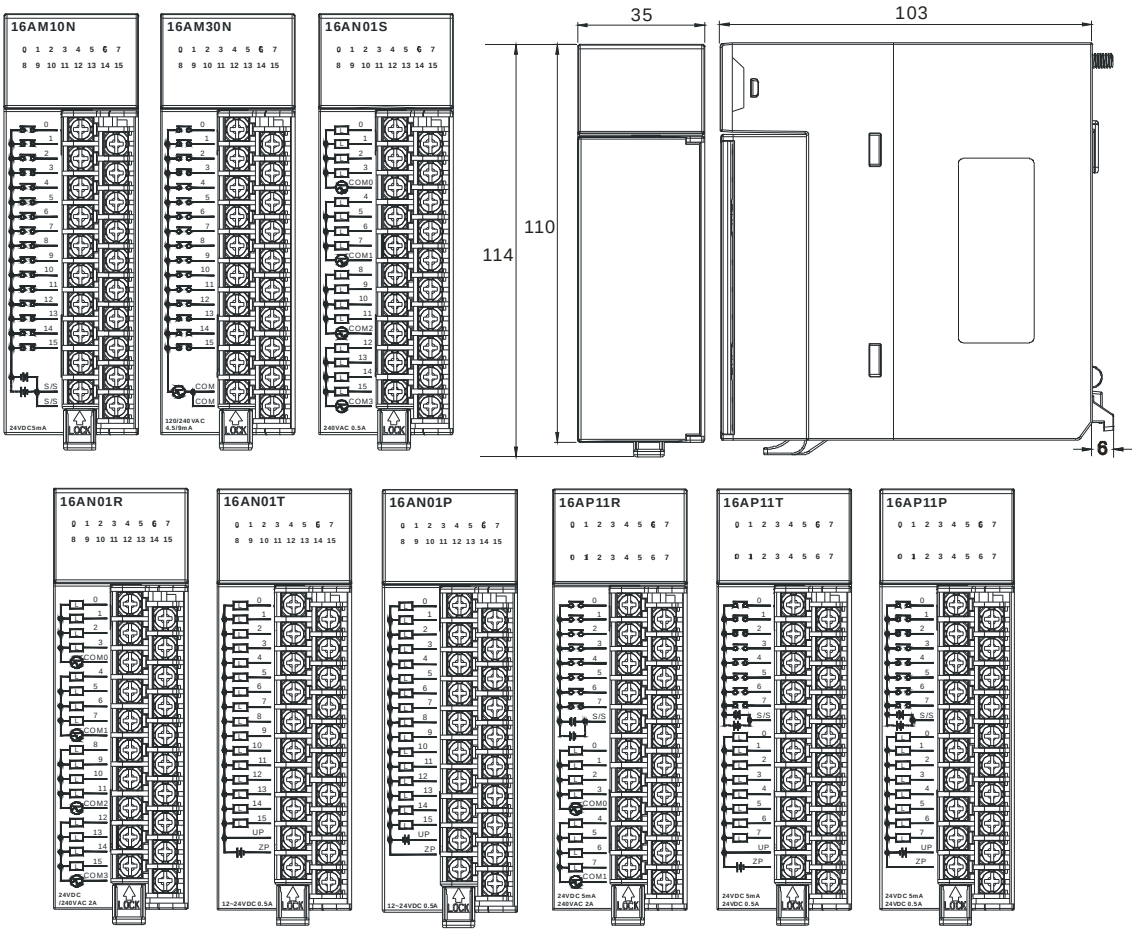


Number	Name	Description
1	20-pin latch connector	Connecting the external terminal module and a digital input/output module
2	Output LED indicator	If there is an output signal, the output LED indicator is ON.
3	Output relay	Output relay
4	Output terminal	Output terminal for wiring
5	Power input terminal	Power input terminal for wiring
6	Clip	Hanging the external terminal module on a DIN rail

Number	Name	Description
7	Set screw	Fixing the base

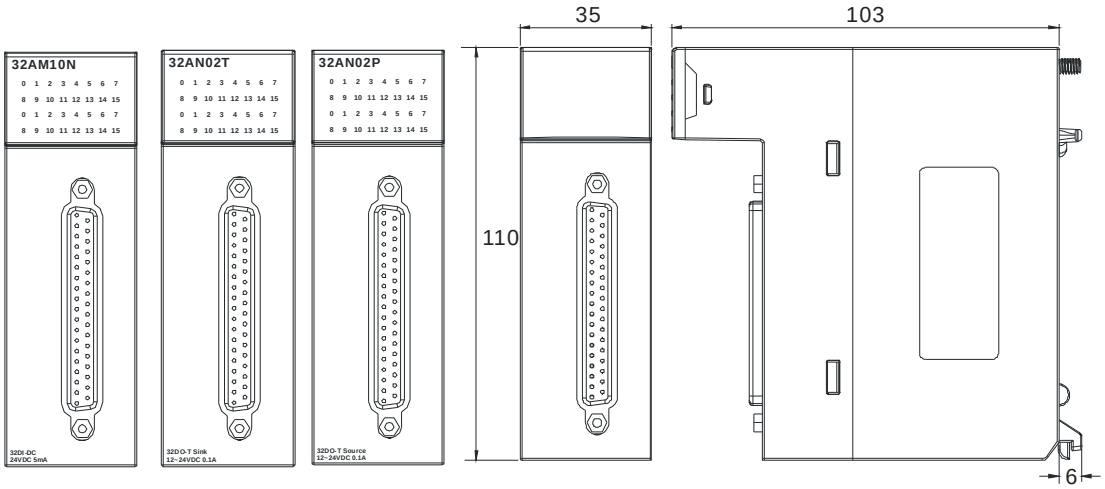
3.5.3 Dimensions

- **AH16AM10N-5A/AH16AM30N-5A/AH16AN01S-5A/AH16AN01R-5A/AH16AN01T-5A/ AH16AN01P-5A/AH16AP11R-5A/AH16AP11T-5A/AH16AP11P-5A**



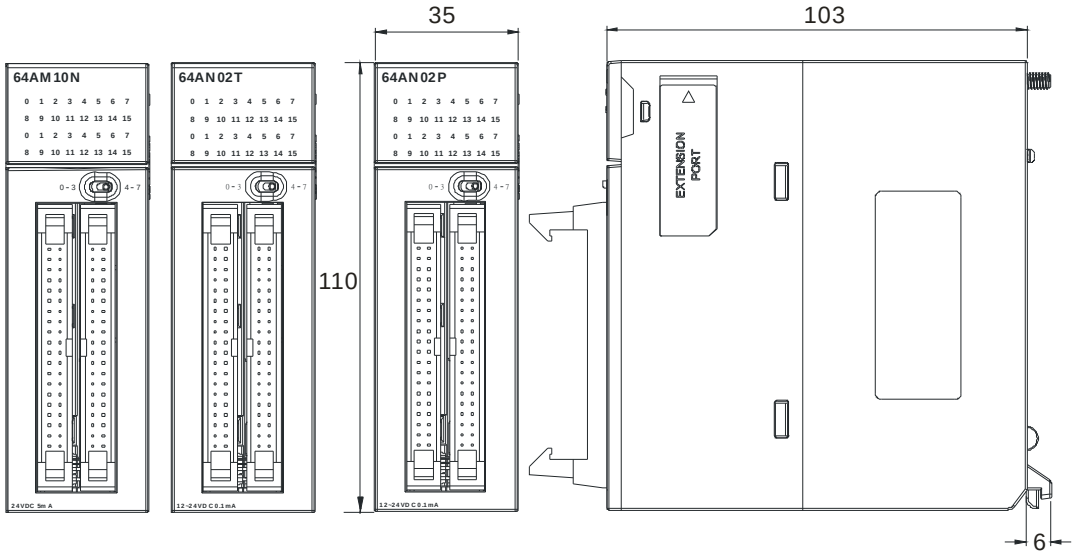
Unit: mm

- **AH32AM10N-5B/AH32AN02T-5B/AH32AN02P-5B**



Unit: mm

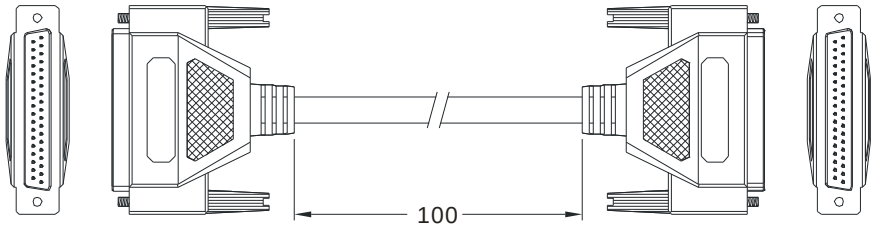
- **AH64AM10N-5B/AH64AN02T-5C/AH64AN02P-5C**



Unit: mm

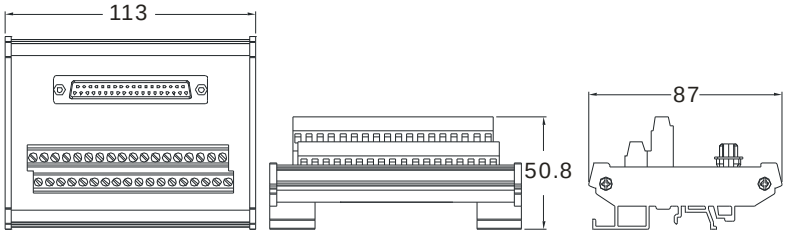
- **The DB37 connector, the I/O extension cable, and the external terminal module**

1. The I/O extension cable DVPACAB7C10



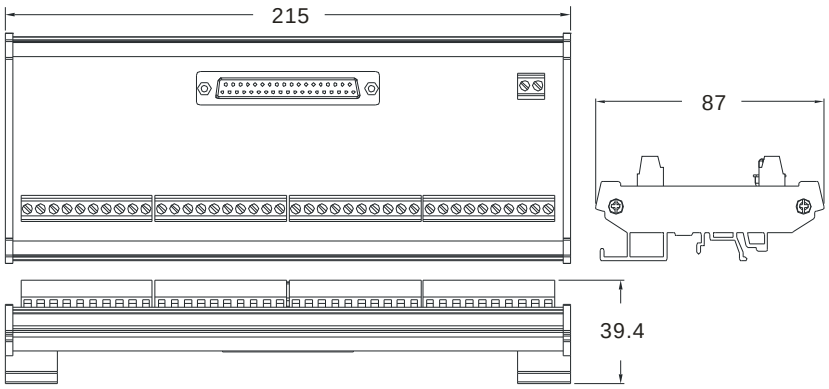
Unit: cm

2. The external terminal module for AH32AM10N-5B: DVPAETB-ID32B



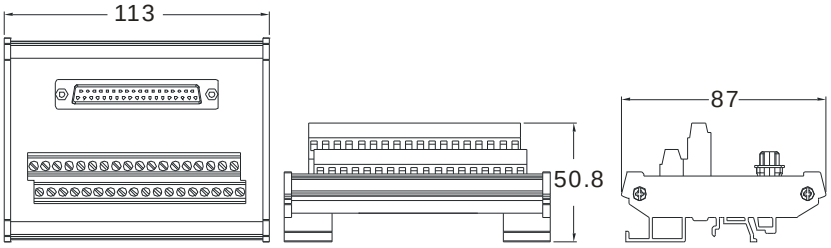
Unit: mm

3. The external terminal modules for AH32AN02T-5B
   - ◆ DVPAETB-OR32A



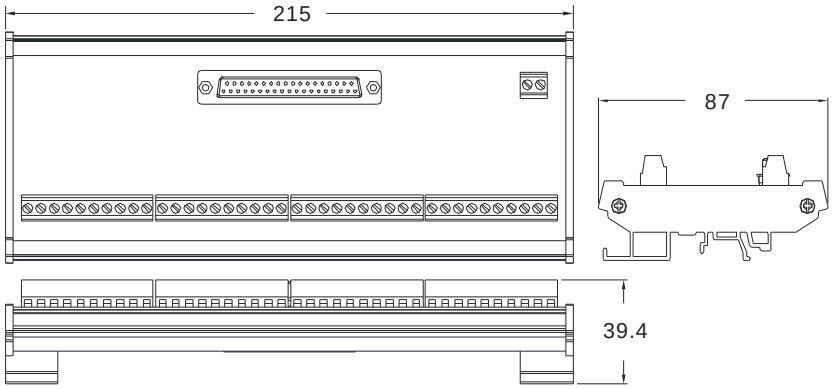
Unit: mm

   - ◆ DVPAETB-OT32B



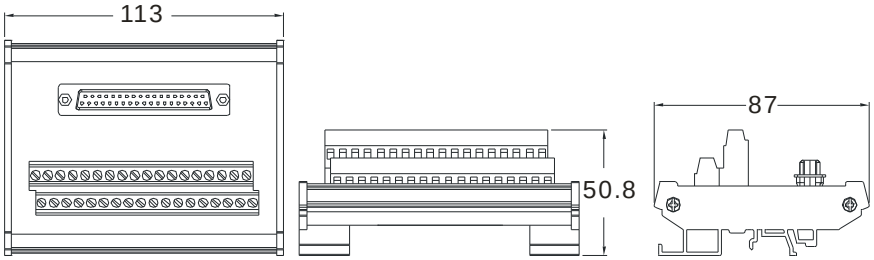
Unit: mm

4. The external terminal modules for AH32AN02P-5B
   - ◆ DVPAETB-OR32B



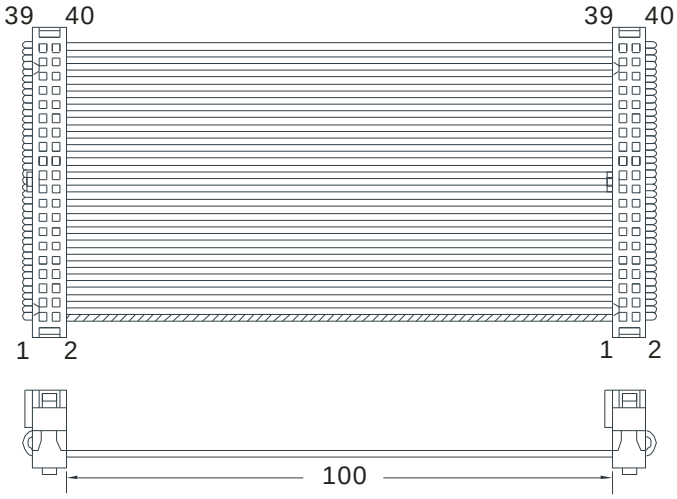
Unit: mm

   - ◆ DVPAETB-OT32B



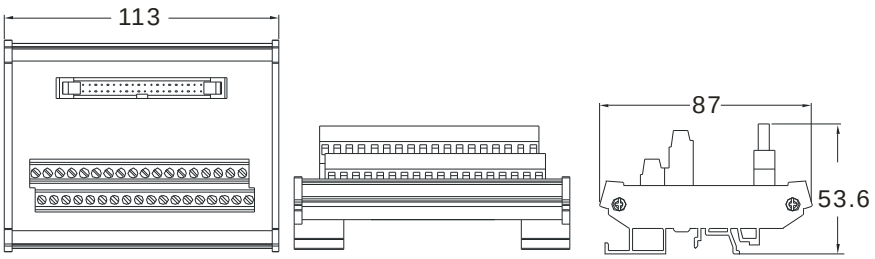
Unit: mm

- **The latch connector, the I/O extension cable, and the external terminal module**
  - ◆ The I/O extension cable DVPACAB7A10



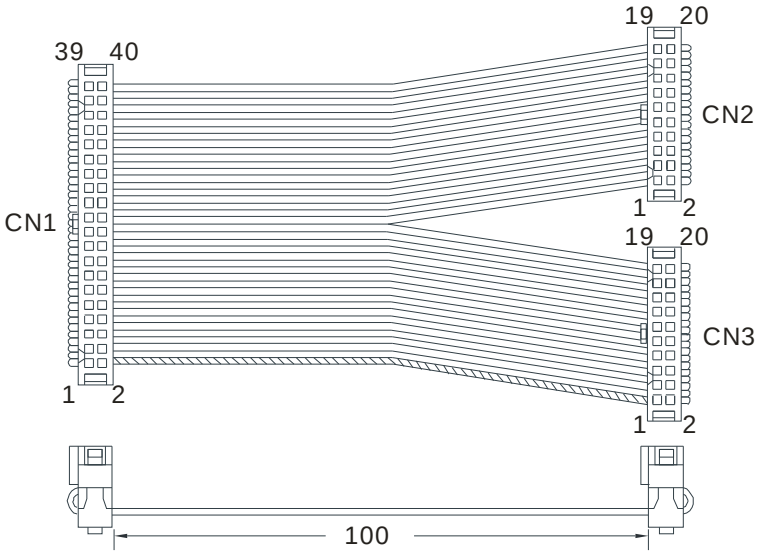
Unit: cm

  - ◆ The external terminal module for AH64AM10N-5C: DVPAETB-ID32A



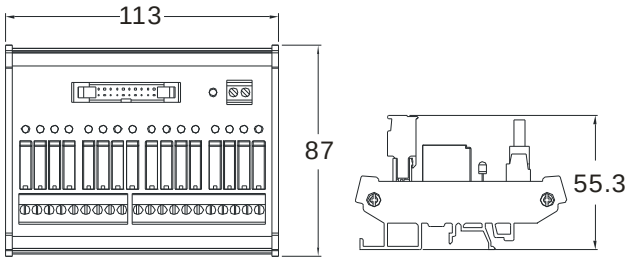
Unit: mm

  - ◆ The I/O extension cable DVPACAB7B10



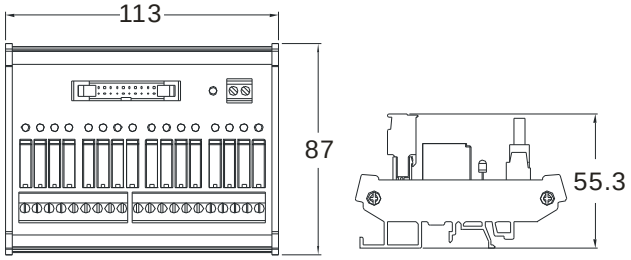
Unit: cm

◆ The external terminal module for AH64AN02T-5C: DVPAETB-OR16A



Unit: mm

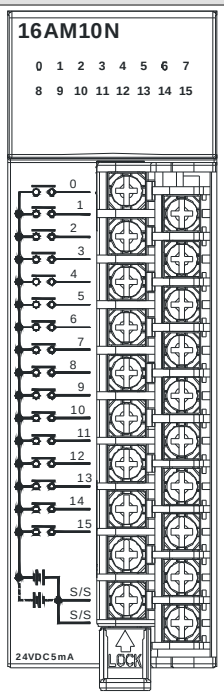
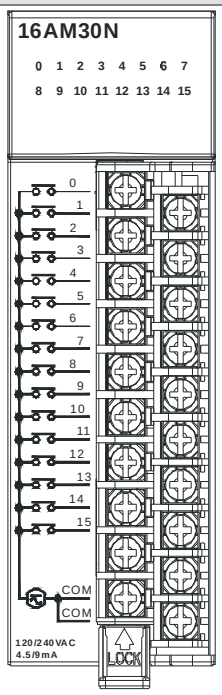
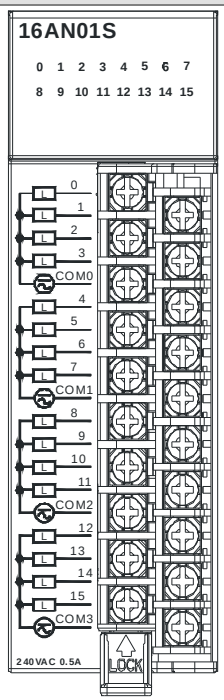
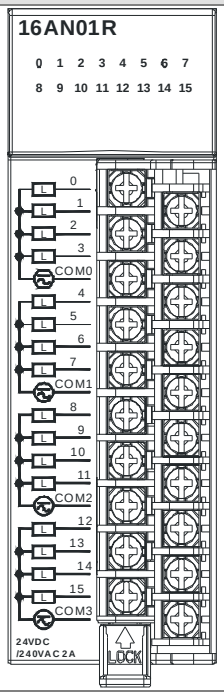
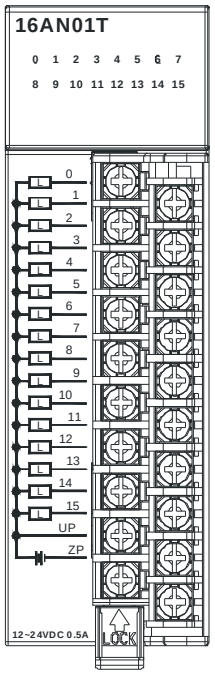
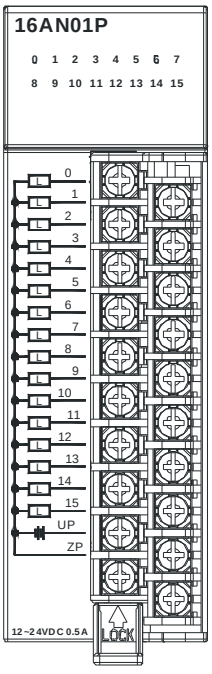
◆ The external terminal module for AH64AN02P-5C: DVPAETB-OR16B

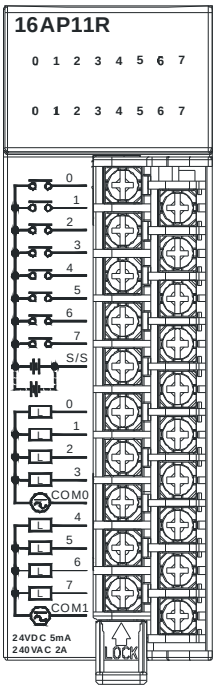
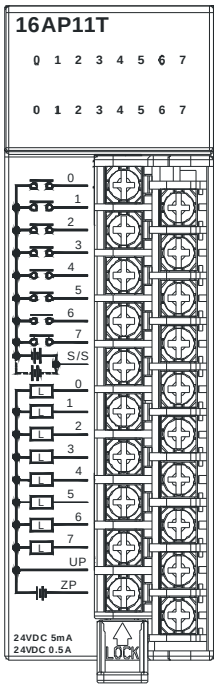
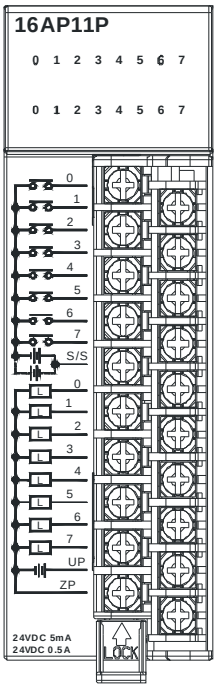


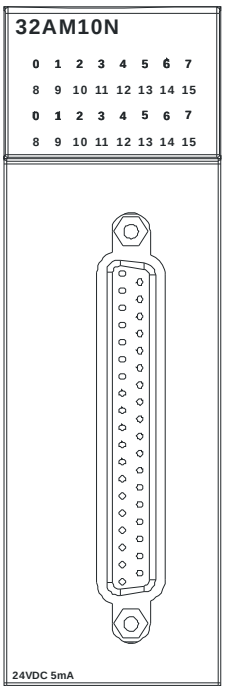
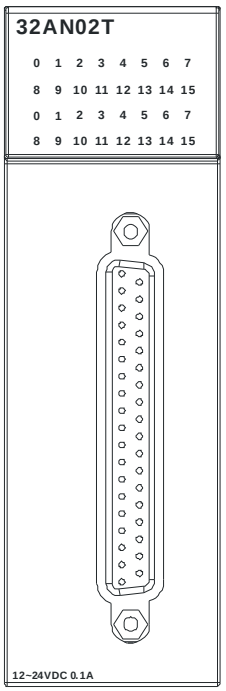
Unit: mm

3

3.5.4 Arrangement of Input/Output Terminals

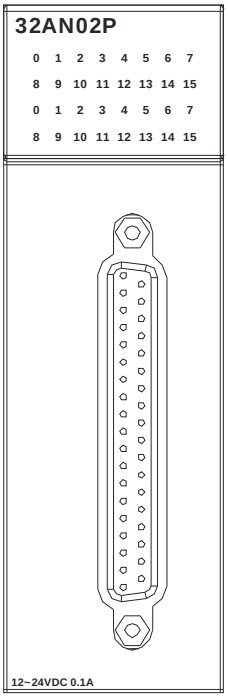
AH16AM10N-5A	AH16AM30N-5A	AH16AN01S-5A
		
AH16AN01R-5A	**AH16AN01T-5A**	**AH16AN01P-5A**
		

AH16AP11R-5A	AH16AP11T-5A	AH16AP11P-5A
		

AH32AM10N-5B		AH32AN02T-5B	
			
0.0	0.1	0.0	0.1
0.2	0.3	0.2	0.3
0.4	0.5	0.4	0.5
0.6	0.7	0.6	0.7
0.8	0.9	0.8	0.9
0.10	0.11	0.10	0.11
0.12	0.13	0.12	0.13
0.14	0.15	0.14	0.15
S/S	S/S	ZP	ZP
NC	1.0	UP	1.0
1.1	1.2	1.1	1.2
1.3	1.4	1.3	1.4
1.5	1.6	1.5	1.6
1.7	1.8	1.7	1.8
1.9	1.10	1.9	1.10
1.11	1.12	1.11	1.12
1.13	1.14	1.13	1.14
1.15	S/S	1.15	ZP
S/S		UP	

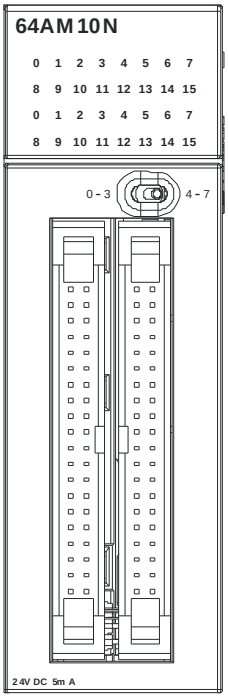
3

AH32AN02P-5C



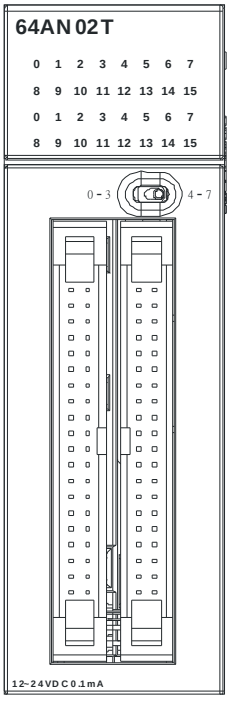
0.0	0.1
0.2	0.3
0.4	0.5
0.6	0.7
0.8	0.9
0.10	0.11
0.12	0.13
0.14	0.15
ZP	ZP
UP	1.0
1.1	1.2
1.3	1.4
1.5	1.6
1.7	1.8
1.9	1.10
1.11	1.12
1.13	1.14
1.15	ZP
UP	

AH64AM10N-5C



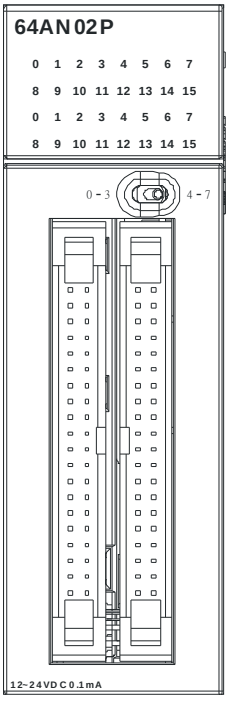
NC	NC	NC	NC
S/S	S/S	2.0	2.1
1.15	1.14	2.2	2.3
1.13	1.12	2.4	2.5
1.11	1.10	2.6	2.7
1.9	1.8	2.8	2.9
1.7	1.6	2.10	2.11
1.5	1.4	2.12	2.13
1.3	1.2	2.14	2.15
1.1	1.0	S/S	S/S
NC	NC	NC	NC
S/S	S/S	3.0	3.1
0.15	0.14	3.2	3.3
0.13	0.12	3.4	3.5
0.11	0.10	3.6	3.7
0.9	0.8	3.8	3.9
0.7	0.6	3.10	3.11
0.5	0.4	3.12	3.13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

AH64AN02T-5C



UP	UP	2.0	2.1
ZP	ZP	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	ZP	ZP
1.1	1.0	UP	UP
UP	UP	3.0	3.1
ZP	ZP	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	ZP	ZP
0.1	0.0	UP	UP

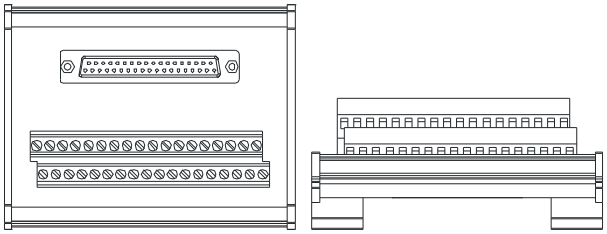
AH64AN02P-5C



UP	UP	2.0	2.1
ZP	ZP	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	ZP	ZP
1.1	1.0	UP	UP
UP	UP	3.0	3.1
ZP	ZP	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	ZP	ZP
0.1	0.0	UP	UP

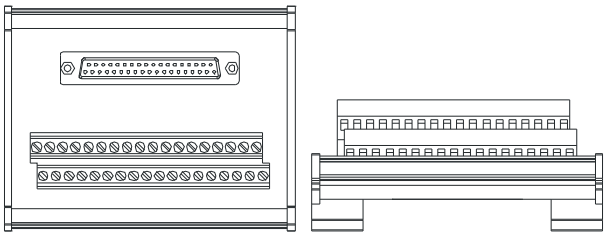
- **The DB37 connector and the external terminal module**

1. The external terminal module for AH32AM10N-5B: DVPAETB-ID32B



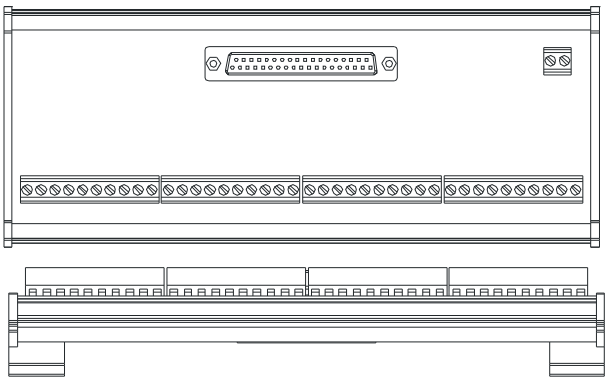
Upper row	X0	X2	X4	X6	X10	X12	X14	X16	X20	X22	X24	X26	X30	X32	X34	X36	S/S	S/S
Lower row	X1	X3	X5	X7	X11	X13	X15	X17	X21	X23	X25	X27	X31	X33	X35	X37	S/S	S/S

2. The external terminal modules for AH32AN02T-5B
   - ◆ DVPAETB-OT32B



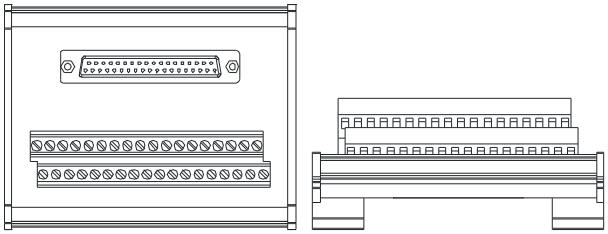
Upper row	Y0	Y2	Y4	Y6	Y10	Y12	Y14	Y16	Y20	Y22	Y24	Y26	Y30	Y32	Y34	Y36	UP	UP
Lower row	Y1	Y3	Y5	Y7	Y11	Y13	Y15	Y17	Y21	Y23	Y25	Y27	Y31	Y33	Y35	Y37	ZP	ZP

   - ◆ DVPAETB-OR32A



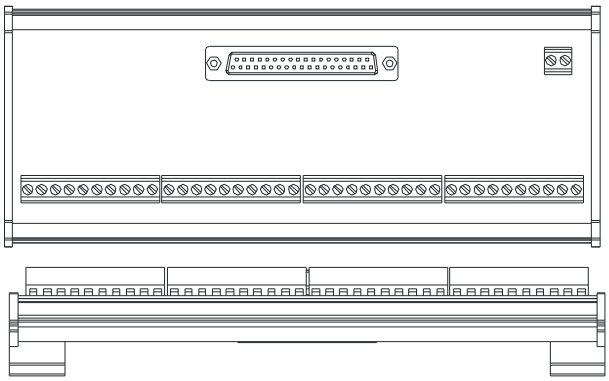
																			GND	+24V
1st from the left	C0	Y0	Y1	Y2	Y3	C1	Y4	Y5	Y6	Y7	C2	Y10	Y11	Y12	Y13	C3	Y14	Y15	Y16	Y17
21st from the left	C4	Y20	Y21	Y22	Y23	C5	Y24	Y25	Y26	Y27	C6	Y30	Y31	Y32	Y33	C7	Y34	Y35	Y36	Y37

3. The external terminal modules for AH32AN02P-5B
   - DVPAETB-OT32B



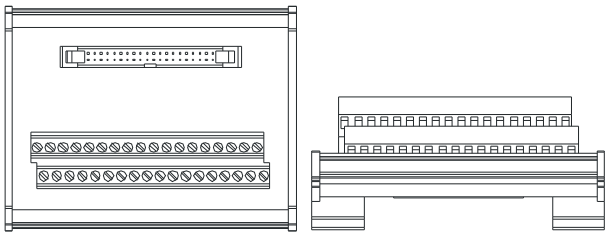
Upper row	Y0	Y2	Y4	Y6	Y10	Y12	Y14	Y16	Y20	Y22	Y24	Y26	Y30	Y32	Y34	Y36	UP	UP
Lower row	Y1	Y3	Y5	Y7	Y11	Y13	Y15	Y17	Y21	Y23	Y25	Y27	Y31	Y33	Y35	Y37	ZP	ZP

   - DVPAETB-OR32B



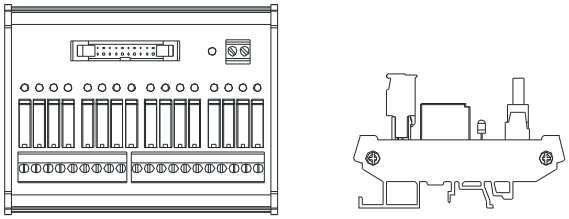
																			GND	+24V
1st from the left	C0	Y0	Y1	Y2	Y3	C1	Y4	Y5	Y6	Y7	C2	Y10	Y11	Y12	Y13	C3	Y14	Y15	Y16	Y17
21st from the left	C4	Y20	Y21	Y22	Y23	C5	Y24	Y25	Y26	Y27	C6	Y30	Y31	Y32	Y33	C7	Y34	Y35	Y36	Y37

- **The latch connector and the external terminal module**
  1. The external terminal module for AH64AM10N-5C: DVPAETB-ID32A



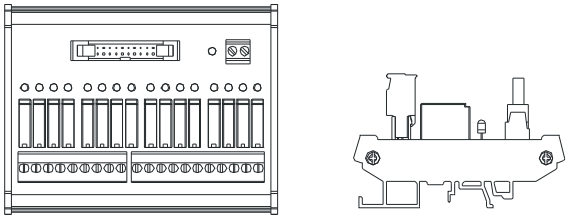
Upper row	S/S	S/S	X0	X2	X4	X6	X10	X12	X14	X16	X20	X22	X24	X26	X30	X32	X34	X36
Lower row	S/S	S/S	X1	X3	X5	X7	X11	X13	X15	X17	X21	X23	X25	X27	X31	X33	X35	X37

2. The external terminal module for AH64AN02T-5C: DVPAETB-OR16A



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

3. The external terminal module for AH64AN02P-5C: DVPAETB-OR16B



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

3.6 Specifications for Analog Input/Output Modules

3.6.1 General Specifications

- **AH04AD-5A/AH08AD-5B**

The electrical specifications

Module name	AH04AD-5A	AH08AD-5B
Number of inputs	4	8
Analog-to-digital conversion	Voltage input/Current input	Voltage input
Supply voltage	24 V DC (20.4 V DC~28.8 V DC) (-15%~+20%)	
Connector type	Removable terminal block	
Overall accuracy	25°C/77°F: The error is ±0.5% of the input within the range -20~60°C/-4~140°F: The error is ±1% of the input within the range	
Conversion time	150 μs/channel	
Isolation	There is isolation between an analog circuit and a digital circuit, but there is no isolation between analog channels. Isolation between a digital circuit and a ground: 500 V DC Isolation between an analog circuit and a ground: 500 V DC Isolation between an analog circuit and a digital circuit: 500 V DC Isolation between the 24 V DC and a ground: 500 V DC	

The functional specifications

Analog-to-digital conversion	Voltage input				
Rated input range	-10 V~10 V	0 V~10 V	±5 V	0 V~5 V	1 V~5 V
Hardware input range	-10.1 V~10.1 V	-0.1 V~10.1 V	-5.05 V~5.05 V	-0.05 V~5.05 V	0.95 V~5.05 V
Hardware resolution	16 bits				
Input impedance	>200 kΩ				
Absolute input range	±15 V				
Analog-to-digital conversion	**Current input**				
Rated input range	±20 mA		0m A~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
Hardware resolution	16 bits				
Input impedance	250 Ω				
Absolute input range	±32 mA				

- **AH04DA-5A/AH08DA-5B**

The electrical specifications

Module name	AH04DA-5A	AH08DA-5B
Number of outputs	4	8
Analog-to-digital conversion	Voltage output/Current output	Voltage output
Supply voltage	24 V DC (20.4 V DC~28.8 V DC) (-15%~+20%)	
Connector type	Removable terminal block	
Overall accuracy	25°C/77°F: The error is ±0.5% of the input within the range -20~60°C/-4~140°F: The error is ±1% of the input within the range	
Conversion time	150 μs/channel	
Isolation	There is isolation between a digital circuit and an analog circuit, but there is no isolation between analog channels. Isolation between a digital circuit and a ground: 500 V DC Isolation between an analog circuit and a ground: 500 V DC Isolation between an analog circuit and a digital circuit: 500 V DC Isolation between the 24 V DC and a ground: 500 V DC	

The 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	-10.1 V~10.1 V	-0.1 V~10.1 V	-5.05 V~5.05 V	-0.05 V~5.05 V	0.95 V~5.05 V
Hardware resolution	16 bits				
Permissible load impedance	1 kΩ~2 MΩ: ±10 V and 0 V~10V ≧500 Ω: 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~20.2 mA		3.8 mA~20.2 mA		
Hardware resolution	16 bits				
Permissible load impedance	≦550 Ω				

- **AH06XA-5A**

The electrical specifications

Module name	AH06XA-5A
Number of inputs	4
Number of outputs	2
Analog-to-digital conversion	Voltage input/Current input/Voltage output/Current output
Supply voltage	24 V DC (20.4 V DC~28.8 V DC) (-15%~+20%)
Connector type	Removable terminal block
Overall accuracy	25°C/77°F: The error is ±0.5% of the input within the range -20~60°C/-4~140°F: The error is ±1% of the input within the range
Conversion time	150 us/channel
Isolation	There is isolation between a digital circuit and an analog circuit, but there is no isolation between analog channels. Isolation between a digital circuit and a ground: 500 V DC Isolation between an analog circuit and a ground: 500 V DC Isolation between an analog circuit and a digital circuit: 500 V DC Isolation between the 24 V DC and a ground: 500 V DC

The functional specifications for the analog-to-digital conversion

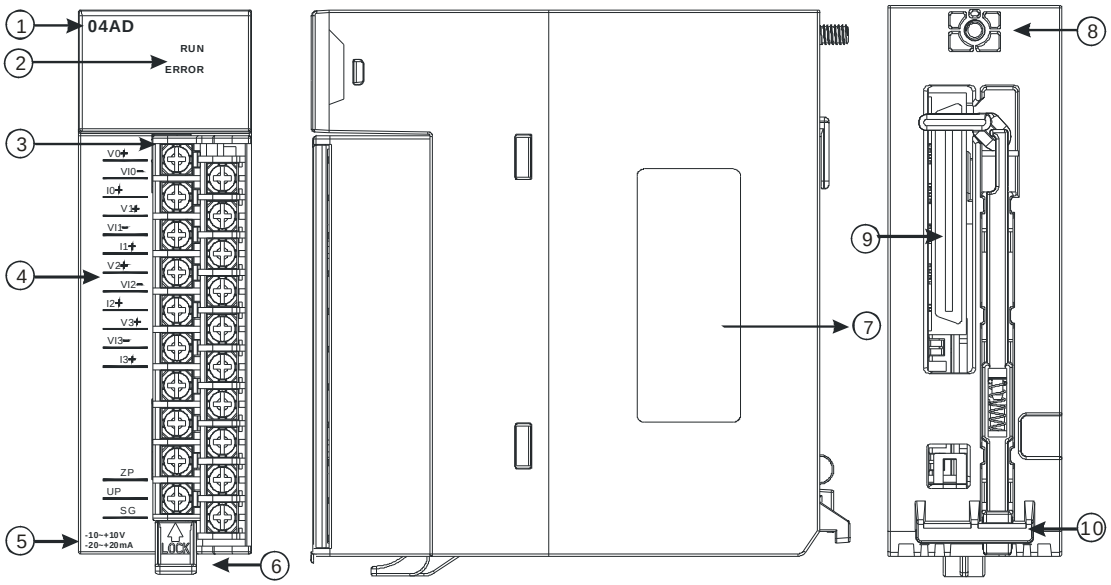
Analog-to-digital conversion	Voltage input				
Rated input range	-10 V~10 V	0 V~10 V	±5 V	0 V~5 V	1 V~5 V
Hardware input range	-10.1 V~10.1 V	-0.1 V~10.1 V	-5.05 V~5.05 V	-0.05 V~5.05 V	0.95 V~5.05 V
Hardware resolution	16 bits				
Input impedance	>200 kΩ				
Absolute input range	±15 V				
Analog-to-digital 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
Hardware resolution	16 bits				
Input impedance	250 Ω				
Absolute input range	±32 mA				

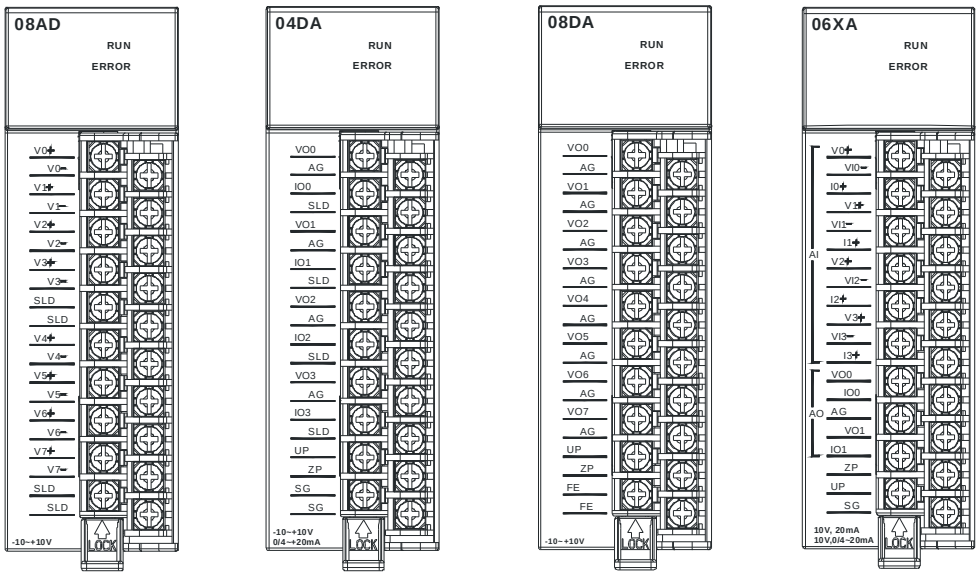
The functional specifications for the digital-to-analog conversion

Digital-to-analog 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	-10.1 V~10.1 V	-0.1 V~10.1 V	-5.05 V~5.05 V	-0.05 V~5.05 V	0.95 V~5.05 V
Hardware resolution	16 bits				
Permissible load impedance	1 kΩ~2 MΩ: ±10 V and 0 V~10 V ≧500Ω: 1 V~5 V				
Digital-to-analog conversion	Current output				
Rated output range	0 mA~20 mA			4 mA~20 mA	
Hardware output range	-0.2 mA~20.2 mA			3.8 mA~20.2 mA	
Hardware resolution	16 bits				
Permissible load impedance	≦550 Ω				

3.6.2 Profiles

- **AH04AD-5A/AH08AD-5B/AH04DA-5A/AH08DA-5B/AH06XA-5A**



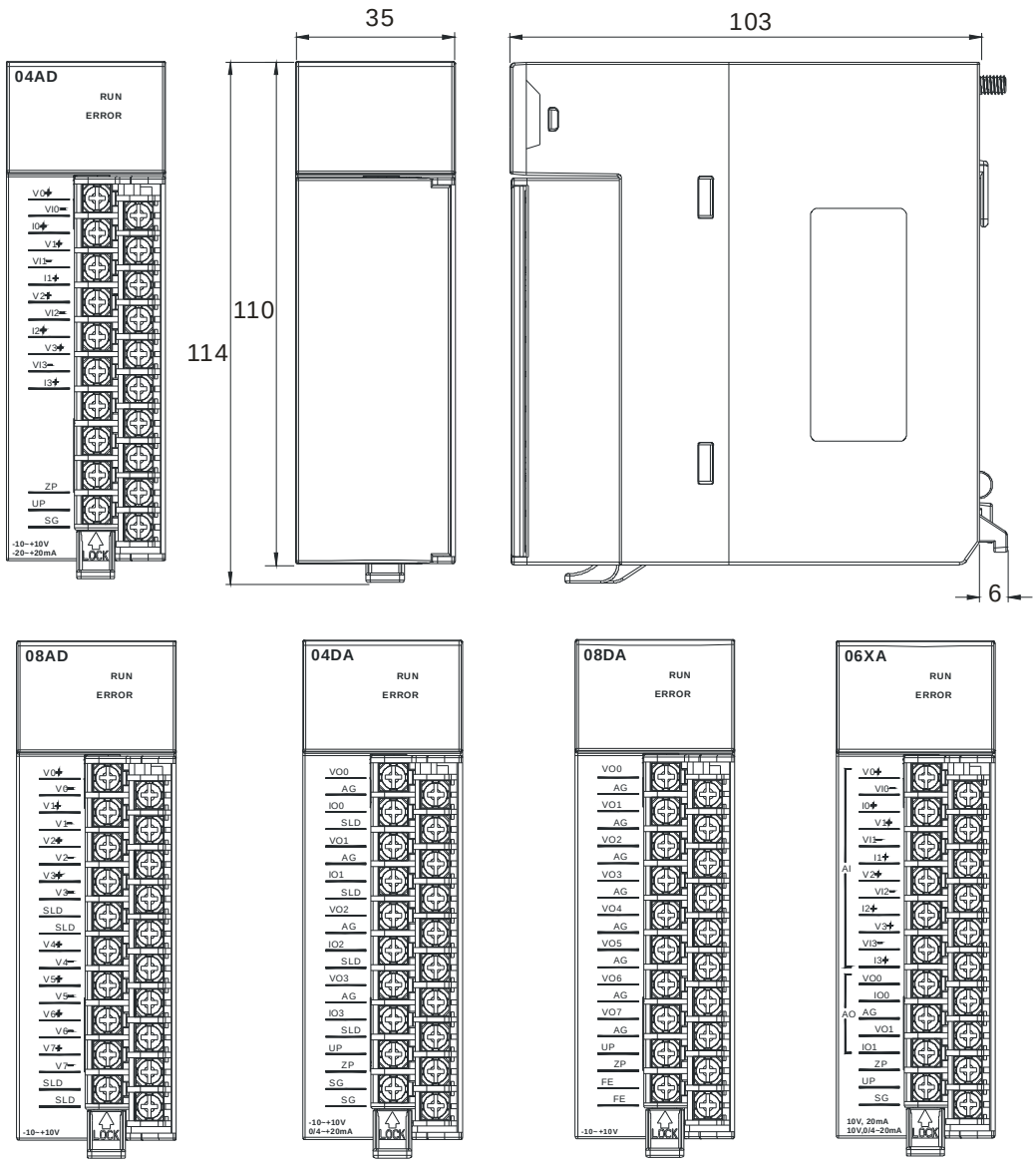


Number	Name	Description
1	Model name	Model name of the module
2	RUN LED indicator	Operating status of the module ON: The module is running. OFF: The module stops running.
	ERROR LED indicator	Error status of the module ON: A serious error occurs in the module. OFF: The module is normal. Blink: A slight error occurs in the module.
3	Removable terminal block	The inputs are connected to sensors. The outputs are connected to loads which will be driven.

Number	Name	Description
4	Arrangement of the input/output terminals	Arrangement of the terminals
5	Description of the inputs/outputs	Simple specifications for the module
6	Clip	Removing the terminal block
7	Label	Nameplate
8	Set screw	Fixing the module
9	Connector	Connecting the module and a backplane
10	Projection	Fixing the module

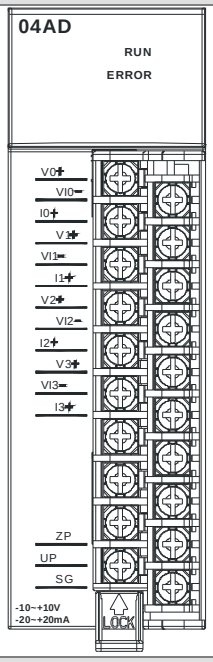
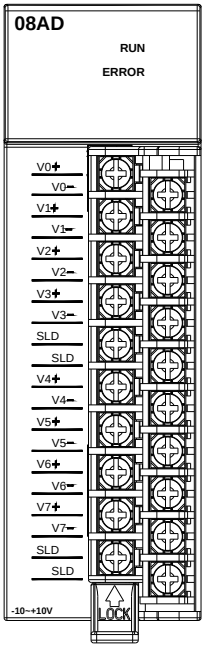
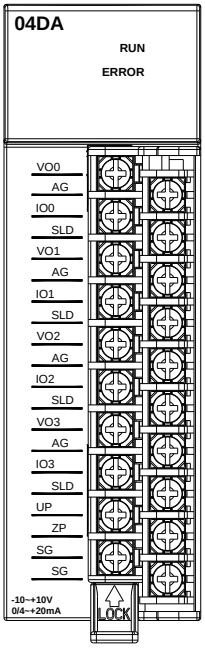
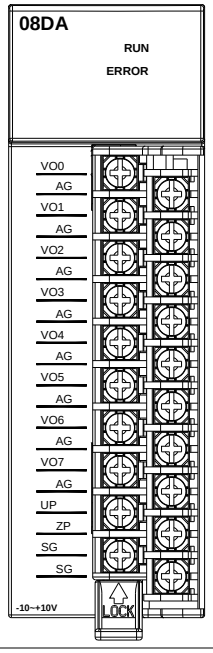
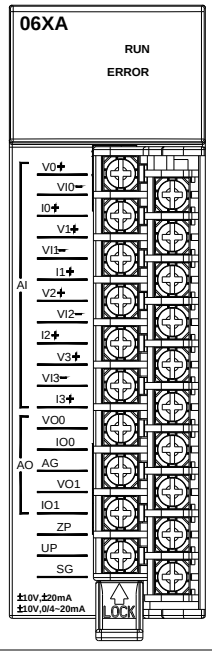
3.6.3 Dimensions

- **AH04AD-5A/AH08AD-5B/AH04DA-5A/AH08DA-5B/AH06XA-5A**



Unit: mm

3.6.4 Arrangement of Input/Output Terminals

AH04AD-5A	AH08AD-5B	AH04DA-5A
		
AH08DA-5B	**AH06XA-5A**	
		

3.7 Specifications for Temperature Measurement Modules

3.7.1 General Specifications

- **AH04PT-5A**

The electrical specifications

Number of analog inputs	4
Applicable sensor	Three-wire configuration: Pt100/Ni100/Pt1000/Ni1000 sensor, and 0~300 Ω input impedance Four-wire configuration: Pt100/Ni100/Pt1000/Ni1000 sensor, and 0~300 Ω input impedance Pt100: DIN 43760-1980 JIS C1604-1989; 100 Ω 3850 PPM/°C Pt1000: DIN EN60751; 1 kΩ 3850 PPM/°C Ni100/Ni1000: DIN 43760
Supply voltage	24 V DC (20.4 V DC~28.8 V DC) (-15%~+20%)
Connector type	Removable terminal block
Overall accuracy	25°C/77°F: The error is ±0.5% of the input within the range -20~60°C/-4~140°F: The error is ±1% of the input within the range
Conversion time	Four-wire configuration: 150 ms/channel Three-wire configuration: 300 ms/channel
Isolation	There is isolation between a digital circuit and an analog circuit, and there is isolation between analog channels. Isolation between a digital circuit and a ground: 500 V DC Isolation between an analog circuit and a ground: 500 V DC Isolation between an analog circuit and a digital circuit: 500 V DC Isolation between the 24 V DC and a ground: 500 V DC

The functional specifications

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

- **AH04TC-5A/AH08TC-5A**

The electrical specifications

Module name	AH04TC-5A	AH08TC-5A
Number of analog inputs	4	8
Applicable sensor	Type J, type K, type R, type S, type T, type E, and type N thermocouples ±150 mV voltage inputs	
Supply voltage	24 V DC (20.4 V DC~28.8 V DC) (-15%~+20%)	
Connector type	Removable terminal block	
Overall accuracy	25°C/77°F: The error is ±0.5% of the input within the range -20~60°C/-4~140°F: The error is ±1% of the input within the range	
Conversion time	200 ms/channel	
Isolation	There is isolation between a digital circuit and an analog circuit, and there is isolation between analog channels.	

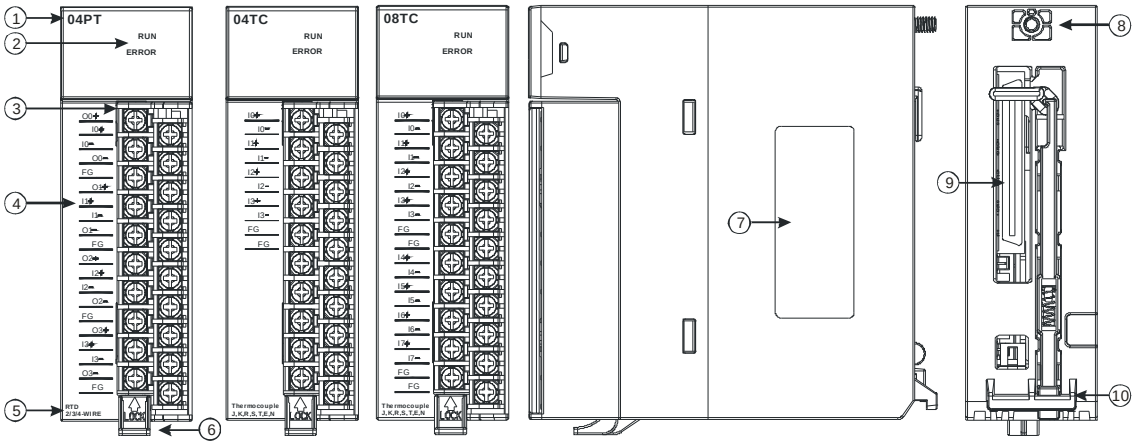
Module name	AH04TC-5A	AH08TC-5A
	Isolation between a digital circuit and a ground: 500 V DC Isolation between an analog circuit and a ground: 500 V DC Isolation between an analog circuit and a digital circuit: 500 V DC Isolation between the 24 V DC and a ground: 500 V DC Isolation between analog channels: 120 V AC	

The functional specifications

Analog-to-digital conversion	Centigrade (°C)	Fahrenheit (°F)	Voltage input
Rated input range	Type J: -100°C~1,150°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~390°C Type E: -150°C~980°C Type N: -150°C~1,280°C	Type J: -148°F~2,102°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~734°F Type E: -238°F~1,796°F Type N: -238°F~2,336°F	±150 mV
Average function	Range: 1~100		
Self-diagnosis	Disconnection detection		

3.7.2 Profiles

- **AH04PT-5A/AH04TC-5A/AH08TC-5A**

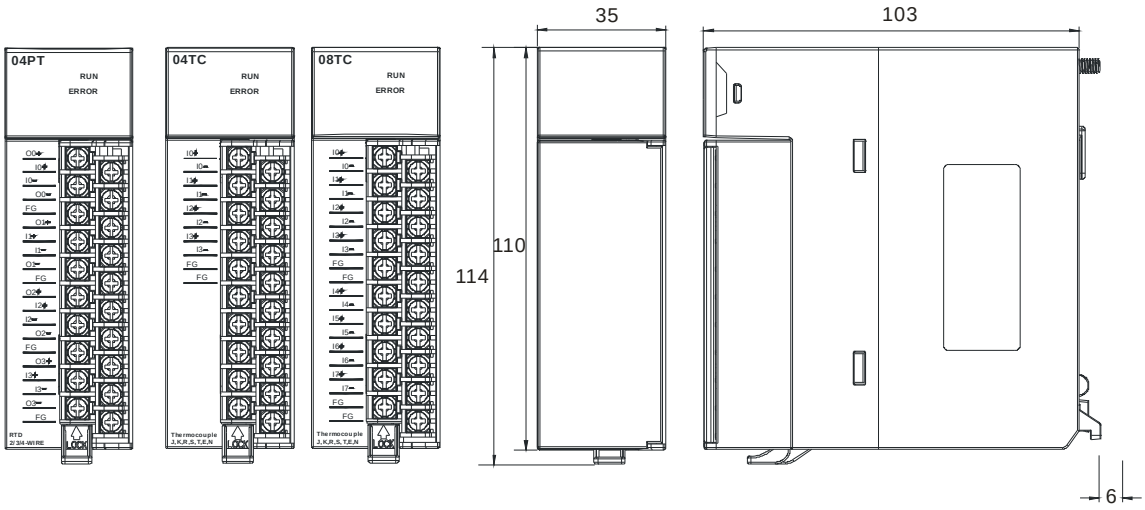


Number	Name	Description
1	Model name	Model name of the module
2	RUN LED indicator	Operating status of the module ON: The module is running. OFF: The module stops running.
2	ERROR LED indicator	Error status of the module ON: A serious error occurs in the module. OFF: The module is normal. Blink: A slight error occurs in the module.
3	Removable terminal block	The inputs are connected to a sensor.
4	Arrangement of the input terminals	Arrangement of the terminals

Number	Name	Description
5	Description of the inputs	Simple specifications for the module
6	Clip	Removing the terminal block
7	Label	Nameplate
8	Set screw	Fixing the module
9	Connector	Connecting the module and a backplane
10	Projection	Fixing the module

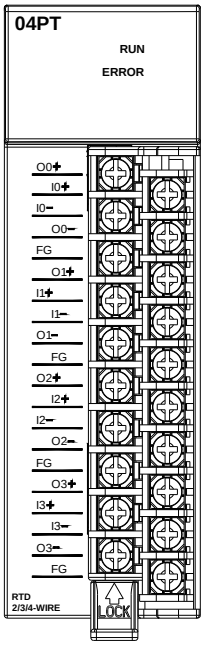
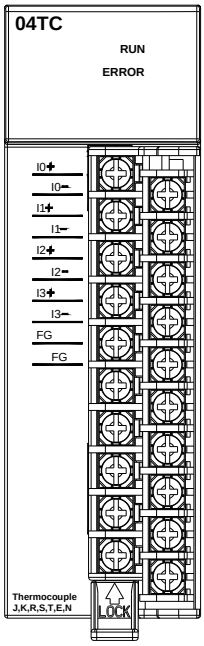
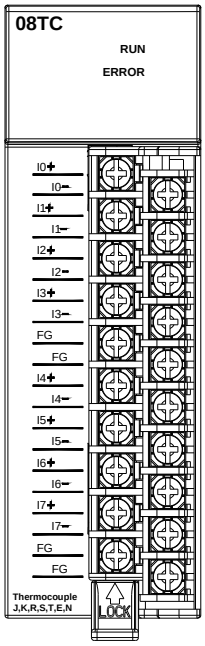
3.7.3 Dimensions

- **AH04PT-5A/AH04TC-5A/AH08TC-5A**



Unit: mm

3.7.4 Arrangement of Input/Output Terminals

AH04PT-5A	AH04TC-5A	AH08TC-5A
		

3.8 Specifications for Network Modules

3.8.1 General Specifications

- **AH10SCM-5A**

Item	Specifications
Connector type	European-style removable terminal block
Transmission interface	RS-485/RS-422
Transmission speed	1,200, 2,400, 4,800, 9,600, 19,200, 38,400, 57,600, 76,800, 115,200, 230,400, and 460,800 bps
Communication format	Stop bit: 1 bit and 2 bits Parity bit: none, an odd parity bit, and an even parity bit Data bit: 7 bits and 8 bits
Communication protocol	Modbus ASCII/RTU UD Link BACnet MS/TP slave
Electric energy consumption	1.5 W
Insulation voltage	2,500 V DC

- **AH10EN-5A**

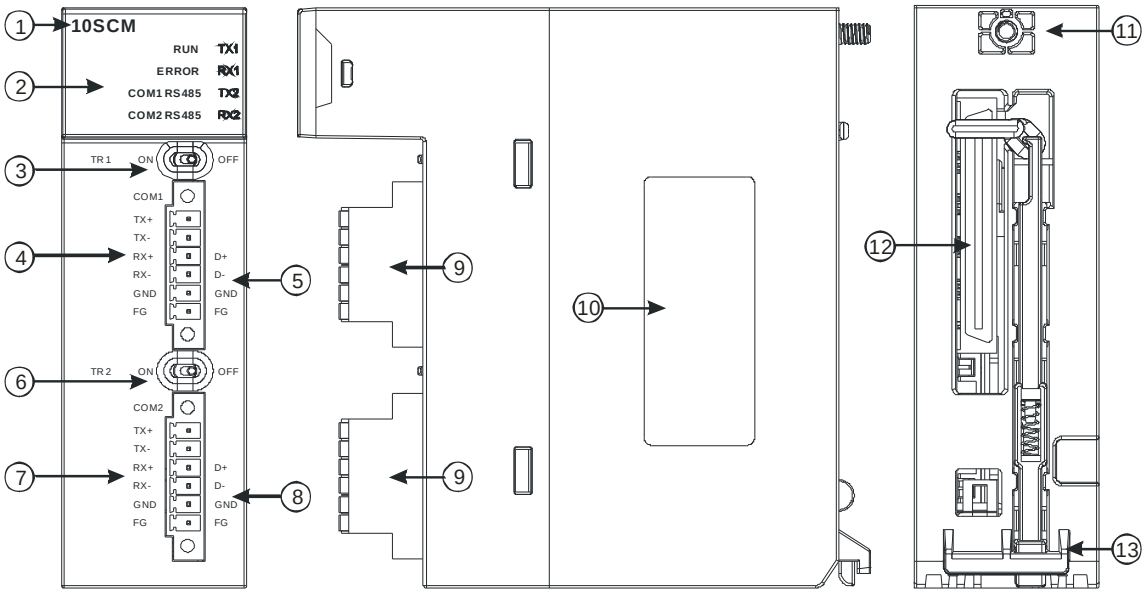
Item	Specifications
Connector type	RJ-45 with auto-MDI/MDIX
Transmission interface	802.3 and 802.3u
Transmission cable	Category 5e cable The maximum length is 100 meters.
Transmission speed	10/100 Mbps auto-detection
Communication protocol	ICMP, IP, TCP, UDP, DHCP, NTP, Modbus TCP, HTTP, SNMP, and SMTP
Electric energy consumption	1.5 W
Insulation voltage	2,500 V DC

- **AH10DNET-5A**

Item	Specifications
Communication type	CAN
Electrical isolation	500 V DC
Connector type	Removable connector (5.08 mm)
Data type	I/O polled, and explicit
Communication speed	Standard mode: 125 kbps, 250 kbps, and 500 kbps Extended mode: 10 kbps, 20 kbps, 50 kbps, 125 kbps, 250 kbps, 500 kbps, 800 kbps, and 1 Mbps
Communication cable	Delta shielded twisted pair (Two communication cables, two power cables, and one shielded cable)

3.8.2 Profiles

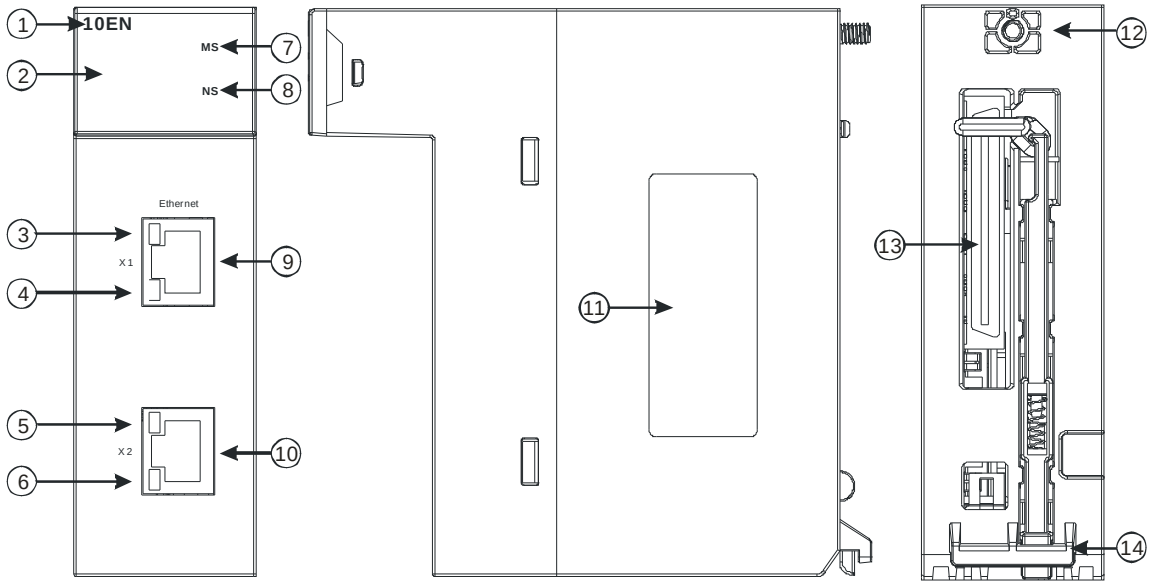
- **AH10SCM-5A**



Number	Name	Description
1	Model name	Model name of the module
2	RUN LED indicator (green)	Operating status of the module ON: The module is running. OFF: The module stops running.
	ERROR LED indicator (red)	Error status of the module ON: There is a hardware error. OFF: The module is normal. Blink: 1. The setting of the module is incorrect, or there is a communication error. 2. Restoring the module to the default factory value
	COM1 (RS-485) LED indicator (green)	ON: RS-485 mode OFF: RS-422 mode
	COM2 (RS-485) LED indicator (green)	ON: RS-485 mode OFF: RS-422 mode
	TX1/TX2 LED indicator (orange)	Blink: The data is being transmitted through the RS-485/RS422 port. OFF: The data is not being transmitted through the RS-485/RS422 port.
	RX1/RX2 LED indicator (orange)	Blink: The data is being reveived through the RS-485/RS422 port. OFF: The data is not being reveived through the RS-485/RS422 port.
3	Switch of terminal resistor 1	Switching terminal resistor 1 ON/OFF
4	Terminals	Terminals for COM1 (RS-422)
5	Terminals	Terminals for COM1 (RS-485)
6	Switch of terminal resistor 2	Switching terminal resistor 2 ON/OFF
7	Terminals	Terminals for COM2 (RS-422)
8	Terminals	Terminals for COM2 (RS-485)

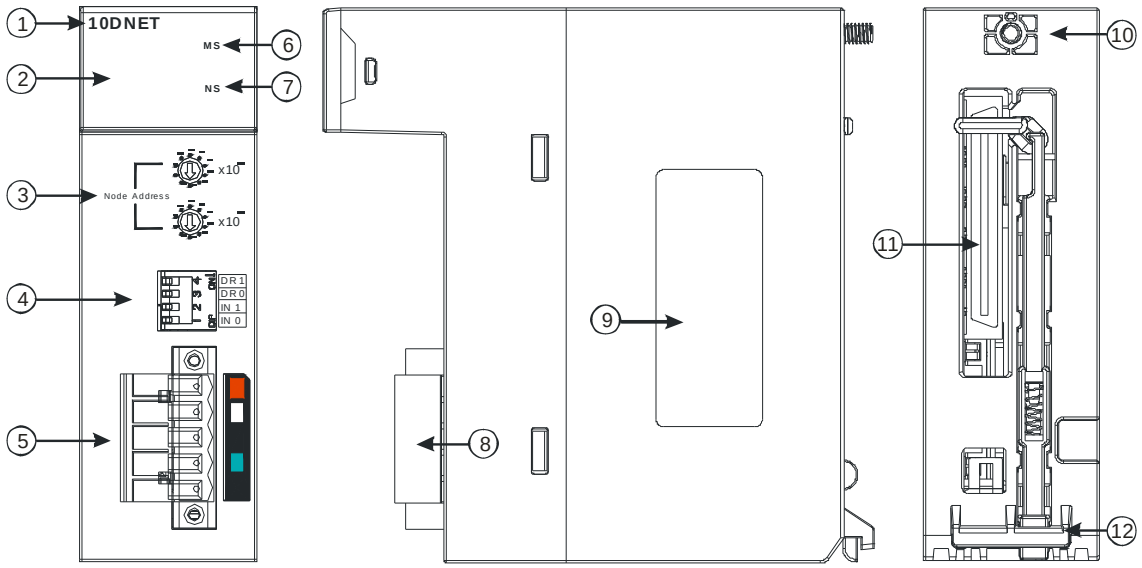
Number	Name	Description
9	European-style terminal block	Terminals for wiring
10	Label	Nameplate
11	Set screw	Fixing the module
12	Connector	Connecting the module and a backplane
13	Projection	Fixing the module

- **AH10EN-5A**



Number	Name	Description
1	Model name	Model name of the module
2	Seven-segment display	Display
3	LINK LED indicator	LINK LED indicator for RJ45 port 1
4	ACK LED indicator	ACK LED indicator for RJ45 port 1
5	LINK LED indicator	LINK LED indicator for RJ45 port 2
6	ACK LED indicator	ACK LED indicator for RJ45 port 2
7	NS LED indicator	LED indicator
8	MS LED indicator	LED indicator
9	RJ45 port 1	RJ45 port 1
10	RJ45 port 2	RJ45 port 2
11	Label	Nameplate
12	Set screw	Fixing the module
13	Connector	Connecting the module and a backplane
14	Projection	Fixing the module

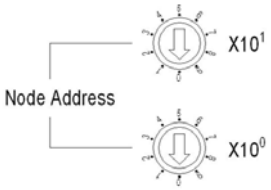
- **AH10DNET-5A**



Number	Name	Description
1	Model name	Model name of the module
2	Seven-segment display	Display
3	Address knob	Setting the address
4	Function switch	Setting the functions
5	DeviceNet connector	DeviceNet is used to interconnect control devices for data exchange.
6	MS LED indicator	Indicating the status of the module
7	NS LED indicator	Indicating the status of the network
8	Removable terminal block	Terminals for wiring
9	Label	Nameplate
10	Set screw	Fixing the module
11	Connector	Connecting the module and a backplane.
12	Projection	Fixing the module

- **The address knobs**

It is used to set the node address of AH10DNET-5[a] on a DeviceNet network. (Node addresses range from 0 to 63.)

Setting	Description	
0…63	Available nodes on a DeviceNet network	
64…99	Unavailable nodes on a DeviceNet network	

Example: If users want to set the communication address of AH10DNET-5A to 26, they can turn the knob corresponding to $x10^1$ to 2, and turn the knob corresponding to $x10^0$ to 6.

Note:

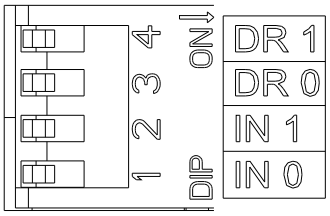
1. When the power supply is cut off, the node address is set. After the setting of the node address is complete, AH10DNET-5A can be supplied with power.
2. If AH10DNET-5A is running, changing the node address is unavailable.
3. Please use a slotted screwdriver to turn the knobs with care, and do not scrape them.

- **The function switch**

  The function switch provides the following functions:

  1. Setting the working mode (IN 0)
  2. Setting the transmission speed of a DeviceNet network (DR 0~DR 1)

DR 1	DR 0	Transmission speed
OFF	OFF	125 kbps
OFF	ON	250 kbps
ON	OFF	500 kbps
ON	ON	Entering the extendable serial transmission speed mode
IN 1	Reserved	
IN 0	ON	If the slave is disconnected, the previous I/O data is retained.
	OFF	If the slave is disconnected, the previous I/O data is cleared.

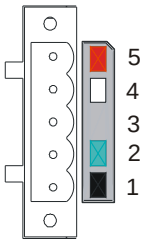


Note:

1. When the power supply is cut off, the functions are set. After the setting of the functions is complete, AH10DNET-5A can be supplied with power.
2. If AH10DNET-5A is running, changing the functions is unavailable.
3. Please use a slotted screwdriver to adjust the DIP switch with care, and do not scrape them.

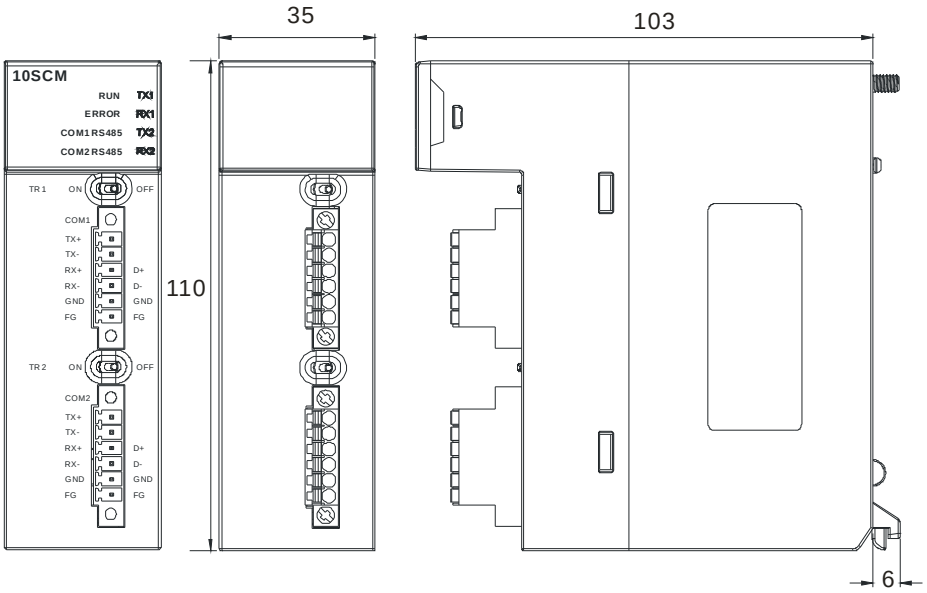
- **The DeviceNet connector**

Pin	Signal	Color	Description
5	V+	Red	24 V DC
4	CAN_H	White	Signal +
3	Ground	-	It is connected to a shielded cable.
2	CAN_L	Blue	Signal -
1	V-	Black	0 V DC



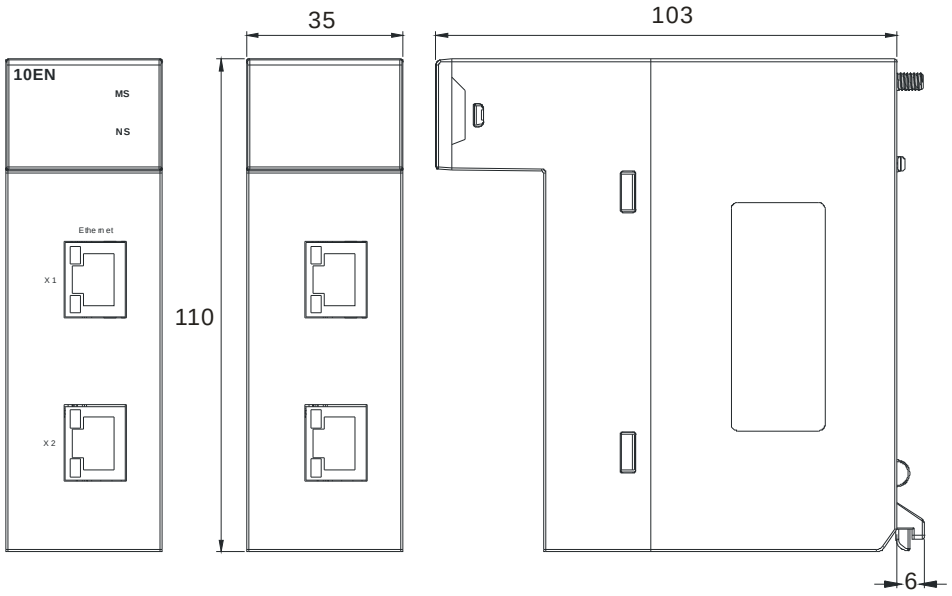
3.8.3 Dimensions

- **AH10SCM-5A**



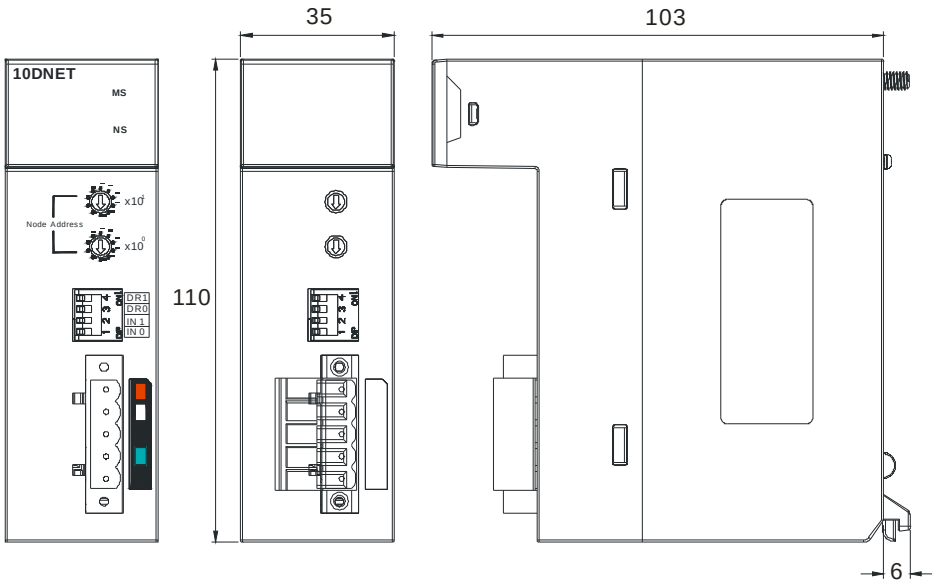
Unit: mm

- **AH10EN-5A**



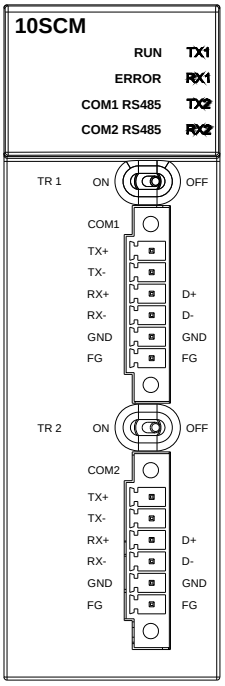
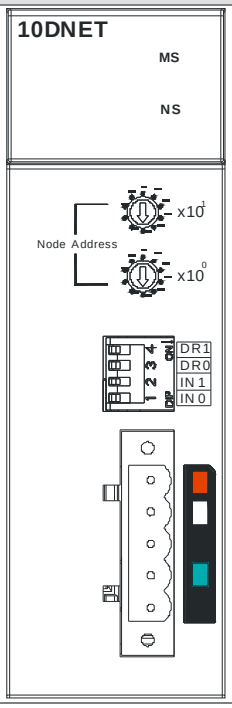
Unit: mm

- **AH10DNET-5A**



Unit: mm

3.8.4 Arrangement of Input/Output Terminals

AH10SCM-5A	AH10DNET-5A
	

3.9 Specifications for Motion Control Modules

3.9.1 General Specifications

- **AH02HC-5A**

Item		Specifications
Number of channels		2 channels
Input signal	**Input (differential input)**	CH0: X0.8+, X0.8-, X0.9+, and X0.9- CH1: X0.10+, X0.10-, X0.11+, and X0.11-
	Pulse format	Pulse/Direction (one phase and one input) Counting up/Counting down (one phase and two inputs) One time the frequency of A/B-phase inputs (two phases and two inputs) Four times the frequency of A/B-phase inputs (two phases and two inputs)
	Signal level	5~24 V DC
Specifications	**Maximum frequency of counting**	The maximum frequency is 200 kHz.
	Range	The number of sampled pulses is within the range between -200000 and 200000. The number of accumulated pulses is within the range between -99999999 and 99999999. The number of input pulses is within the range between -2147483648 and 2147483648.
	Type	General count Circular count
RESET input	**Input (differential input)**	CH0: X0.0+ and X0.0- CH1: X0.1+ and X0.1-
	Signal level	5~24 V DC
	Maximum current	15 mA
Comparison output	**Output type**	CH0: The high-speed pulse output Y0.8 is a transistor whose collector is an open collector. CH1: The high-speed pulse output Y0.9 is a transistor whose collector is an open collector.
	Signal level	24 V DC
	Maximum current	15 mA

- **AH04HC-5A**

Item		Specifications
Number of channels		4 channels
Input signal	**Input (differential input)**	CH0: X0.8+, X0.8-, X0.9+, and X0.9- CH1: X0.10+, X0.10-, X0.11+, and X0.11- CH2: X0.12+, X0.12-, X0.13+, and X0.13- CH3: X0.14+, X0.14-, X0.15+, and X0.15-
	Pulse format	Pulse/Direction (one phase and one input) Counting up/Counting up (one phase and two inputs) One time the frequency of A/B-phase inputs (two phases and two inputs) Four times the frequency of A/B-phase inputs (two phases and two inputs)
	Signal level	5~24 V DC
Specifications	**Maximum frequency of counting**	The maximum frequency is 200 kHz.
	Range	The number of sampled pulses is within the range between -200000 and 200000. The number of accumulated pulses is within the range between -99999999 and 99999999. The number of input pulses is within the range between -2147483648 and 2147483648.
	Type	General count Circular count
RESET input	**Input (differential input)**	CH0: X0.0+ and X0.0- CH1: X0.1+ and X0.1- CH2: X0.2+ and X0.2- CH3: X0.3+ and X0.3-
	Signal level	5~24V DC
	Maximum current	15 mA
Comparison output	**Output type**	CH0: The high-speed pulse output Y0.8 is a transistor whose collector is an open collector. CH1: The high-speed pulse output Y0.9 is a transistor whose collector is an open collector. CH2: The high-speed pulse output Y0.10 is a transistor whose collector is an open collector. CH3: The high-speed pulse output Y0.11 is a transistor whose collector is an open collector.
	Signal level	24 V DC
	Maximum current	15 mA

- **AH05PM-5A**

Item		Specifications		
		AH05PM-5A		
Number of axes		2 axes		
Storage		The capacity of the built-in storage is 64 ksteps.		
Unit		Motor unit	Compound unit	Mechanical unit
Connection with a CPU module		Users can set the initial register involved in the data exchange in a CPU module, and the number of registers involved in the data exchange in the CPU module. Four hundred data registers at most can be involved in the data exchange.		
Motor control		There are three types of pulse output modes. These modes adopt the differential output. 1. Pulse/Direction 2. Counting up/Counting down 3. A/B-phase output		
Maximum speed		Single axis: 500 kpps Multi-axis interpolation: 500 kpps		
Input signal	**Detector**	X0.0, X0.1, X0.8, X0.9, X0.12, and X0.13		
Output signal	**Servo output signal**	Y0.0+, Y0.0-, Y0.2+, Y0.2-, Y0.1+, Y0.1-, Y0.3+, Y0.3-, Y0.8, and Y0.9		
External communication port		Mini USB port		
Number of basic instructions		27		
Number of applied instructions		130		
M-code		● OX0~99 (motion subroutine/positioning program): M02 (The execution of the program stops. (END)) ● M00~M01, M03~M101, and M103~M65535: The execution of the program pauses. (WAIT) Users can use them freely.		
G-code		G0 (rapid positioning), G1 (linear interpolation), G2 (circular interpolation, clockwise), G3 (circular interpolation, counterclockwise), G4 (dwell), G17 (XY plane selection), G90 (absolute programming), and G91 (incremental programming)		

The description of the terminals

Terminal	Description	Response characteristic	Maximum input	
			Current	Voltage
X0.0, X0.1, X0.8, X0.9, X0.12, and X0.13	1. They are single/A/B-phase inputs. 2. The functions of the terminals: ● Motion control: ◆ X0.0 is the PG input for axis 1, and X0.1 is the PG input for axis 2. ◆ X0.12 is the DOG input for axis 1, and X0.13 is the DOG input for axis 2. ◆ X0.8 and X0.9 are for a manual pulse generator. ● High-speed count: ◆ X0.0 is the RESET input for counter 0. ◆ X0.8 is an A-phase input for counter 0, and X0.9 is a B-phase input for counter 0. ● High-speed comparison and catch: The terminals can function as trigger signals for a high-speed catch. ● Interrupt inputs	200 kHz	15 mA	24 V
Y0.8 and Y0.9	1. The high-speed pulse outputs are transistors whose collectors are open collector. 2. The functions of the terminals: ● Motion control: Y0.8 is the CLEAR output for axis 1, and Y0.9 is the CLEAR output for axis 2. ● High-speed comparison and catch: The high-speed comparison outputs provide the PWM function.	200 kHz	15 mA	24 V
Y0.0+, Y0.0-, Y0.1+, Y0.1-, Y0.2+, Y0.2-, Y0.3+, and Y0.3-	1. They are differential outputs. 2. The function of the terminals: ● Motion control: ◆ Y0.0+ and Y0.0- are A-phase outputs for axis 1. Y0.2+ and Y0.2- are A-phase outputs for axis 2. ◆ Y0.1+ and Y0.1- are B-phase outputs for axis 1. Y0.3+ and Y0.3- are B-phase outputs for axis 2.	1 MHz	5 mA	5 V

- **AH10PM-5A**

Item		Specifications		
		AH10PM-5A		
Number of axes		6 axes		
Storage		The capacity of the built-in storage is 64 ksteps.		
Unit		Motor unit	Compound unit	Mechanical unit
Connection with a CPU module		Users can set the initial register involved in the data exchange in a CPU module, and the number of registers involved in the data exchange in the CPU module. Four hundred data registers at most can be involved in the data exchange.		
Motor control		There are three types of pulse output modes. These modes adopt the differential output. 1. Pulse/Direction 2. Counting up/Counting down 3. A/B-phase output		
Maximum speed		Single axis: 500 kpps Multi-axis interpolation: 500 kpps		
Input signal	**Operating switch**	STOP/RUN (automatic/manual switch)		
	Detector	X0.8, X0.9, X0.10, X0.11, X0.12, X0.13, X0.14, X0.15, X0.0+, X0.0-, X0.1+, X0.1-, X0.2+, X0.2-, X0.3+, and X0.3-		
Output signal	**Servo output signal**	Y0.0+, Y0.0-, Y0.2+, Y0.2-, Y0.4+, Y0.4-, Y0.6+, Y0.6-, Y0.1+, Y0.1-, Y0.3+, Y0.3-, Y0.5+, Y0.5-, Y0.7+, Y0.7-, Y0.8, Y0.9, Y0.10, and Y0.11		
External communication port		Mini USB port Ethernet port		
Expansion storage device		Mini SD card The maximum capacity is 32 GB.		
Number of basic instructions		27		
Number of applied instructions		130		
M-code		● OX0~99 (motion subroutine/positioning program): M02 (The execution of the program stops. (END)) ● M00~M01, M03~M101, and M103~M65535: The execution of the program pauses. (WAIT) Users can use them freely.		
G-code		G0 (rapid positioning), G1 (linear interpolation), G2 (circular interpolation, clockwise), G3 (circular interpolation, counterclockwise), G4 (dwell), G17 (XY plane selection), G18 (ZX plane selection), G19 (YZ plane selection), G90 (absolute programming), and G91 (incremental programming)		

The description of the terminals

Terminal	Description	Response characteristic	Maximum input	
			Current	Voltage
X0.0+, X0.0-, X0.1+, X0.1-, X0.2+, X0.2-, X0.3+, and X0.3-	1. They are differential inputs. 2. The functions of the terminals: ● Motion control: They are the PG inputs for axis 1~axis 4. ● High-speed counter: X0.0+ and X0.0- are the RESET inputs for counter 0. X0.1+ and X0.1- are the RESET inputs for counter 1. X0.2+ and X0.2- are the RESET inputs for counter 2 and counter 4. X0.3+ and X0.3- are the RESET inputs for counter 3 and counter 5. ● High-speed comparison and catch: The terminals can function as trigger signals for a high-speed catch. ● Interrupt inputs	200 kHz	15 mA	5~24 V
X0.8 and X0.9	1. They are single/A/B-phase inputs. 2. The functions of the terminals: ● Motion control: The terminals are for a manual pulse generator. ● High-speed count: ◆ The terminals are for counter 0. ◆ X0.8 is an A-phase input for counter 0, and X0.9 is a B-phase input for counter 0. ● High-speed comparison and catch: The terminals can function as trigger signals for a high-speed catch. ● Interrupt inputs	200 kHz	15 mA	24 V
X0.10, X0.11, X0.12, X0.13, X0.14, and X0.15	1 They are single/A/B-phase inputs. 2 The functions of the terminals: ● Motion control: They are the DOG inputs for axis 1~axis 6. ● High-speed counter: ◆ The terminals are for counter 1~counter 5. ◆ X0.10 is an A-phase input for counter 1, X0.12 is an A-phase input for counter 2 and counter 4, and X0.14 is an A-phase input for counter 3 and counter 5. ◆ X0.11 is a B-phase input for counter 1, X0.13 is a B-phase input for counter 2 and counter 4, and X0.15 is a B-phase input for counter 3 and counter 5. ● High-speed comparison and catch: The terminals can function as trigger signals for a high-speed catch. ● Interrupt inputs	200 kHz	15 mA	24 V

Terminal	Description	Response characteristic	Maximum input	
			Current	Voltage
Y0.8, Y0.9, Y0.10, and Y0.11	1. The high-speed pulse outputs are transistors whose collectors are open collector. 2. The functions of the terminals: ● Motion control: ◆ The terminals are the CLEAR outputs for axis 1~axis 4, and provide the PWM function. ◆ Y0.8 and Y0.9 are for axis 5. Y0.10 and Y0.11 are for axis 6. Y0.8 is an A-phase output for axis 5, and Y0.10 is an A-phase output for axis 6. Y0.9 is a B-phase output for axis 5, and Y0.11 is a B-phase output for axis 6. ● High-speed comparison and catch: The high-speed comparison outputs provide the PWM function.	200 kHz	15 mA	24 V
Y0.0+, Y0.0-, Y0.1+, Y0.1-, Y0.2+, Y0.2-, Y0.3+, Y0.3-, Y0.4+, Y0.4-, Y0.5+, Y0.5-, Y0.6+, Y0.6-, Y0.7+, and Y0.7-	1. They are differential outputs. 2. The function of the terminals: ● Motion control: ◆ The terminals are for axis 1~axis 4. ◆ Y0.0+ and Y0.0- are A-phase outputs for axis 1. Y0.2+ and Y0.2- are A-phase outputs for axis 2. Y0.4+ and Y0.4- are A-phase outputs for axis 3. Y0.6+ and Y0.6- are A-phase outputs for axis 4. ◆ Y0.1+ and Y0.1- are B-phase outputs for axis 1. Y0.3+ and Y0.3- are B-phase outputs for axis 2. Y0.5+ and Y0.5- are B-phase outputs for axis 3. Y0.7+ and Y0.7- are B-phase outputs for axis 4. ◆ Y0.0+ and Y0.0- are the CLEAR outputs for axis 5. Y0.1+ and Y0.1- are the CLEAR outputs for axis 6.	1 MHz	5 mA	5 V

- **AH20MC-5A**

Item		Specifications		
		AH20MC-5A		
Number of axes		12 axes		
Storage		The capacity of the built-in storage is 64 ksteps.		
Unit		Motor unit	Compound unit	Mechanical unit
Connection with a CPU module		Users can set the initial register involved in the data exchange in a CPU module, and the number of registers involved in the data exchange in the CPU module. Four hundred data registers at most can be involved in the data exchange.		
Motor control		Delta high-speed motion control system DMCNET (Delta Motion Control Network) The response time is one millisecond.		
Maximum speed		Single axis: 500 kpps Two-axis interpolation: 500 kpps		
Input signal	**Operating switch**	STOP/RUN (automatic/manual switch)		
	Detector	X0.10+, X0.10-, X0.11+, X0.11-, X0.12+, X0.12-, X0.13+, X0.13-, X0.14+, X0.14-, X0.15+, X0.15, X0.0+, X0.0-, X0.1+, X0.1-, X0.2+, X0.2-, X0.3+, X0.3-, X0.8+, X0.8-, X0.9+, and X0.9-		
Output signal	**Servo output signal**	Y0.8+, Y0.8-, Y0.9+, Y0.9-, Y0.10+, Y0.10-, Y0.11+ and Y0.11-		
External communication port		Mini USB port Ethernet port DMCNET port		
Expansion storage device		Mini SD card The maximum capacity is 32 GB.		
Number of basic instructions		27		
Number of applied instructions		130		
M-code		● OX0~99 (motion subroutine/positioning program): M02 (The execution of the program stops. (END)) ● M00~M01, M03~M101, and M103~M65535: The execution of the program pauses. (WAIT) Users can use them freely.		
G-code		G0 (rapid positioning), G1 (linear interpolation), G2 (circular interpolation, clockwise), G3 (circular interpolation, counterclockwise), G4 (dwell), G17 (XY plane selection), G18 (ZX plane selection), G19 (YZ plane selection), G90 (absolute programming), and G91 (incremental programming)		

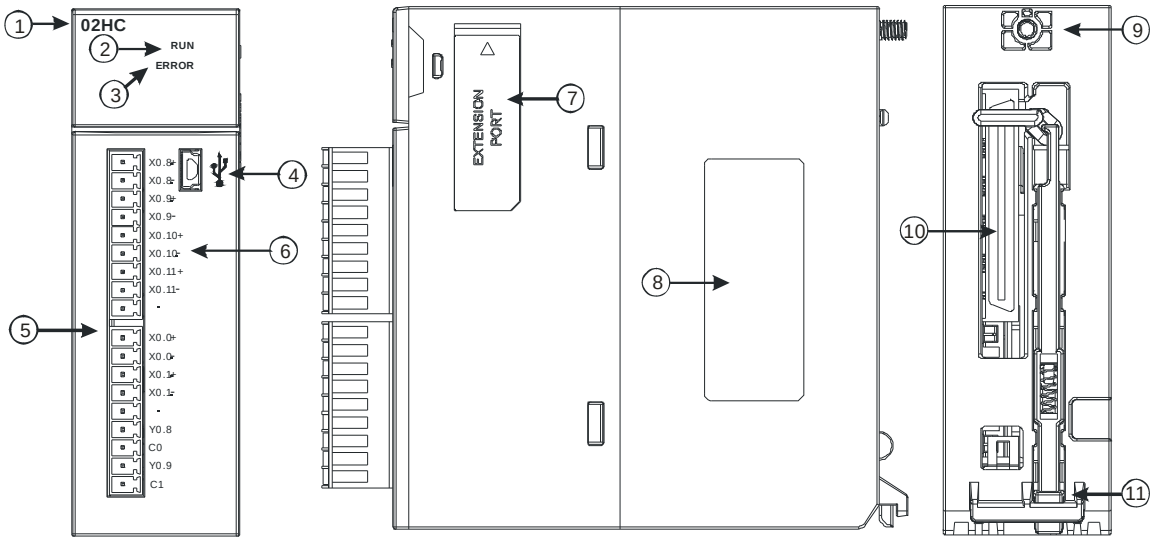
The description of the terminals

Terminal	Description	Response characteristic	Maximum input	
			Current	Voltage
X0.0+, X0.0-, X0.1+, X0.1-, X0.2+, X0.2-, X0.3+, and X0.3-	1. They are differential inputs. 2. The functions of the terminals: ● High-speed count: ◆ The terminals are the RESET inputs for counter 0~counter 5. ◆ X0.0+ and X0.0- are for counter 0. X0.1+ and X0.1- are for counter 1. X0.2+ and X0.2- are for counter 2 and counter 4. X0.3+ and X0.3- are for counter 3 and counter 5. ● High-speed comparison and catch: The terminals can function as trigger signals for a high-speed catch. ● Interrupt inputs	200 kHz	15 mA	5~24 V
X0.8+, X0.8-, X0.9+, and X0.9-	1. They are differential inputs. 2. The functions of the terminals: ● Motion control: The terminals are for a manual pulse generator. ● High-speed count: ◆ The terminals are for counter 0. ◆ X0.8+ and X0.8- are A-phase inputs for counter 0. X0.9+ and X0.9- are B-phase inputs for counter 0. ● High-speed comparison and catch: The terminals can function as trigger signals for a high-speed catch. ● Interrupt inputs	200 kHz	15 mA	5~24 V

Terminal	Description	Response characteristic	Maximum input	
			Current	Voltage
X0.10+, X0.10-, X0.11+, X0.11-, X0.12+, X0.12-, X0.13+, X0.13, X0.14+, X0.14-, X0.15+, and X0.15-	1. They are differential inputs. 2. The functions of the terminals: ● High-speed count: ◆ The terminals are for counter 1~counter 5. ◆ X0.10+ an X0.10- are A-phase inputs for counter 1. X0.12+ and X0.12- are A-phase inputs for counter 2 and counter 4. X0.14+ and X0.14- are A-phase inputs for counter 3 and counter 5. ◆ X0.11+ and X0.11- are B-phase inputs for counter 1. X0.13+ and X0.13- are B-phase inputs for counter 2 and counter 4. X0.15+ and X0.15- are B-phase inputs for counter 3 and counter 5. ● High-speed comparison and catch: The terminals can function as trigger signals for a high-speed catch. ● Interrupt inputs	200 kHz	15 mA	5~24 V
Y0.8, Y0.9, Y0.10, and Y0.11	1. The high-speed pulse outputs are transistors whose collectors are open collector. 2. The function of the terminals: ● High-speed comparison and catch: The high-speed comparison outputs provide the PWM function.	200 kHz	15 mA	24 V

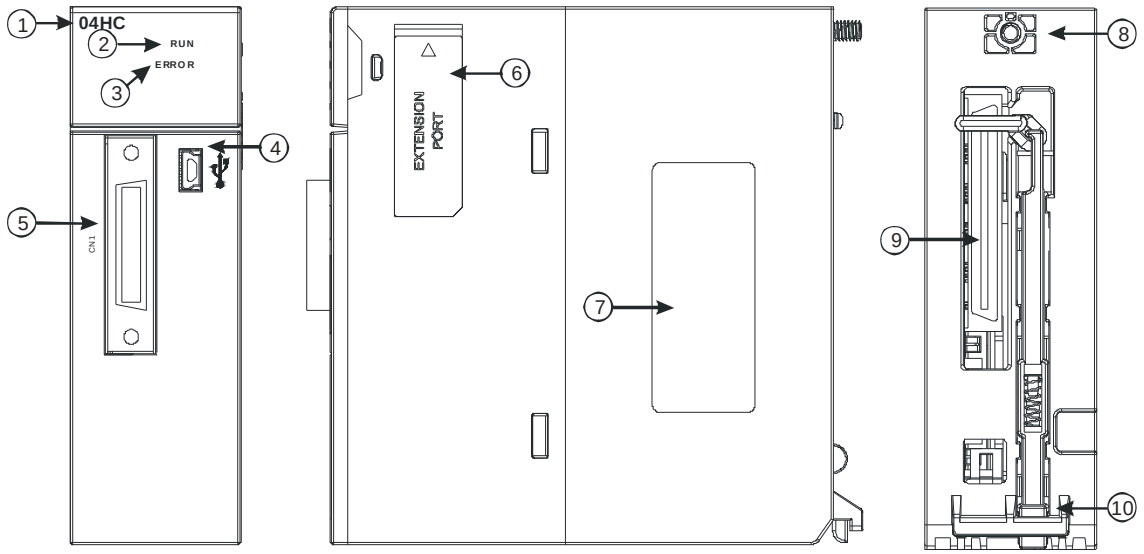
3.9.2 Profiles

- **AH02HC-5A**



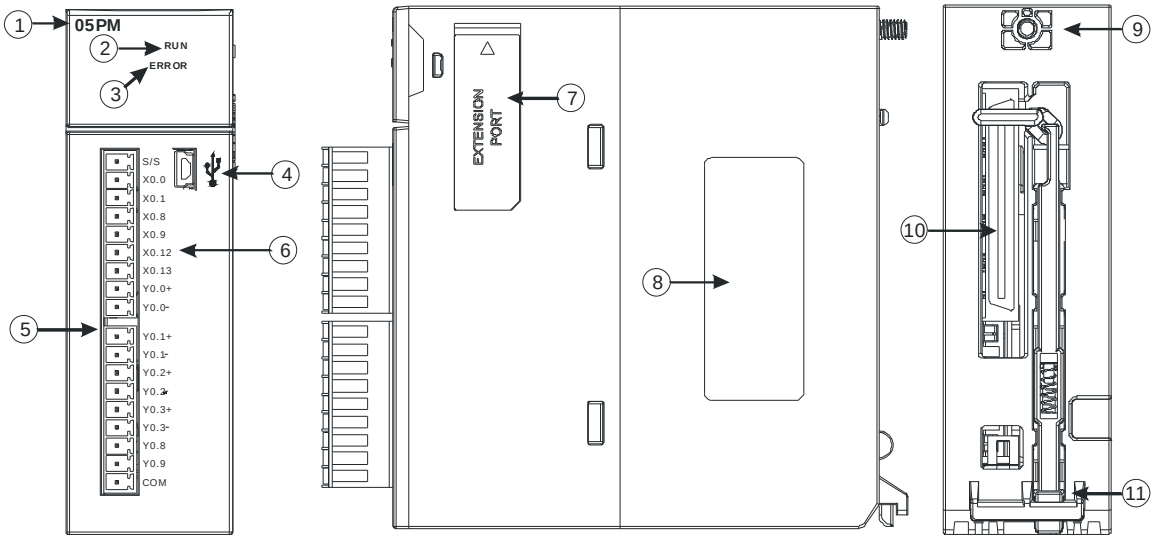
Number	Name	Description
1	Model name	Model name of the module
2	RUN LED indicator (green)	Operating status of the module ON: The module is running. OFF: The module stops running.
3	ERROR LED indicator (red)	Error status of the module Blink: The module is abnormal.
4	USB port	Providing the mini USB communication interface
5	Terminals	Input/Output terminals
6	Arrangement of the input/output terminals	Arrangement of the terminals
7	Extension port	Updating the firmware
8	Label	Nameplate
9	Set screw	Fixing the module
10	Connector	Connecting the module and a backplane
11	Projection	Fixing the module

- **AH04HC-5A**



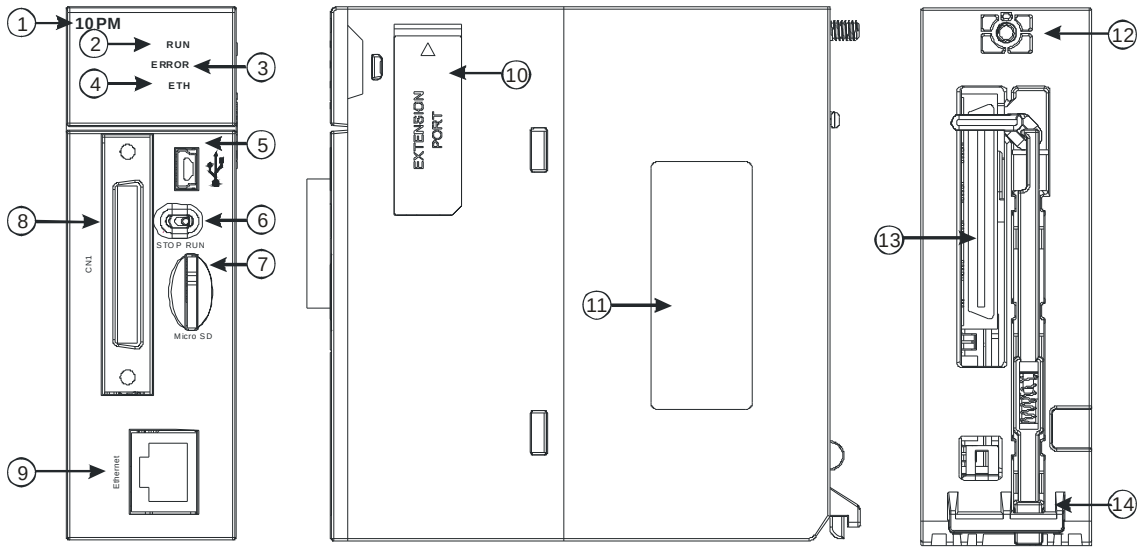
Number	Name	Description
1	Model name	Model name of the module
2	RUN LED indicator (green)	Operating status of the module ON: The module is running. OFF: The module stops running.
3	ERROR LED indicator (red)	Error status of the module Blink: The module is abnormal.
4	USB port	Providing the mini USB communication interface
5	Connector	Connecting the module and an I/O extension cable
6	Extension port	Updating the firmware
7	Label	Nameplate
8	Set screw	Fixing the module
9	Connector	Connecting the module and a backplane
10	Projection	Fixing the module

- **AH05PM-5A**



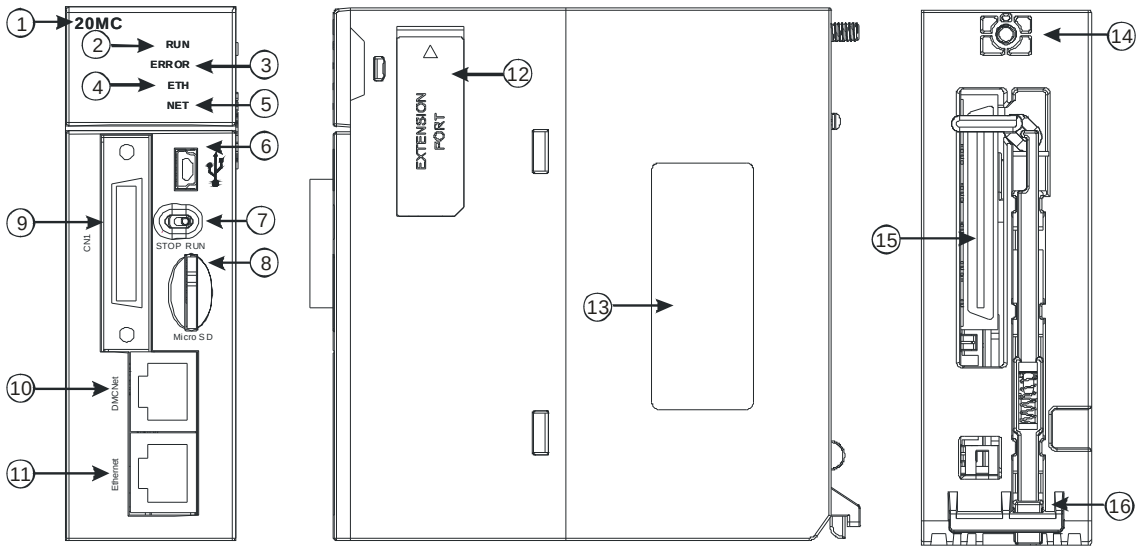
Number	Name	Description
1	Model name	Model name of the module
2	RUN LED indicator (green)	Operating status of the module ON: The module is running. OFF: The module stops running.
3	ERROR LED indicator (red)	Error status of the module Blink: The module is abnormal.
4	USB port	Providing the mini USB communication interface
5	Terminals	Input/Output terminals
6	Arrangement of the input/output terminals	Arrangement of the terminals
7	Extension port	Updating the firmware
8	Label	Nameplate
9	Set screw	Fixing the module
10	Connector	Connecting the module and a backplane
11	Projection	Fixing the module

- **AH10PM-5A**



Number	Name	Description
1	Model name	Model name of the module
2	RUN LED indicator (green)	Operating status of the module ON: The module is running. OFF: The module stops running.
3	ERROR LED indicator (red)	Error status of the module Blink: The module is abnormal.
4	Ethernet connection LED indicator (green)	Status of the Ethernet connection ON: The Ethernet connection is being connected. OFF: The Ethernet connection is disconnected.
5	USB port	Providing the mini USB communication interface
6	RUN/STOP switch	RUN: The user program is executed. STOP: The execution of the user program stops.
7	SD slot	Providing the SD interface
8	Connector	Connecting the module and an I/O extension cable
9	Ethernet port	Providing the Ethernet communication interface
10	Extension port	Updating the firmware
11	Label	Nameplate
12	Set screw	Fixing the module
13	Connector	Connecting the module and a backplane
14	Projection	Fixing the module

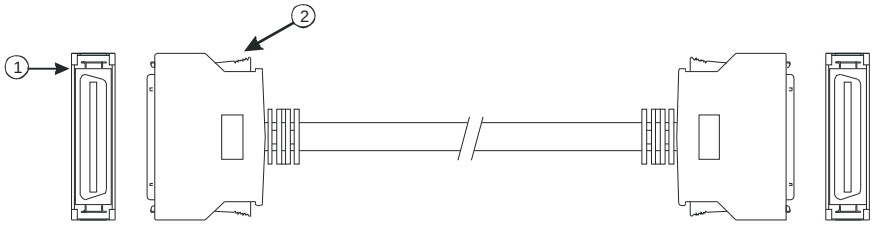
- **AH20MC-5A**



Number	Name	Description
1	Model name	Model name of the module
2	RUN LED indicator (green)	Operating status of the module ON: The module is running. OFF: The module stops running.
3	ERROR LED indicator (red)	Error status of the module Blink: The module is abnormal.
4	Ethernet connection LED indicator (green)	Status of the Ethernet connection ON: The Ethernet connection is being connected. OFF: The Ethernet connection is disconnected.
5	DMCNET connection LED indicator (green)	Status of the DMCNET connection ON: The DMCNET connection is being connected. OFF: The DMCNET connection is disconnected.
6	USB port	Providing the mini USB communication interface
7	RUN/STOP switch	RUN: The user program is executed. STOP: The execution of the user program stops.
8	SD slot	Providing the SD interface
9	Connector	Connecting the module and an I/O extension cable.
10	DMCNET port	Providing the DMCNET communication interface
11	Ethernet port	Providing the Ethernet communication interface
12	Extension port	For updating the firmware
13	Label	Nameplate
14	Set screw	Fixing the module
15	Connector	Connecting the module and a backplane
16	Projection	Fixing the module

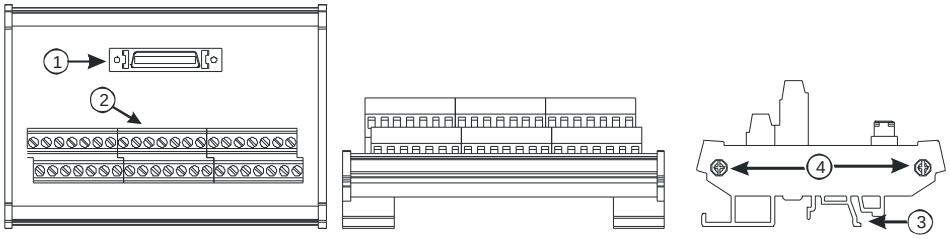
- **The I/O extension cable, and the external terminal module**

1. The I/O extension cable DVPACAB7D10/DVPACAB7E10

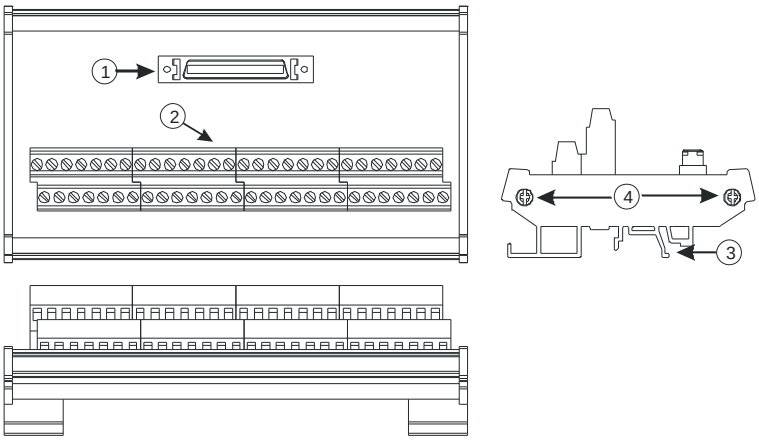


Number	Name	Description
1	Connector	Connecting a motion control module and an external terminal module DVPACAB7D10 is a 36-pin I/O extension cable for AH04HC-5A and AH20MC-5A. DVPACAB7E10 is a 50-pin I/O extension cable for AH10PM-5A.
2	Clip	Fixing the connector

2. The external terminal module for AH04HC-5A and AH20MC-5A: DVPAETB-IO16C



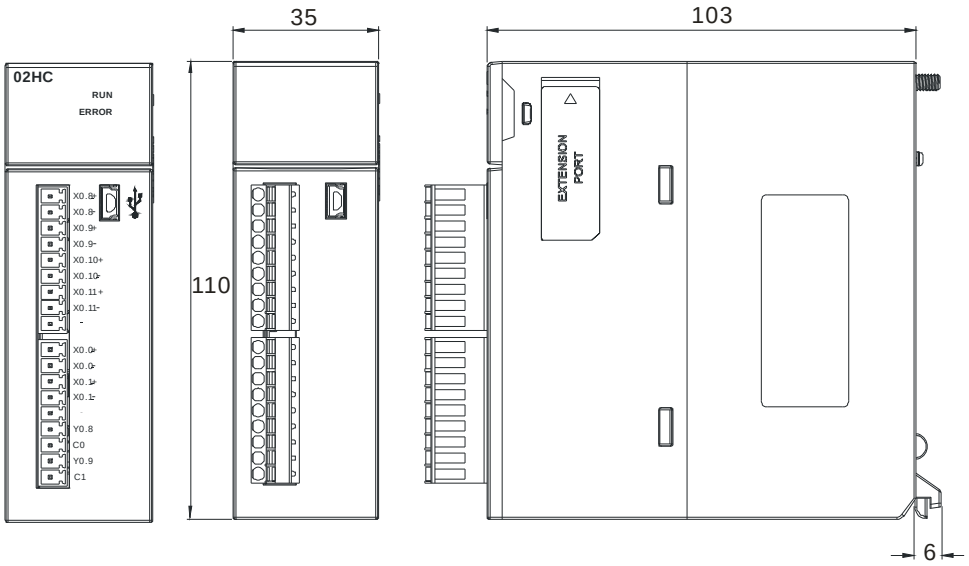
3. The external terminal module for AH10PM-5A: DVPAETB-IO24



Number	Name	Description
1	Connector	Connecting the external terminal module and a motion control module
2	Terminals	Input/Output terminals for wiring
3	Clip	Hanging the external terminal module on a DIN rail
4	Set screw	Fixing the base

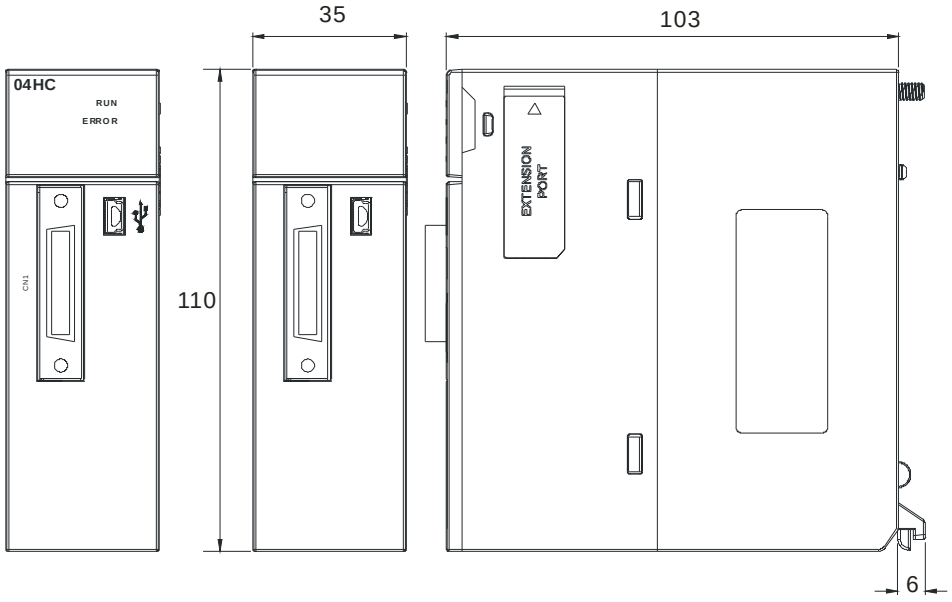
3.9.3 Dimensions

- **AH02HC-5A**



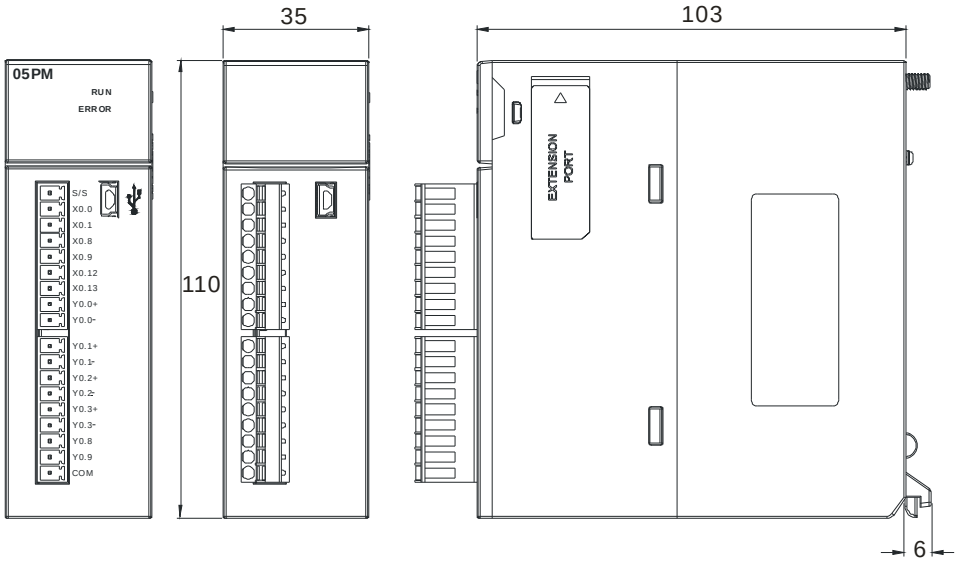
Unit: mm

- **AH04HC-5A**



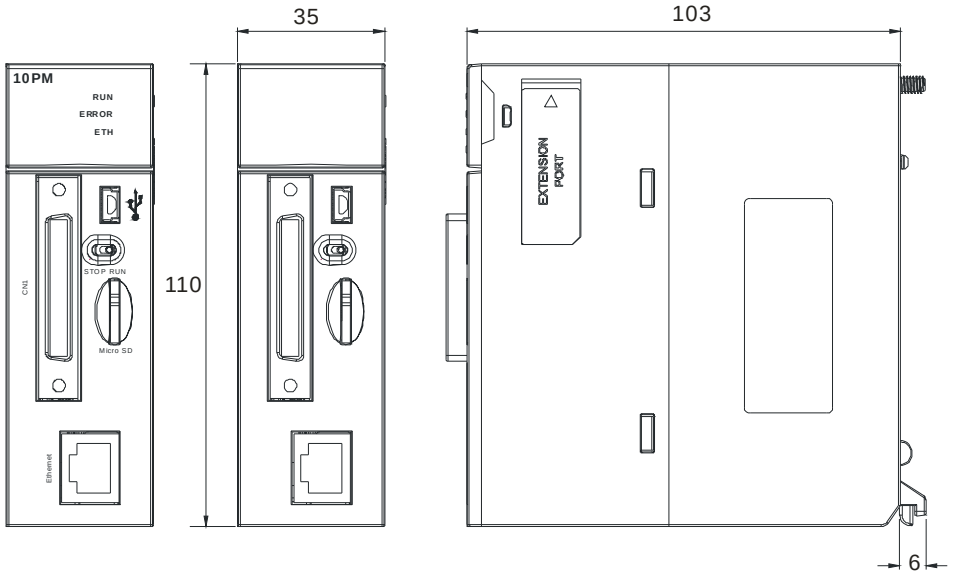
Unit: mm

- **AH05PM-5A**



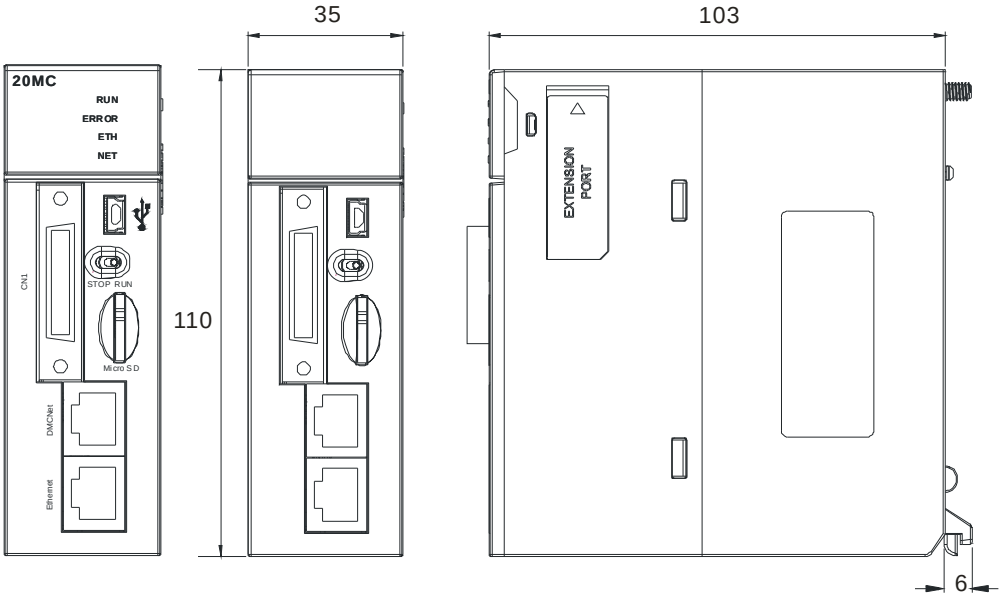
Unit: mm

- **AH10PM-5A**



Unit: mm

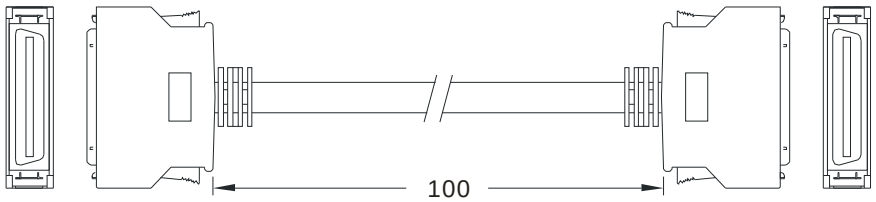
- **AH20MC-5A**



Unit: mm

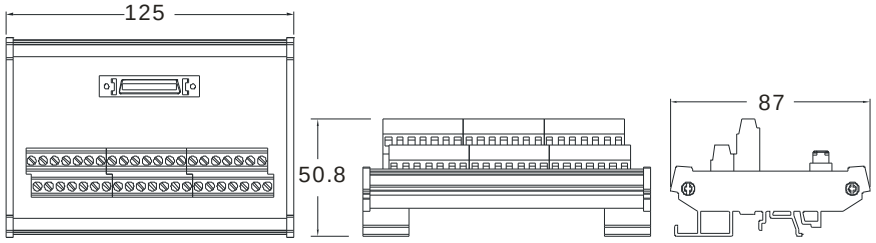
- **The I/O extension cable, and the external terminal module**

1. The 36-pin I/O extension cable for AH04HC-5A and AH20MC-5: DVPACAB7D10



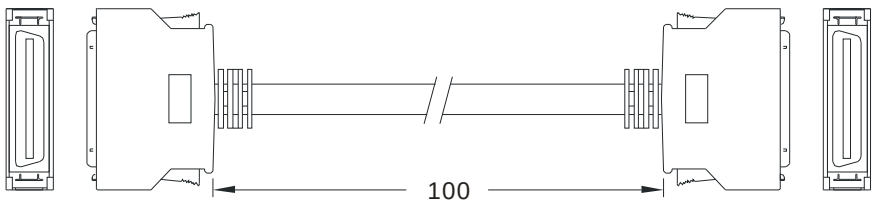
Unit: cm

2. The external terminal module for AH04HC-5A and AH20MC-5A: DVPAETB-IO16C



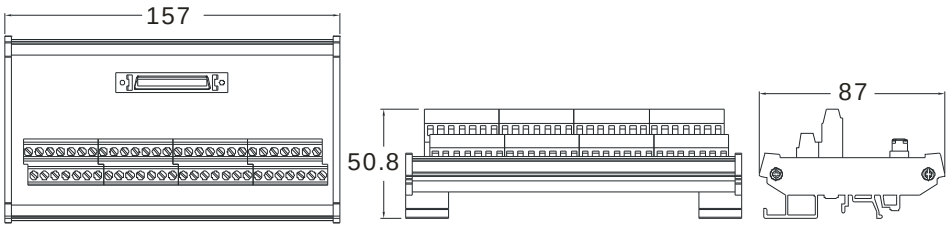
Unit: mm

3. The 50-pin I/O extension cable for AH10PM-5A: DVPACAB7E10



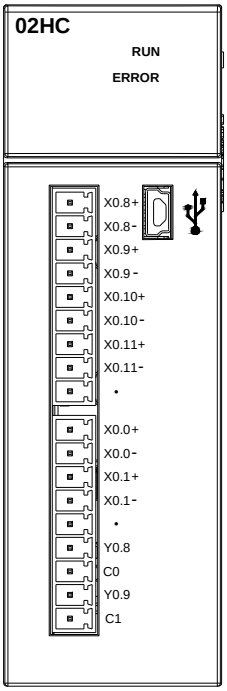
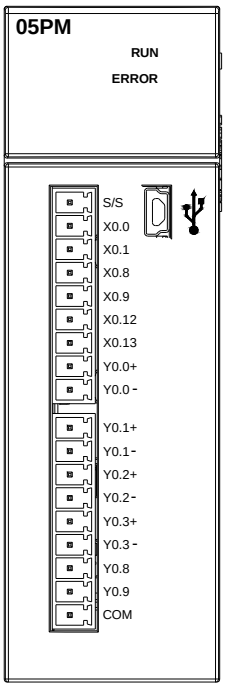
Unit: cm

4. The external terminal module for AH10PM-5A: DVPAETB-IO24

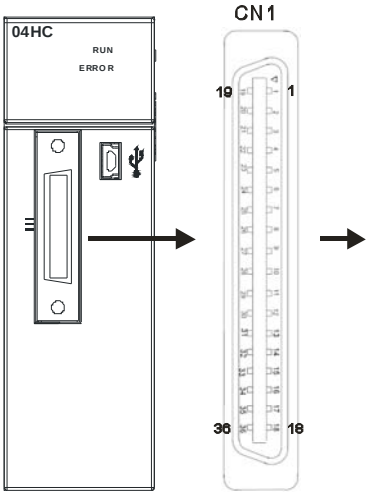


Unit: mm

3.9.4 Arrangement of Input/Output Terminals

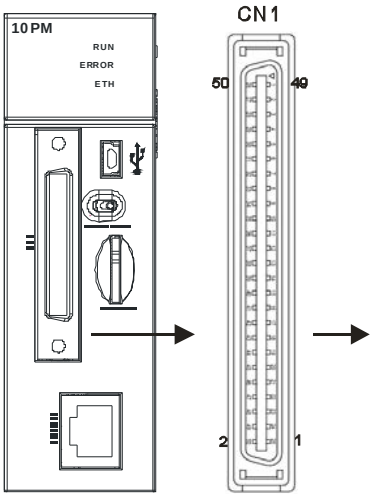
AH02HC-5A	AH05PM-5A
	

- **AH04HC-5A**



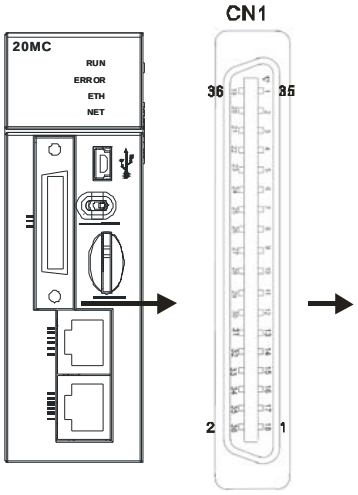
Pin	Terminal	Pin	Terminal	Pin	Terminal	Pin	Terminal
1	X0.8+	2	X0.8-	3	X0.9+	4	X0.9-
5	X0.0+	6	X0.0-	7	X0.10+	8	X0.10-
9	X0.11+	10	X0.11-	11	X0.1+	12	X0.1-
13	X0.12+	14	X0.12-	15	X0.13+	16	X0.13-
17	X0.2+	18	X0.2-	19	X0.14+	20	X0.14-
21	X0.15+	22	X0.15-	23	X0.3+	24	X0.3-
25	N/C	26	N/C	27	N/C	28	N/C
29	Y0.8	30	C0	31	Y0.9	32	C1
33	Y0.10	34	C2	35	Y0.11	36	C3

- **AH10PM-5A**



Pin	Terminal	Pin	Terminal	Pin	Terminal	Pin	Terminal
50	X0.0+	49	X0.0-	48	X0.1+	47	X0.1-
46	X0.2+	45	X0.2-	44	X0.3+	43	X0.3-
42	N/C	41	N/C	40	N/C	39	N/C
38	X0.8	37	X0.9	36	X0.10	35	X0.11
34	X0.12	33	X0.13	32	X0.14	31	X0.15
30	S/S	29	N/C	28	N/C	27	N/C
26	Y0.0+	25	Y0.0-	24	Y0.1+	23	Y0.1-
22	Y0.2+	21	Y0.2-	20	Y0.3+	19	Y0.3-
18	Y0.4+	17	Y0.4-	16	Y0.5+	15	Y0.5-
14	Y0.6+	13	Y0.6-	12	Y0.7+	11	Y0.7-
10	N/C	9	N/C	8	Y0.8	7	C0
6	Y0.9	5	C1	4	Y0.10	3	C2
2	Y0.11	1	C3				

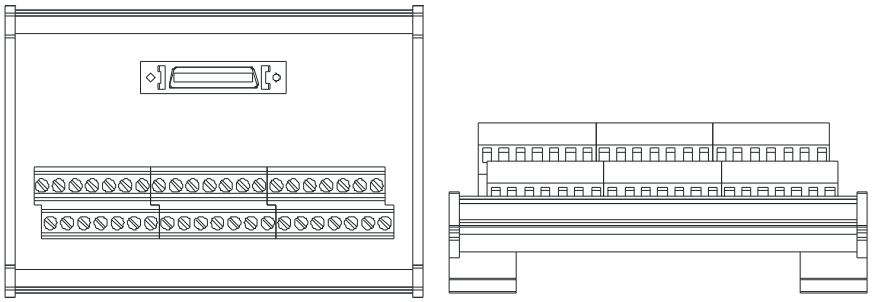
- **AH20MC-5A**



Pin	Terminal	Pin	Terminal	Pin	Terminal	Pin	Terminal
36	X0.8+	35	X0.8-	34	X0.9+	33	X0.9-
32	X0.0+	31	X0.0-	30	X0.10+	29	X0.10-
28	X0.11+	27	X0.11-	26	X0.1+	25	X0.1-
24	X0.12+	23	X0.12-	22	X0.13+	21	X0.13-
20	X0.2+	19	X0.2-	18	X0.14+	17	X0.14-
16	X0.15+	15	X0.15-	14	X0.3+	13	X0.3-
12	N/C	11	N/C	10	N/C	9	N/C
8	Y0.8	7	C0	6	Y0.9	5	C1
4	Y0.10	3	C2	2	Y0.11	1	C3

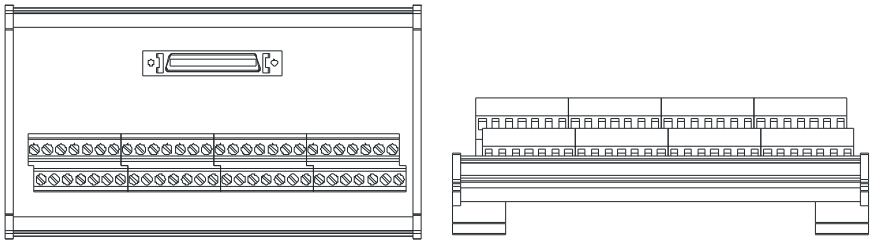
- **The external terminal module**

1. The external terminal module for AH04HC-5A: DVPAETB-IO16C



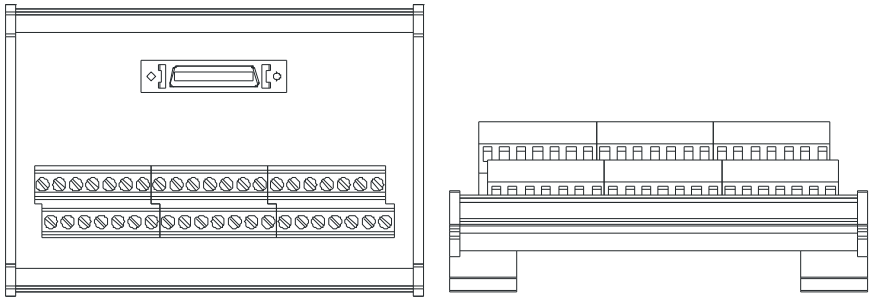
C3	C2	C1	C0	N/C	N/C	X0.3-	X0.15-	X0.14-	X0.2-	X0.13-	X0.12-	X0.1-	X0.11-	X0.10-	X0.0-	X0.9-	X0.8-	24G	24G	FE
Y0.11	Y0.10	Y0.9	Y0.8	N/C	N/C	X0.3+	X0.15+	X0.14+	X0.2+	X0.13+	X0.12+	X0.1+	X0.11+	X0.10+	X0.0+	X0.9+	X0.8+	N/C	24V	24V

2. The external terminal module for AH10PM-5A: DVPAETB-IO24



1st from the upper left	C3	C2	C1	C0	N/C	Y0.7-	Y0.6-	Y0.5-	Y0.4-	Y0.3-	Y0.2-	Y0.1-	Y0.0-	N/C
15th from the upper left	N/C	X0.15	X0.13	X0.11	X0.9	N/C	N/C	X0.3-	X0.2-	X0.1-	X0.0-	24G	24G	FE
1st from the lower left	Y0.11	Y0.10	Y0.9	Y0.8	N/C	Y0.7+	Y0.6+	Y0.5+	Y0.4+	Y0.3+	Y0.2+	Y0.1+	Y0.0+	N/C
15th from the lower left	S/S	X0.14	X0.12	X0.10	X0.8	N/C	N/C	X0.3+	X0.2+	X0.1+	X0.0+	N/C	24V	24V

3. The external terminal module for AH20MC-5A: DVPAETB-IO16C



C3	C2	C1	C0	N/C	N/C	X0.3-	X0.15-	X0.14-	X0.2-	X0.13-	X0.12-	X0.1-	X0.11-	X0.10-	X0.0-	X0.9-	X0.8-	24G	24G	FE
Y0.11	Y0.10	Y0.9	Y0.8	N/C	N/C	X0.3+	X0.15+	X0.14+	X0.2+	X0.13+	X0.12+	X0.1+	X0.11+	X0.10+	X0.0+	X0.9+	X0.8+	N/C	24V	24V

3.10 Specifications for the RTU module

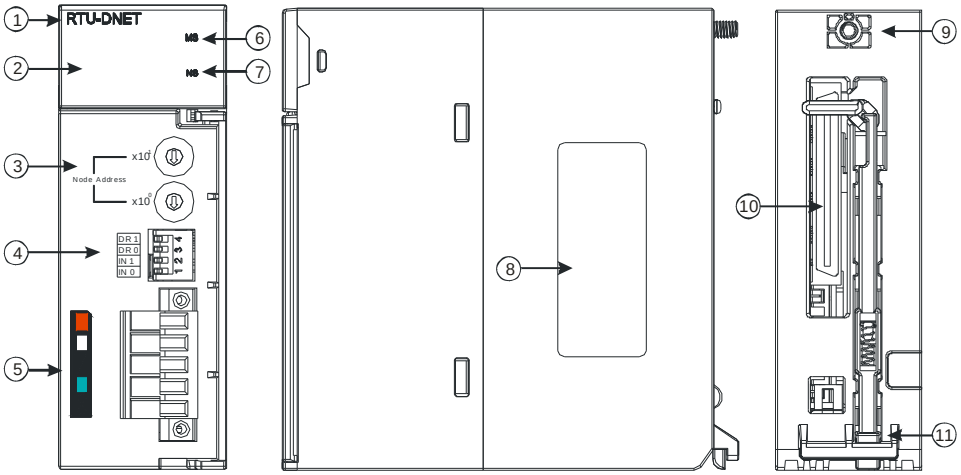
3.10.1 General Specifications

- **AHRTU-DNET-5A**

Item	Specifications
Communication type	CAN
Electrical isolation	500 V DC
Connector type	Removable connector (5.08 mm)
Data type	I/O polled, and explicit
Communication speed	Standard mode: 125 kbps, 250 kbps, and 500 kbps Extended mode: 10 kbps, 20 kbps, 50 kbps, 125 kbps, 250 kbps, 500 kbps, 800 kbps, and 1 Mbps
Communication cable	Delta shielded twisted pair (Two communication cables, two power cables, and one shielded cable)

3.10.2 Profiles

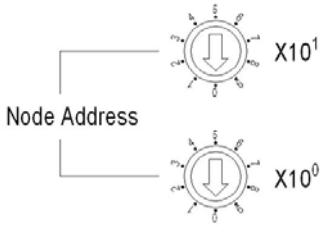
- **AHRTU-DNET-5A**



Number	Name	Description
1	Model name	Model name of the module
2	Seven-segment display	Display
3	Address knob	Setting the address
4	Function switch	Setting the functions
5	DeviceNet connector	DeviceNet is used to interconnect control devices for data exchange.
6	MS LED indicator	Indicating the status of the module
7	NS LED indicator	Indicating the status of the network
8	Label	Nameplate
9	Set screw	Fixing the module
10	Connector	Connecting the module and a backplane
11	Projection	Fixing the module

- **The address knobs**

It is used to set the node address of AHRTU-DNET-5A on a DeviceNet network. (Node addresses range from 0 to 63.)

Setting	Description	
0…63	Available nodes on a DeviceNet network	
64…99	Unavailable nodes on a DeviceNet network	

Example: If users want to set the communication address of AHRTU-DNET-5A to 26, they can turn the knob corresponding to $x10^1$ to 2, and turn the knob corresponding to $x10^0$ to 6.

Note:

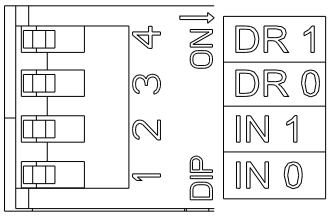
1. When the power supply is cut off, the node address is set. After the setting of the node address is complete, AHRTU-DNET-5A can be supplied with power.
2. If AHRTU-DNET-5A is running, changing the node address is unavailable.
3. Please use a slotted screwdriver to turn the knobs with care, and do not scrape them.

- **The function switch**

The function switch provides the following functions:

1. Setting the working mode (IN 0)
2. Setting the transmission speed of a DeviceNet network (DR 0~DR 1)

DR1	DR0	Transmission speed
OFF	OFF	125 kbps
OFF	ON	250 kbps
ON	OFF	500 kbps
ON	ON	Entering the extendable serial transmission speed mode



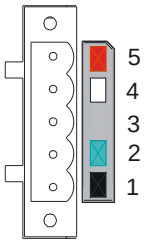
IN1	Reserved	
IN0	ON	If the slave is disconnected, the previous I/O data is retained.
	OFF	If the slave is disconnected, the previous I/O data is cleared.

Note:

1. When the power supply is cut off, the functions are set. After the setting of the functions is complete, AHRTU-DNET-5A can be supplied with power.
2. If AHRTU-DNET-5A is running, changing the functions is unavailable.
3. Please use a slotted screwdriver to adjust the DIP switch with care, and do not scrape them.

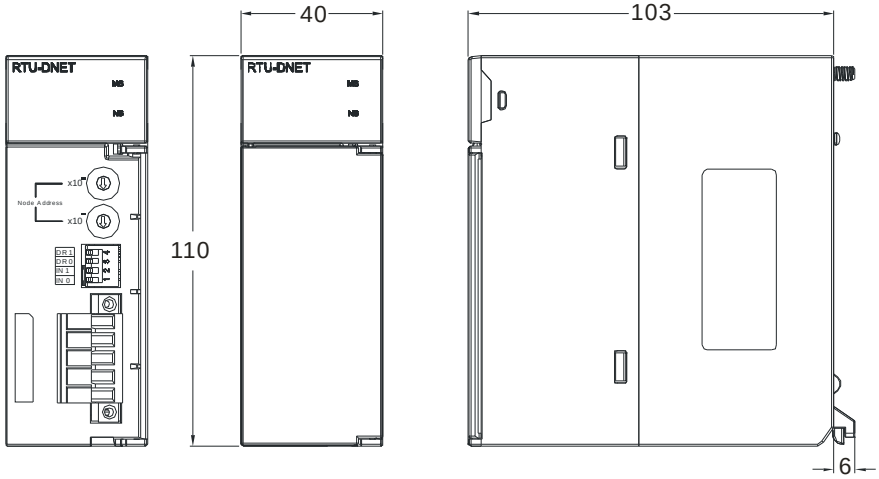
- **The DeviceNet connector**

Pin	Signal	Color	Description
5	V+	Red	24 V DC
4	CAN_H	White	Signal +
3	Ground	-	It is connected to a shielded cable.
2	CAN_L	Blue	Signal -
1	V-	Black	0 V DC



3.10.3 Dimensions

- **AHRTU-DNET-5A**

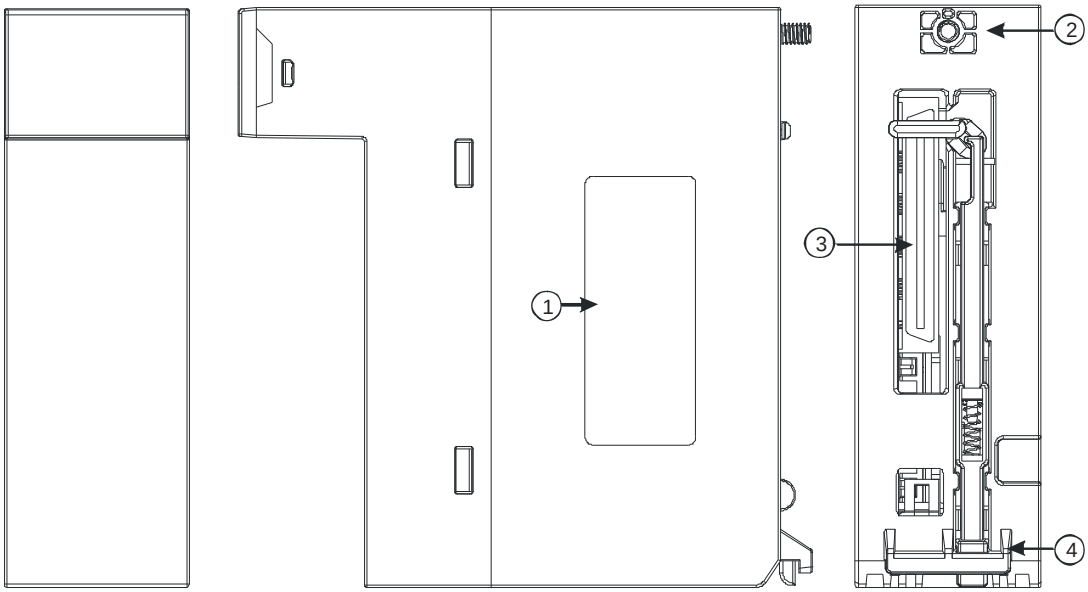


Unit: mm

3.11 Space Module and Extension Cables

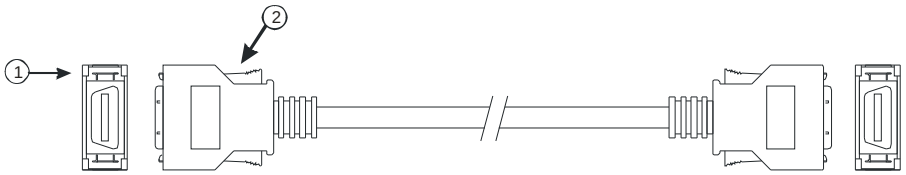
3.11.1 Profiles

- **The space module AHASP01-5A**



Number	Name	Description
1	Label	Nameplate
2	Set screw	Fixing the module
3	Connector	Connecting the module and a backplane
4	Projection	Fixing the module

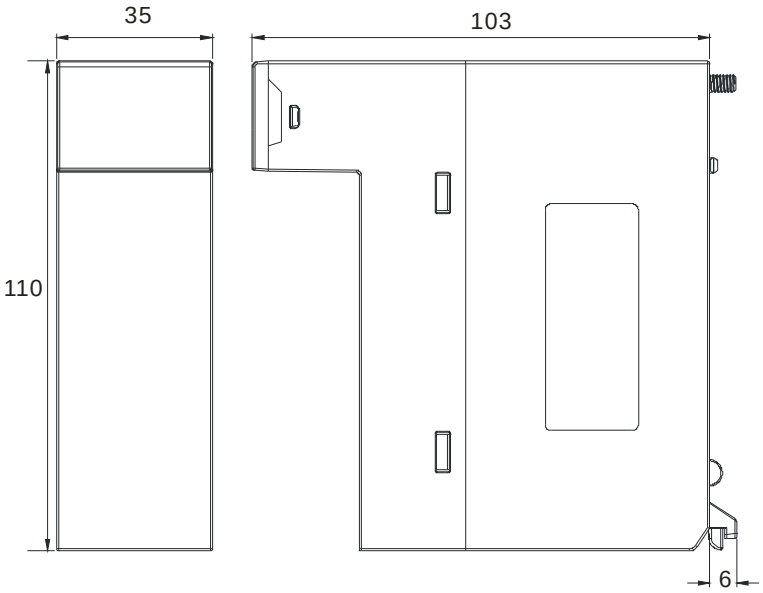
- **The extension cable**



Number	Name	Description
1	Connector	Connecting backplanes 1. AHACAB06-5A 2. AHACAB10-5A 3. AHACAB15-5A 4. AHACAB30-5A
2	Clip	Fixing the connector

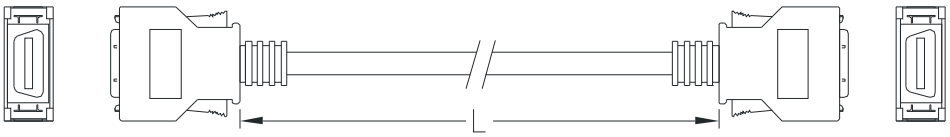
3.11.2 Dimensions

- **The space module AHASP01-5A**



Unit: mm

- **The extension cable**



Extension cable	Length
AHACAB06-5A	0.6 m
AHACAB10-5A	1.0 m
AHACAB15-5A	1.5 m
AHACAB30-5A	3.0 m

Chapter 4 Addressing

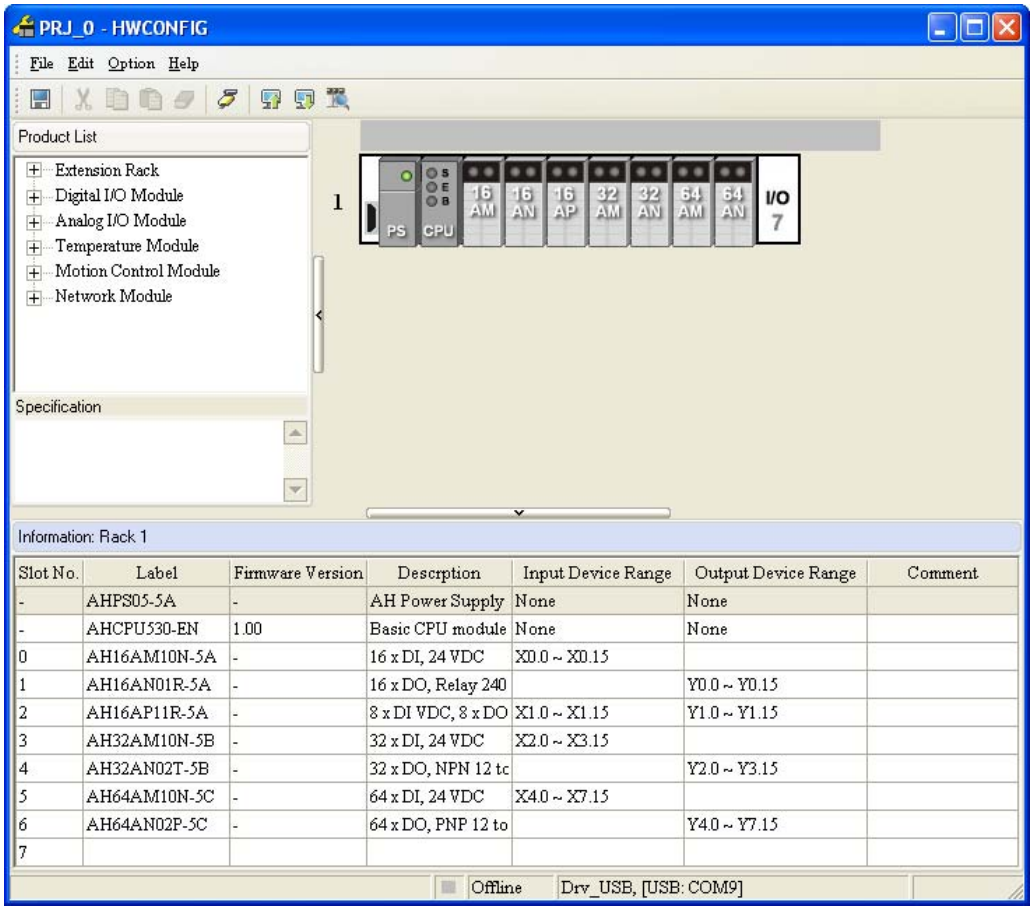
Table of Contents

4.1 I/O Addressing

The distribution of input devices and that of output devices to an AH500 series input/output module installed on a local backplane are explained in this chapter.

HWCONFIG in ISPSoft

The following is the **HWCONFIG** window in ISPSoft. Please refer to chapter 8 in AH500 Operation Manual for more information related to the hardware configuration.



The software-defined address

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

The user-defined address

Users can assign a start address to an input/output module through HWCONFIG in ISPSoft. The advantage is that a start address assigned to an input/output module is the address set by users. Besides, users can write a program easily.

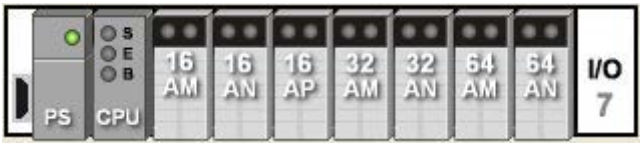
4.2 Software-defined Addresses

4.2.1 Start Addresses for Digital Input/Output Modules

Input/Output devices are automatically assigned to a digital input/output module through HWCONFIG in ISPSoft according to the number of inputs/outputs which the digital input/output module has. The default start addresses are shown below.

- AH16AM10N-5A: There are 16 inputs. The **input device range** occupies 16 bits. (X**n**.0~X**n**.15)

- AH16AN01R-5A: There are 16 inputs. The **input device range** occupies 16 bits. (Y**n**.0~Y**n**.15)
- AH16AP11R-5A: There are 8 inputs, and 8 outputs. The **input device range** occupies 16 bits, and the **output device range** occupies 16 bits. (X**n**.0~X**n**.15, and Y**n**.0~Y**n**.15)
- AH32AM10N-5B: There are 32 inputs. The **input device range** occupies 32 bits. (X**n**.0~X**n+1**.15)
- AH32AN02T-5B: There are 32 outputs. The **output device range** occupies 32 bits. (Y**n**.0~Y**n+1**.15)
- AH64AM10N-5C: There are 64 inputs. The **input device range** occupies 64 bits. (X**n**.0~X**n+3**.15)
- AH64AN02P-5C: There are 64 inputs. The **output device range** occupies 64 bits. (Y**n**.0~Y**n+3**.15)



Slot No.	Label	Firmware Version	Description	Input Device Range	Output Device Range	Comment
-	AHPS05-5A	-	AH Power Supply Module	None	None	
-	AHCPU530-EN	1.00	Basic CPU module building with Ethernet	None	None	
0	AH16AM10N-5A	-	16 x DI, 24 VDC	X0.0 ~ X0.15		
1	AH16AN01R-5A	-	16 x DO, Relay 240 VAC/24 VDC		Y0.0 ~ Y0.15	
2	AH16AP11R-5A	-	8 x DI VDC, 8 x DO VAC/VDC	X1.0 ~ X1.15	Y1.0 ~ Y1.15	
3	AH32AM10N-5B	-	32 x DI, 24 VDC	X2.0 ~ X3.15		
4	AH32AN02T-5B	-	32 x DO, NPN 12 to 24 VDC		Y2.0 ~ Y3.15	
5	AH64AM10N-5C	-	64 x DI, 24 VDC	X4.0 ~ X7.15		
6	AH64AN02P-5C	-	64 x DO, PNP 12 to 24 VDC		Y4.0 ~ Y7.15	
7						

4.2.2 Start Addresses for Analog Input/Output Modules

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

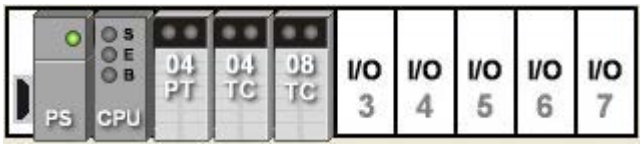
- AH04AD-5A: There are 4 input channels. The **input device range** occupies 8 data registers.
- AH08AD-5B: There are 8 input channels. The **input device range** occupies 16 data registers
- AH06XA-5A: There are 4 input channels, and 2 output channels. The **input device range** occupies 8 data registers, and the **output device range** occupies 4 data registers.
- AH04DA-5A: There are 4 output channels. The **output device range** occupies 8 data registers.
- AH08DA-5B: There are 8 output channels. The **output device range** occupies 16 data registers.

Slot No.	Label	Firmware Version	Description	Input Device Range	Output Device Range	Comment
-	AHPS05-5A	-	AH Power Supply Module	None	None	
-	AHCPU530-EN	1.00	Basic CPU module building with Ethernet	None	None	
0	AH04AD-5A	1.00	4 x AI 16bit	D0 ~ D7		
1	AH08AD-5B	1.00	8 x AI 16bit	D8 ~ D23		
2	AH06XA-5A	1.00	4 x 16bit AI, 2 x 16bit AO	D24 ~ D31	D32 ~ D35	
3	AH04DA-5A	1.00	4 x AO 16bit		D36 ~ D43	
4	AH08DA-5B	1.00	4 x AO 16bit		D44 ~ D59	
5						
6						
7						

4.2.3 Start Addresses for Temperature Measurement Modules

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

- AH04PT-5A: There are 4 input channels. The **input device range** occupies 8 data registers.
- AH04TC-5A: There are 4 input channels. The **input device range** occupies 8 data registers.
- AH08TC-5A: There are 8 input channels. The **input device range** occupies 16 data registers



Slot No.	Label	Firmware Version	Descrption	Input Device Range	Output Device Range	Comment
-	AHPS05-5A	-	AH Power Supply	None	None	
-	AHCPU530-EN	1.00	Basic CPU modul	None	None	
0	AH04PT-5A	1.00	4 x 3/4 wires RTD	D0 ~ D7		
1	AH04TC-5A	1.00	4 x 24bit TC input	D8 ~ D15		
2	AH08TC-5A	1.00	8 x 24bit TC input	D16 ~ D31		
3						
4						
5						
6						
7						

4.2.4 Start Addresses for Motion Control Modules

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

- AH02HC-5A: There are 2 input channels. The **input device range** occupies 14 data registers, and the **output device range** occupies 2 data registers.
- AH04HC-5A: There are 4 input channels. The **input device range** occupies 28 data registers, and the **output device range** occupies 4 data registers.
- AH10PM-5A: No input registers and no output registers are assigned to it. Please refer to AH5000 Motion Control Module Manual for more information about the parameter setting.
- AH20MC-5A: No input registers and no output registers are assigned to it. Please refer to AH5000 Motion Control Module Manual for more information about the parameter setting.

Slot No.	Label	Firmware Version	Descrption	Input Device Range	Output Device Range	Comment
-	AHPS05-5A	-	AH Power Supply Module	None	None	
-	AHCPU530-EN	1.00	Basic CPU module building with Ethernet	None	None	
0	AH02HC-5A	1.00	High speed counter, 2 channels	D0 ~ D13	D14 ~ D15	
1	AH04HC-5A	1.00	High speed counter, 4 channels	D16 ~ D43	D44 ~ D47	
2	AH10PM-5A	1.00	6-axis pulse-train MC	None	None	
3	AH20MC-5A	1.00	12-axis DMCNET MC	None	None	
4						
5						
6						
7						

4.2.5 Start Addresses for Network Modules

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

- AH10EN-5A: The **input device range** occupies 20 data registers, and the **output device range** occupies 20 data registers.
- AH10SCM-5A: The **input device range** occupies 18 data registers.
- AH10DNET-5A: No input registers and no output registers are assigned to it.

Slot No.	Label	Firmware Version	Descrption	Input Device Range	Output Device Range	Comment
-	AHPS05-5A	-	AH Power Supply Module	None	None	
-	AHCPU530-EN	1.00	Basic CPU module building with Ethernet	None	None	
0	AH10EN-5A	1.00	Ethernet master module	D0 ~ D19	D20 ~ D39	
1	AH10SCM-5A	1.00	Serial communication module	D40 ~ D57		
2	AH10DNET-5A	1.00	DeviceNet scanner	None	None	
3	AH10PFBS-5A	1.00	Profibus slave module	None	None	
4						
5						
6						
7						

4.3 User-defined Addresses

4.3.1 Start Addresses for Digital Input/Output Modules

Users can assign input devices and output devices to a digital input/output module through HWCONFIG in ISPSoft. The input devices should be within the range between X0.0 and X511.15, and the output devices should be within the range between Y0.0 and Y511.15. Take AH16AP11R-5A for example. The original input devices are X0.0~X0.15, and the original output devices are Y0.0~Y0.15. Users can change the **input device range** from X0.0~X0.15 to X10.0~X10.15, and change the **output device range** from Y0.0~Y0.15 to Y20.0~Y20.15.

- The default input/output device range: X0.0~X0.15, and Y0.0~Y0.15

Slot No.	Label	Firmware Version	Descrption	Input Device Range	Output Device Range	Comment
-	AHPS05-5A	-	AH Power Supply Module	None	None	
-	AHCPU530-EN	1.00	Basic CPU module building with Ethernet	None	None	
0	AH16AP11R-5A	-	8 x DI VDC, 8 x DO VAC/VDC	X0.0 ~ X0.15	Y0.0 ~ Y0.15	
1						
2						
3						
4						
5						
6						
7						

- The user-defined input/output device range: X10.0~X10.15, and Y20.0~Y20.15

Slot No.	Label	Firmware Version	Description	Input Device Range	Output Device Range	Comment
-	AHPS05-5A	-	AH Power Supply Module	None	None	
-	AHCPU530-EN	1.00	Basic CPU module building with Ethernet	None	None	
0	AH16AP11R-5A	-	8 x DI VDC, 8 x DO VAC/VDC	X10.0 ~ X10.15	Y20.0 ~ Y20.15	
1						
2						
3						
4						
5						
6						
7						

4.3.2 Start Addresses for Analog Input/Output Modules

Users can assign input registers and output registers to an analog input/output module through HWCONFIG in ISPSoft. The input registers and the output registers should be within the range between D0 and D65535. Take AH06XA-5A for example. The original input registers are D0~D7, and the original output registers are D8~D11. Users can change the **input device range** from D0~D7 to D50~D57, and change the **output device range** from D8~D11 to D100~D103.

- The default input/output device range: D0~D7, and D8~D11

Slot No.	Label	Firmware Version	Description	Input Device Range	Output Device Range	Comment
-	AHPS05-5A	-	AH Power Supply Module	None	None	
-	AHCPU530-EN	1.00	Basic CPU module building with Ethernet	None	None	
0	AH06XA-5A	1.00	4 x 16bit AI, 2 x 16bit AO	D0 ~ D7	D8 ~ D11	
1						
2						
3						
4						
5						
6						
7						

- The user-defined input/output device range: D50~D57, and D100~D103

Slot No.	Label	Firmware Version	Description	Input Device Range	Output Device Range	Comment
-	AHPS05-5A	-	AH Power Supply Module	None	None	
-	AHCPU530-EN	1.00	Basic CPU module building with Ethernet	None	None	
0	AH06XA-5A	1.00	4 x 16bit AI, 2 x 16bit AO	D50 ~ D57	D100 ~ D103	
1						
2						
3						
4						
5						
6						
7						

4.3.3 Start Addresses for Temperature Measurement Modules

Users can assign input registers to a temperature measurement module through HWCONFIG in ISPSoft. The input registers should be within the range between D0 and D65535. Take AH08TC-5A for example. The original input registers are D0~D15. Users can change the **input device range** from D0~D15 to D60~D75.

- The default input device range: D0~D15

Slot No.	Label	Firmware Versi...	Description	Input Device Range	Output Device Range	Comment
-	AHPS05-5A	-	AH Power Supply	None	None	
-	AHCPU530-EN	1.00	Basic CPU modul	None	None	
0	AH08TC-5A	1.00	8 x 24bit TC input	D0 ~ D15		
1						
2						
3						
4						
5						
6						
7						

- The user-defined input device range: D60~D75

Slot No.	Label	Firmware Versi...	Description	Input Device Range	Output Device Range	Comment
-	AHPS05-5A	-	AH Power Supply	None	None	
-	AHCPU530-EN	1.00	Basic CPU modul	None	None	
0	AH08TC-5A	1.00	8 x 24bit TC input	D60 ~ D75		
1						
2						
3						
4						
5						
6						
7						

4.3.4 Start Addresses for Motion Control Modules

Users can assign input registers and output registers to a motion control module through HWCONFIG in ISPSoft. The input registers should be within the range between D0 and D65535, and the output registers should be within the range between D0 and D65535. Take AH04HC-5A for example. The original input registers are D0~D27. Users can change the **input device range** from D0~D27 to D200~D227.

- The default input device range: D0~D27

Slot No.	Label	Firmware Version	Description	Input Device Range	Output Device Range	Comment
-	AHPS05-5A	-	AH Power Supply Module	None	None	
-	AHCPU530-EN	1.00	Basic CPU module building with Ethernet	None	None	
0	AH04HC-5A	1.00	High speed counter, 4 channels	D0 ~ D27	D28 ~ D31	
1						
2						
3						
4						

- The user-defined input device range: D200~D227

Slot No.	Label	Firmware Version	Description	Input Device Range	Output Device Range	Comment
-	AHPS05-5A	-	AH Power Supply Module	None	None	
-	AHCPU530-EN	1.00	Basic CPU module building with Ethernet	None	None	
0	AH04HC-5A	1.00	High speed counter, 4 channels	D200 ~ D227	D28 ~ D31	
1						
2						
3						
4						

4.3.5 Start Addresses for Network Modules

Users can assign input registers and output registers to a network module through HWCONFIG in ISPSoft. The input registers should be within the range between D0 and D65535, and the output registers should be within the range between D0 and D65535. Take AH10EN-5A for example. The original input registers are D0~D19. Users can change the **input device range** from D0~D19 to D150~D169.

- The default input device range: D0~D19

Slot No.	Label	Firmware Version	Description	Input Device Range	Output Device Range	Comment
-	AHPS05-5A	-	AH Power Supply Module	None	None	
-	AHCPU530-EN	1.00	Basic CPU module building with Ethernet	None	None	
0	AH10EN-5A	1.00	Ethernet master module	D0 ~ D19	D20 ~ D39	
1						
2						
3						
4						

- The user-defined input device range: D150~D169

Slot No.	Label	Firmware Version	Description	Input Device Range	Output Device Range	Comment
-	AHPS05-5A	-	AH Power Supply Module	None	None	
-	AHCPU530-EN	1.00	Basic CPU module building with Ethernet	None	None	
0	AH10EN-5A	1.00	Ethernet master module	D150 ~ D169	D20 ~ D39	
1						
2						
3						
4						

Chapter 5 Wiring

Table of Contents

5.1 Wiring

- **The points for attention**

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

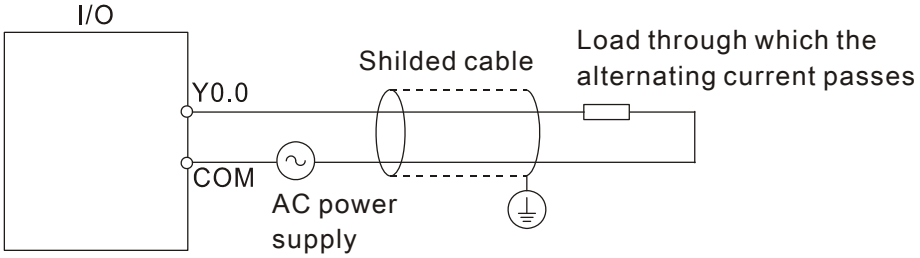
- **Wiring an I/O module**

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

(2) Please use single-core cables or twin-core cables. The diameters of the cables used should be within the range between 12 AWG and 22 AWG. The torques applied to the screw terminals should be within the range between 5 kg-cm (4.3 lb-in) and 8 kg-cm (6.9 lb-in). Please use copper conducting wires. The temperature of the copper conducting wires should be 60/75°C.

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

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



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

(6) Please keep 24 V DC input cables separate from 110 V AC input cables and 220 V DC input cables.

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

- **Grounding a cable**

  Please ground a cable according to the steps below.

  (1) Please ground a cable correctly.

  (2) The area of the cross-section of the cable which is grounded should be 2 mm^2 or larger than 2 mm^2.

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

Note

(1) The 110 V/220 V power cable and the 24 V DC power cable should be thick cables. (The area of the cross-section of the cable is 2 mm^2, and the diameter of the cable is 14 AWG.) Be sure to twist the power cables at terminal screws. To prevent the short circuit which results from loose screws, users need to use solderless terminals with insulation sleeves.

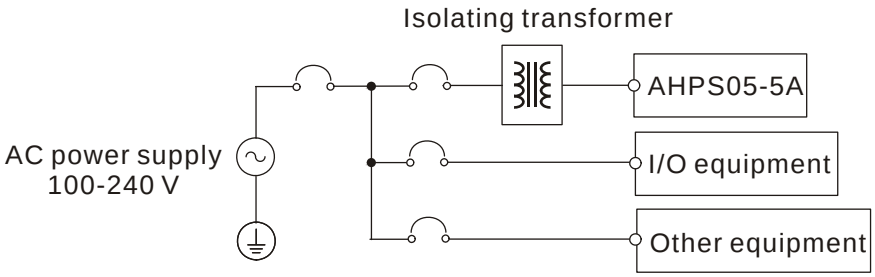
(2) If cables are connected to the terminals LG and FG, the cables need to be grounded. Do not connect LG and FG to any devices. If LG and FG are not grounded, the PLC will be susceptible to noise. Since LG have potential, users will get an electric shock if they touch metal parts.

5.2 Power Wiring

5.2.1 Precautions

- **The power wiring**

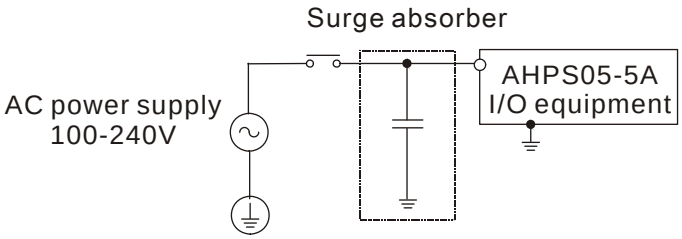
  (a) Please separate the power cable of AHPS05-5A from the power cables for the I/O device and the power device. If there is much noise, connect an isolating transformer.



  (b) The 110 V AC cable, the 220 V AC cable, and the 24 V DC cable should be twisted, and connected to a module within a short distance.

  (c) Do not bundle 110 V AC cable, the 220 V AC cable, the 24 V DC cable, the main circuit, and the I/O signal cable together. Besides, it is recommended that the distance between adjacent cables is 100 millimeters.

  (d) To prevent the surge resulting from lightning, please install a surge absorber as follows.

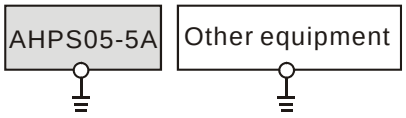


Note:

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

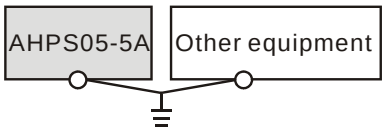
5.2.2 Ground

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



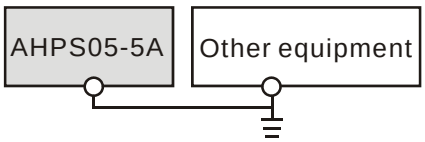
The single-point ground is better.

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



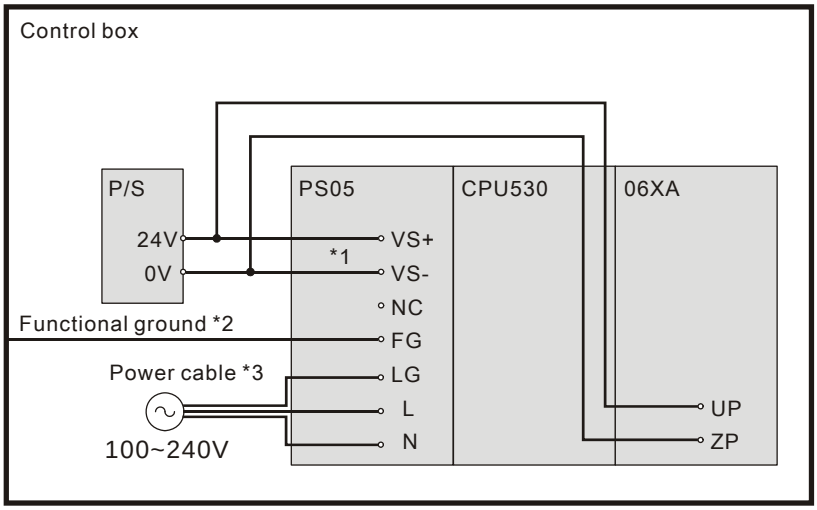
The common-point ground is permitted.

- Users can not ground equipment in the way shown on the right.



The equipment can not be grounded in this way.

5.2.3 Wiring the Power Supply Module



*1. The 24 V power supply is connected to VS+ and VS- on the power supply module. VS+ and VS- can be used to detect whether the voltage of the external power supply is stable.

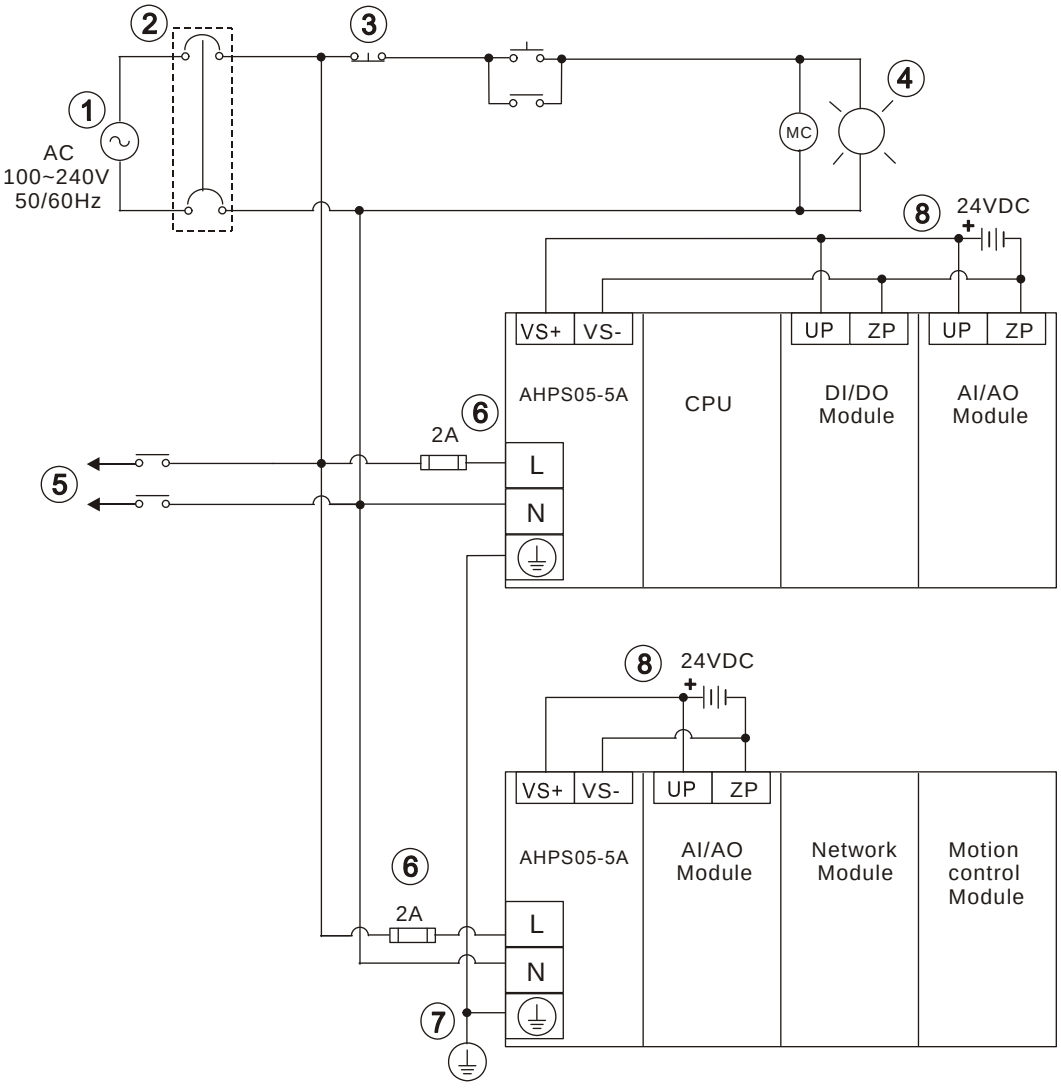
*2. FG on the power supply module is connected to the control box as the functional ground.

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

The power input of AHPS05-5A is the AC input. Users have to pay attention to the following points when they use AHPS05-5A.

- The alternating-current input voltage is within the range between 100 V AC and 240 V AC. Please connect the power supply to the terminals L and N. If the 110 V AC or the 220 V AC power supply is connected to the input terminals VS+ and VS-, the PLC will be damaged.
- In order to ensure that the 24 V DC external power supply is provided stably, it can be connected to VS+ and VS-. If the PLC detects that the voltage of the external power supply is lower than the working voltage, users can write a protective program.

- The length of the cable connecting with the ground is 1.6 millimeters.
- If the power cut lasts for less than 10 milliseconds, the PLC keeps running without being affected. If the power cut lasts for long, or if the voltage of the power supply decreases, the PLC stops running, and there is no output. When the power supply returns to normal, the PLC resumes. (Users have to notice that there are latched auxiliary relays and registers in the PLC when they write the program.)
- Please use single-core cables or multicore cables. The diameters of the cables used should be with the range between 12 AWG and 22 AWG. The torque applied to the terminal screws should be 9.50 kg-cm (8.25 lb-in). Please use copper conducting wires. The temperature of the copper conducting wires should be 60/75°C.
- Safety wiring: The PLC controls many devices, and the activity of any device affects the activity of other devices. If any device breaks down, the whole automatic control system goes out of control, and the danger occurs. The protection circuit is as follows.



①	Alternating-current power supply: 100~240 V AC, and 50/60 Hz
②	Circuit breaker
③	Emergency stop: The emergency stop button can be used to cut off the power when an emergency occurs.
④	Power indicator
⑤	Load through which the alternating current passes

⑥	2 A Fuse
⑦	The ground impedance is less than 100 Ω.
⑧	Direct-current power supply: 24 V DC

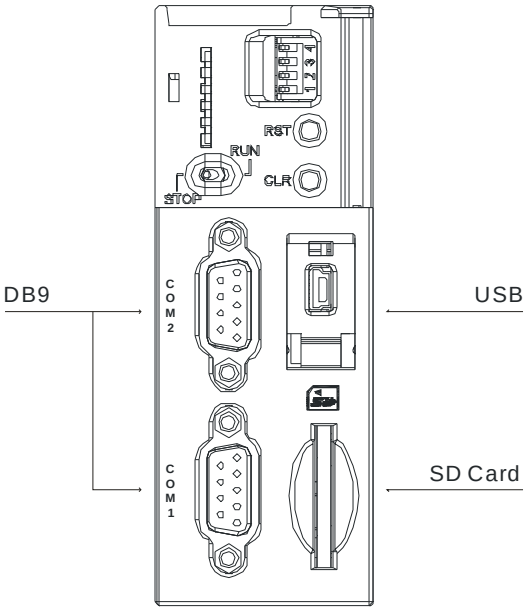
5.2.4 Power Consumption

Classification	Model name	Internal power consumption	External power consumption
CPU module	AHCPU500-RS2	2 W	-
	AHCPU510-RS2	2 W	-
	AHCPU520-RS2	2 W	-
	AHCPU530-RS2	2 W	-
	AHCPU500-EN	2 W	-
	AHCPU510-EN	2 W	-
	AHCPU520-EN	2 W	-
	AHCPU530-EN	2 W	-
Main backplane	AHBP04M1-5A	10 mW	-
	AHBP06M1-5A	10 mW	-
	AHBP08M1-5A	10 mW	-
	AHBP12M1-5A	10 mW	-
Extension backplane	AHBP06E1-5A	1.41 W	-
	AHBP08E1-5A	1.41 W	-
Digital I/O module	AH16AM10N-5A	0.1 W	1.9 W
	AH16AM30N-5A	0.1 W	-
	AH16AN01P-5A	0.2 W	0.4 W
	AH16AN01R-5A	2.1 W	-
	AH16AN01S-5A	0.6 W	-
	AH16AN01T-5A	0.2 W	0.4 W
	AH16AP11P-5A	0.2 W	0.2 W
	AH16AP11R-5A	1.1 W	-
	AH16AP11T-5A	0.2 W	0.2 W
	AH32AM10N-5A	0.2 W	3.8 W
	AH32AM10N-5B	0.2 W	3.8 W
	AH32AM10N-5C	0.2 W	3.8 W
	AH32AN02P-5A	0.4 W	0.8 W
	AH32AN02P-5B	0.4 W	0.8 W
	AH32AN02P-5C	0.4 W	0.8 W
	AH32AN02T-5A	0.4 W	0.8 W
	AH32AN02T-5B	0.4 W	0.8 W
	AH32AN02T-5C	0.4 W	0.8 W

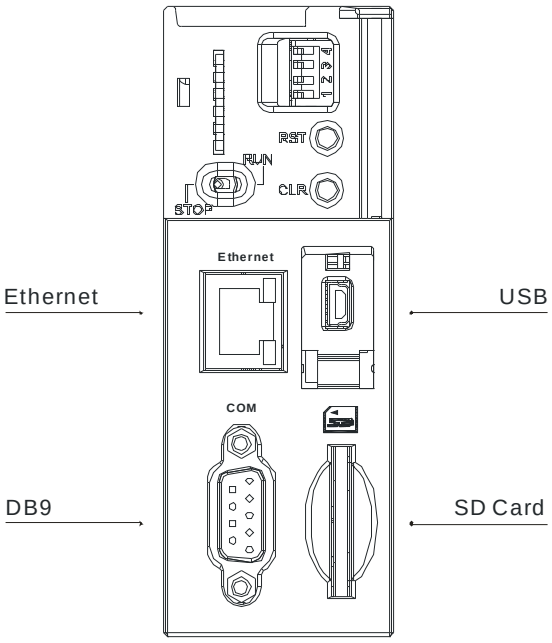
Classification	Model name	Internal power consumption	External power consumption
Digital I/O module	AH64AM10N-5C	0.2 W	4.9 W
	AH64AN02P-5C	0.6 W	1.5 W
	AH64AN02T-5C	0.6 W	1.5 W
Analog I/O module	AH04AD-5A	0.35 W	1 W
	AH04DA-5A	0.34 W	2.6 W
	AH06XA-5A	0.34 W	1.4 W
	AH08AD-5B	1.9 W	-
	AH08AD-5C	1.6 W	-
	AH08DA-5B	2.5 W	2.2 W
Temperature measurement module	AH04PT-5A	2 W	-
	AH04TC-5A	1.5 W	-
	AH08TC-5A	1.5 W	-
Motion control module	AH02HC-5A	2.4 W	-
	AH04HC-5A	2.4 W	-
	AH05PM-5A	2.7 W	-
	AH10PM-5A	2.7 W	-
	AH20MC-5A	3 W	-
Network module	AH10EN-5A	1.6 W	-
	AH10SCM-5A	1.2 W	-
	AH10DNET-5A	0.9 W	0.72 W
	AH10PFBS-5A	1 W	-
RTU module	AHRTU-DNET-5A	0.75 W	0.72 W

5.3 Wiring CPU Modules

- **AHCPU530-RS2**

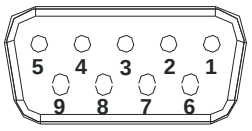


- **AHCPU530-EN**



- **The DB9 connector**

Pin	Function		
	RS485	RS422	RS232
1	D+	RX+	N/C
2	N/C	N/C	RX
3	N/C	N/C	TX
4	N/C	TX2	N/C
5	Ground	Ground	Ground
6	D-	RX-	N/C
7	N/C	N/C	N/C
8	N/C	N/C	N/C
9	N/C	TX-	N/C

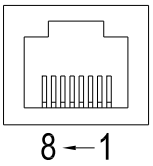


- **The USB port**

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

- **The Ethernet port**

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

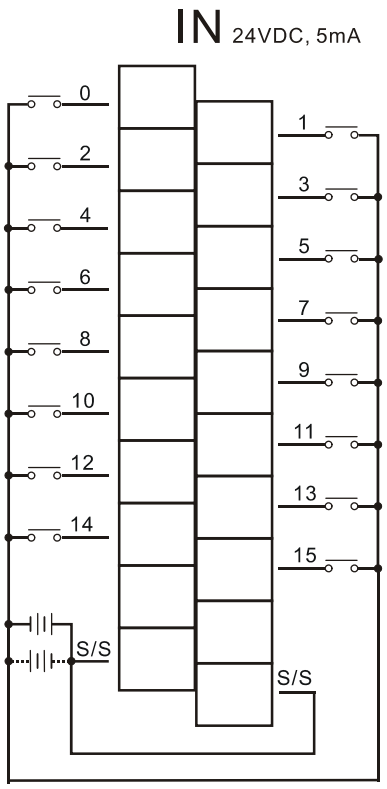


5.4 Wiring Digital Input/Output Modules

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

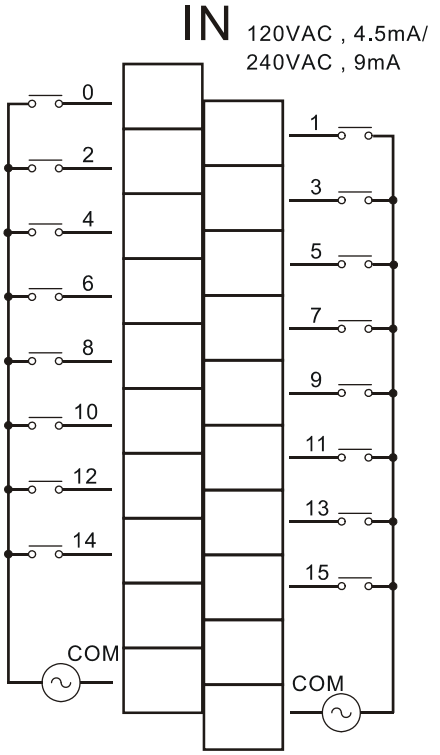
5.4.1 Wiring AH16AM10N-5A

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



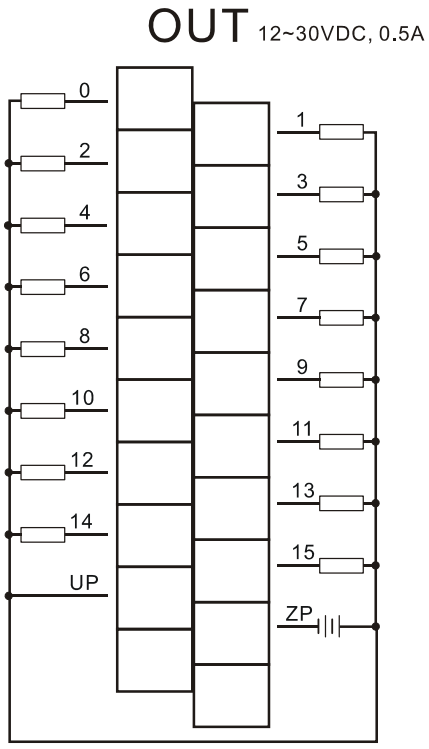
5.4.2 Wiring AH16AM30N-5A

Input form	Alternating current
Input current	120 V AC, 4.5 mA; 240 V AC, 9 mA



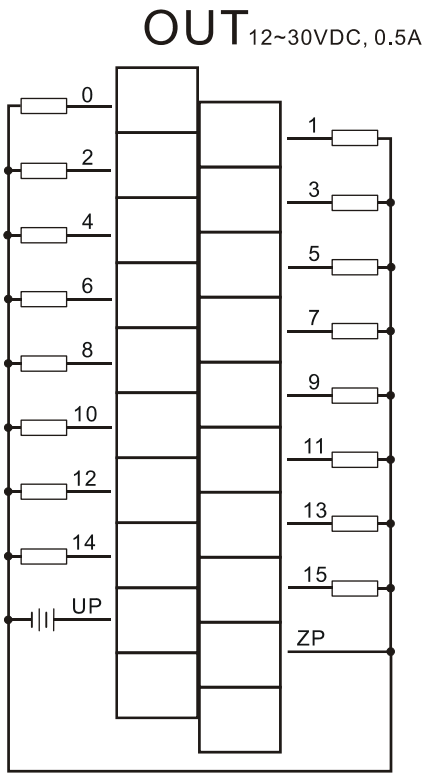
5.4.3 Wiring AH16AN01T-5A

Input type	Transistor-T (sinking)
Voltage specifications	12~30 V DC



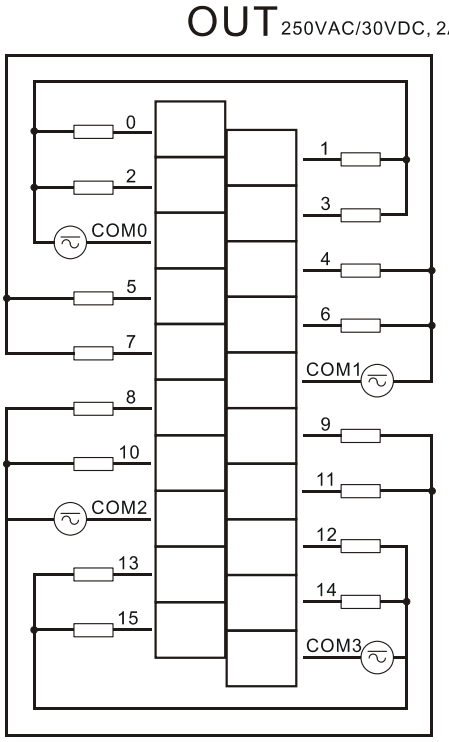
5.4.4 Wiring AH16AN01P-5A

Input type	Transistor-P (sourcing)
Voltage specifications	12~30 V DC



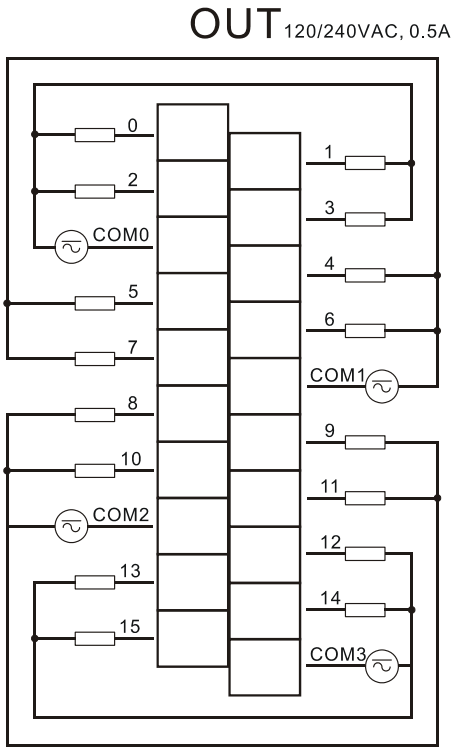
5.4.5 Wiring AH16AN01R-5A

Input type	Relay-R
Voltage specifications	Below 250 V AC, below 30 V DC



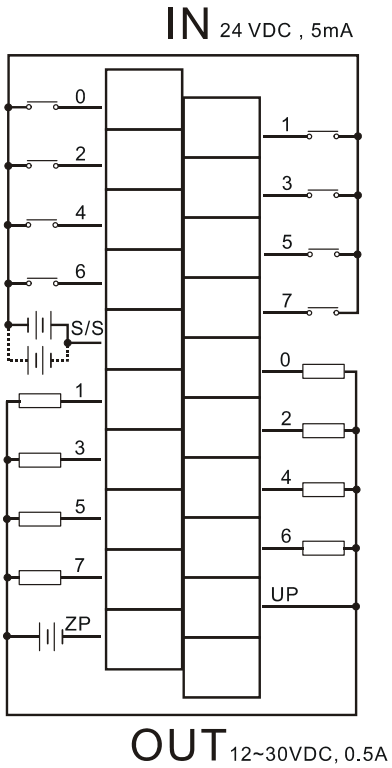
5.4.6 Wiring AH16AN01S-5A

Input type	TRIAC-S
Voltage specifications	120/240 V AC



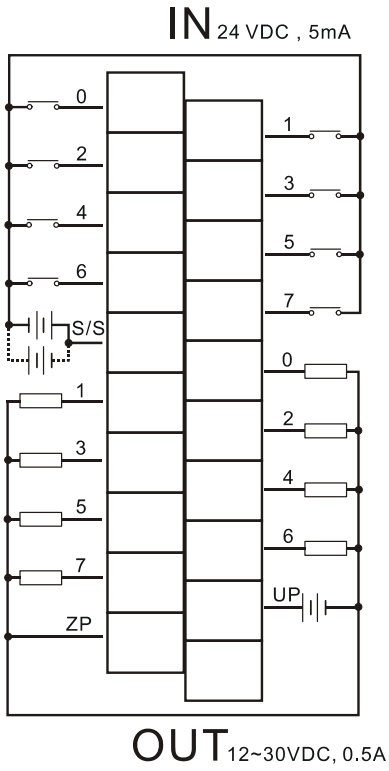
5.4.7 Wiring AH16AP11T-5A

Input form	Direct current (sinking or sourcing)
Input current	24 V DC, 5 mA
Input type	Transistor-T (sourcing)
Voltage specifications	12~30 V DC



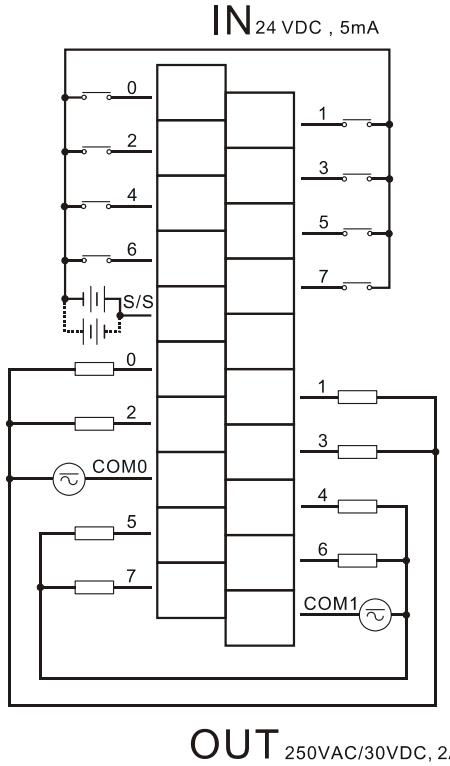
5.4.8 Wiring AH16AP11P-5A

Input form	Direct current (sinking or sourcing)
Input current	24 V DC, 5 mA
Input type	Transistor-P (sourcing)
Voltage specifications	12~30 V DC



5.4.9 Wiring AH16AP11R-5A

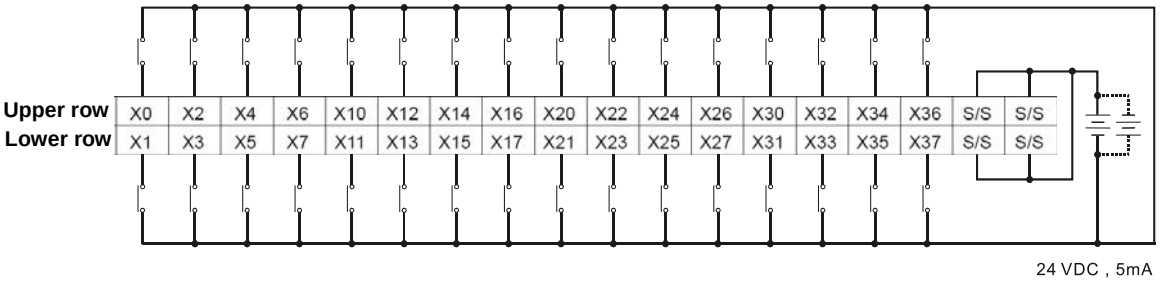
Input form	Direct current (sinking or sourcing)
Input current	24 V DC, 5 mA
Input type	Relay-R
Voltage specifications	Below 250 V AC, below 30 V DC



5.4.10 External Terminal Module for AH32AM10N-5B

DVPAETB-ID32B

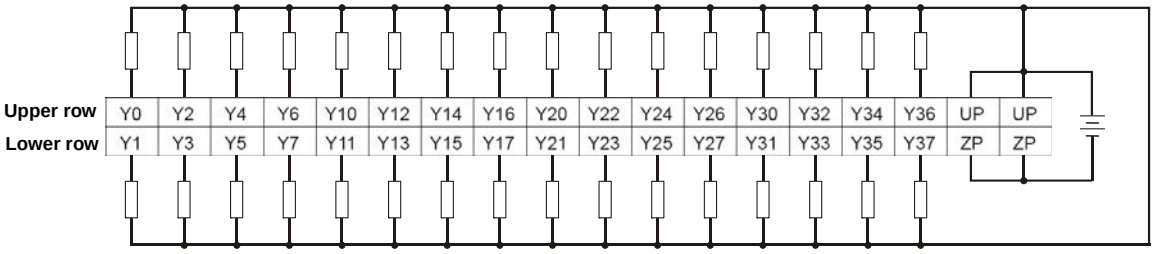
Input form	Direct current (sinking or sourcing)
Input current	24 V DC, 5 mA



5.4.11 External Terminal Modules for AH32AN02T-5B

- DVPAETB-OT32B

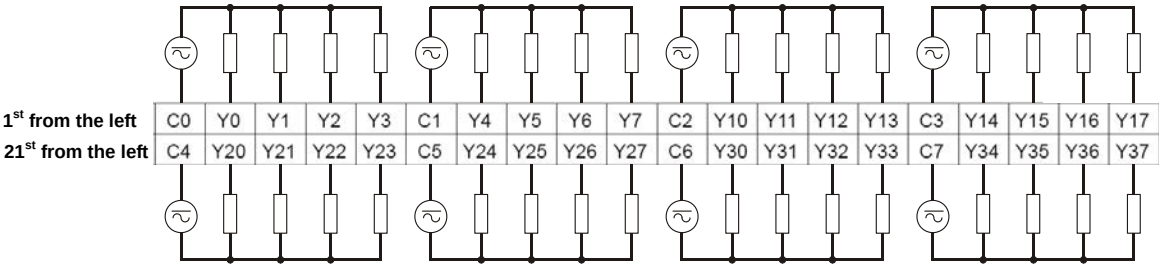
Input type	Transistor-T (sinking)
Voltage specifications	12~30 V DC



12~30VDC, 0.1A

- DVPAETB-OR32A

Input type	Relay-R
Voltage specifications	Below 250 V AC, below 30VDC

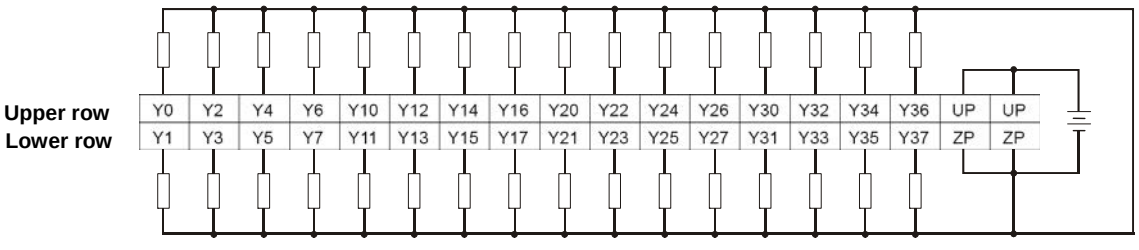


250VAC/30VDC, 2A

5.4.12 External Terminal Modules for AH32AN02P-5B

- DVPAETB-OT32B

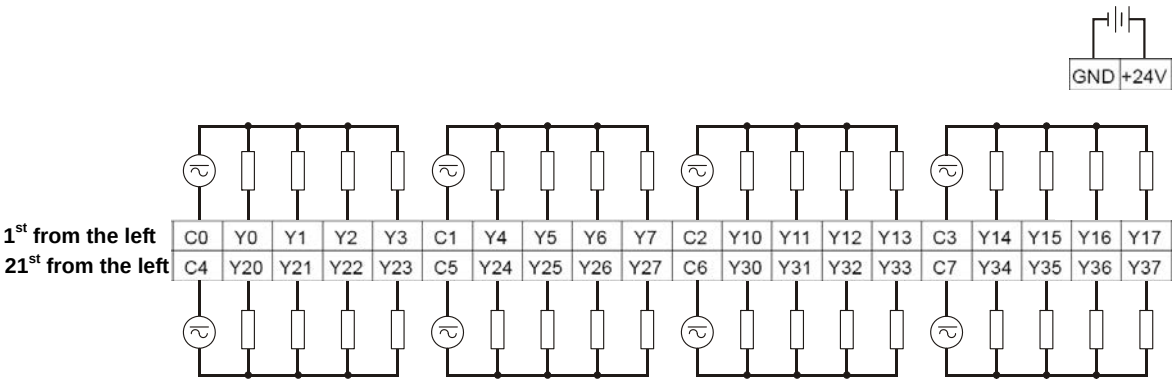
Input type	Transistor-P (sourcing)
Voltage specifications	12~30 V DC



12~30VDC, 0.1A

- DVPAETB-OR32B

Input type	Relay-R
Voltage specifications	Below 250 V AC, below 30 V DC

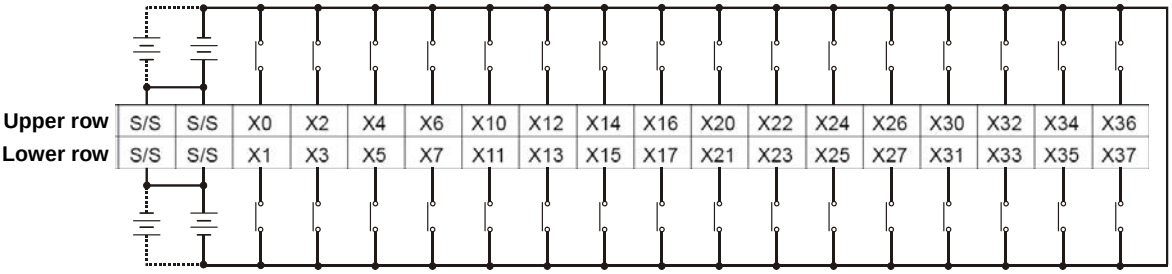


250VAC/30VDC, 2A

5.4.13 External Terminal Module for AH64AM10N-5C

DVPAETB-ID32A

Input form	Direct current (sinking or sourcing)
Input current	24 V DC, 3.2 mA

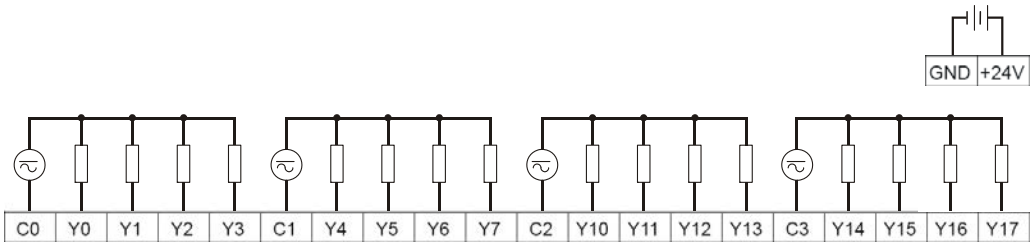


24 VDC, 3.2mA

5.4.14 External Terminal Module for AH64AN02T-5C

DVPAETB-OR16A

Input type	Relay-R
Voltage specifications	Below 250 V AC, below 30 V DC

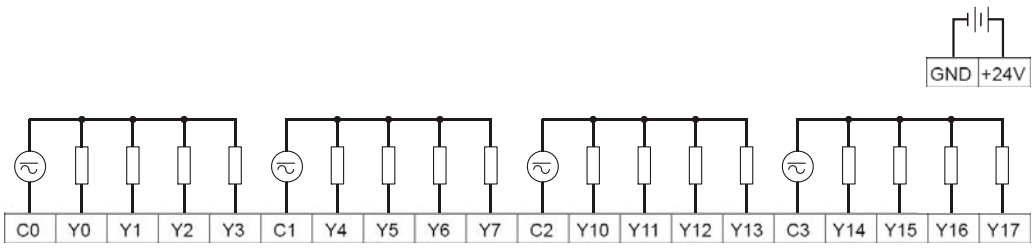


250VAC/30VDC, 2A

5.4.15 External Terminal Module for AH64AN02P-5C

DVPAETB-OR16B

Input type	Relay-R
Voltage specifications	Below 250 V AC, below 30 V DC



5.5 Wiring Digital Input/Output Terminals

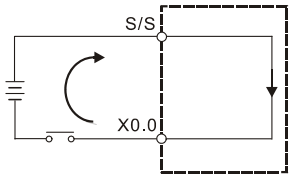
5.5.1 Wiring Digital Input Terminals

5.5.1.1 Sinking and Sourcing

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

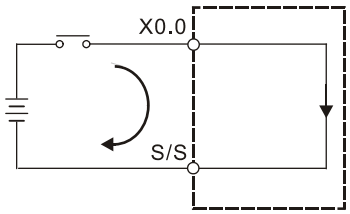
- Sinking

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



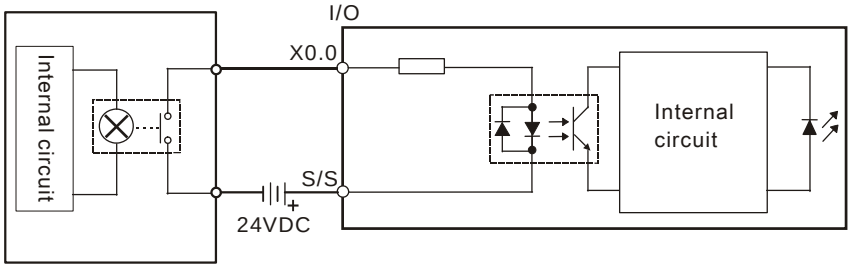
- Sourcing

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

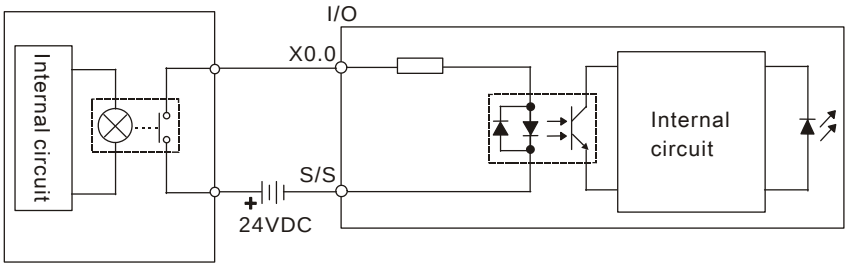


5.5.1.2 Relay type

- Sinking



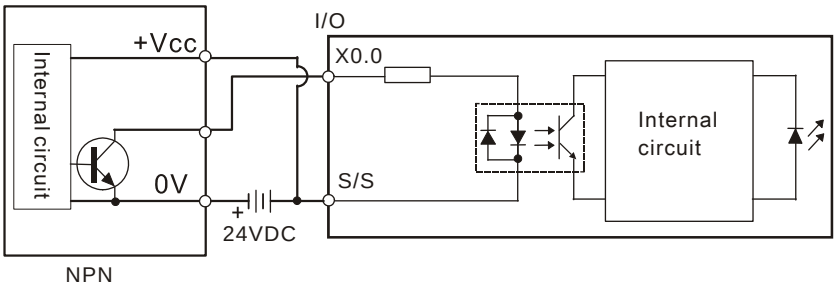
- Sourcing



5.5.1.3 Open-collector Input Type

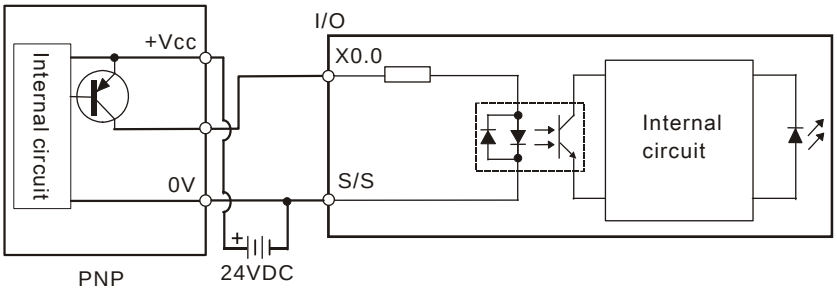
- Sinking

(An NPN transistor whose collector is open)



- Sourcing

(A PNP transistor whose collector is open)

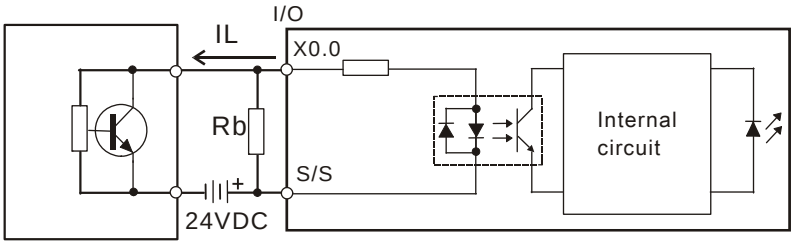


5.5.1.4 Two-wire Proximity Switch

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

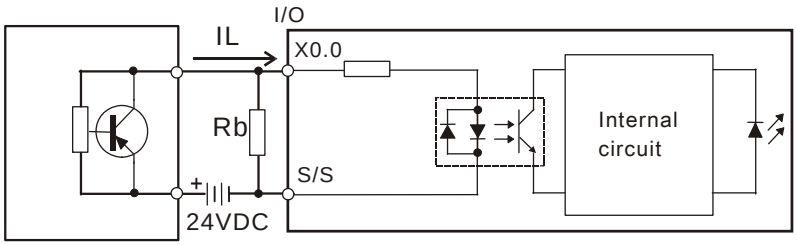
$$Rb \leq \frac{6}{IL - 1.5} \quad (\text{k } \Omega)$$

- Sinking



Two-wire proximity switch

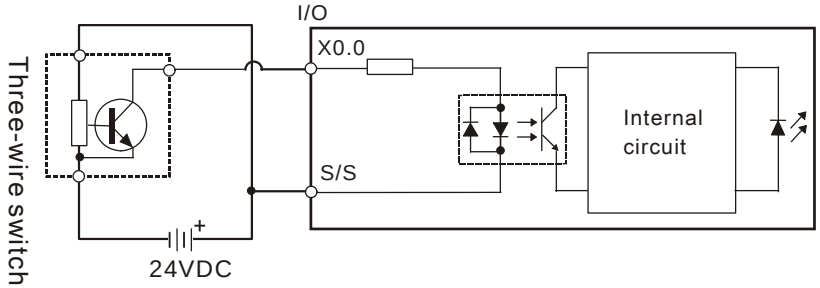
- Sourcing



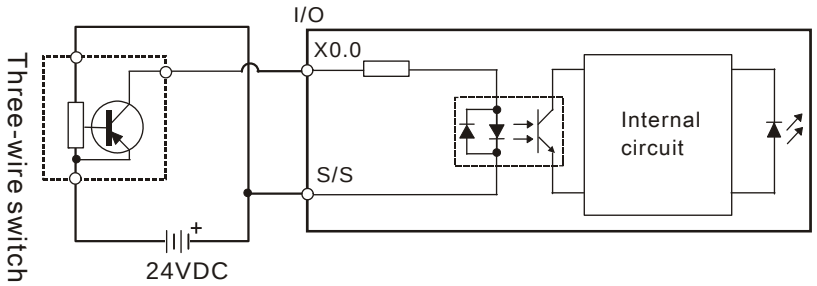
Two-wire proximity switch

5.5.1.5 Three-wire Switch

- Sinking

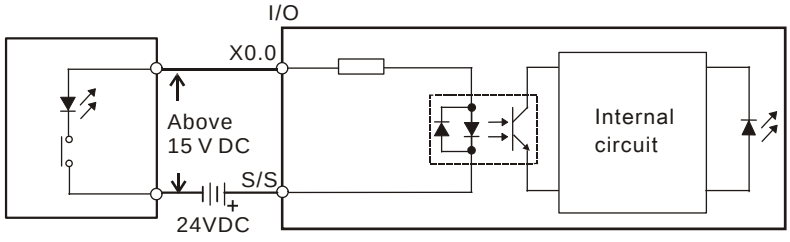


- Sourcing



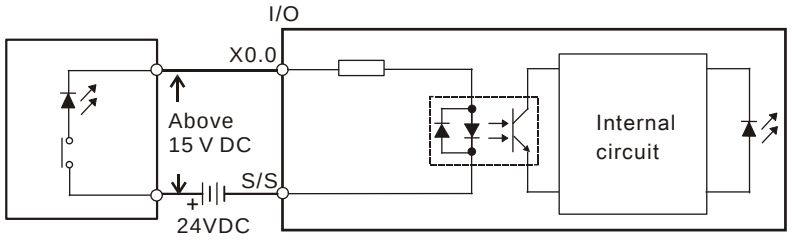
5.5.1.6 Optoelectronic Switch

- Sinking



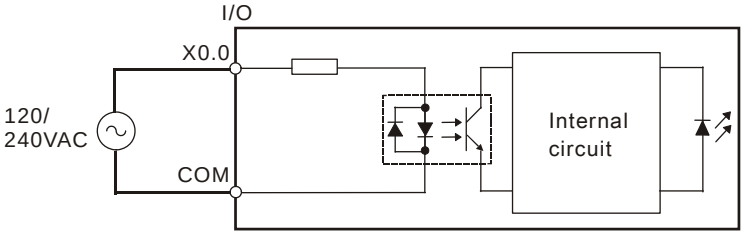
Optoelectronic switch

- Sourcing



Optoelectronic switch

5.5.1.7 Voltage Input (120~240 V AC)

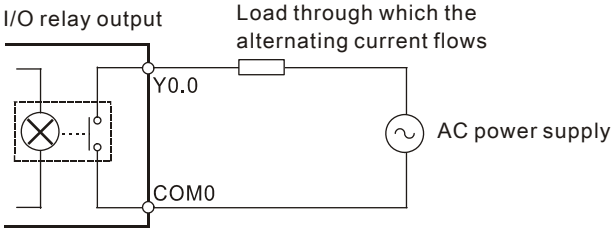


5.5.2 Wiring Digital Output Terminals

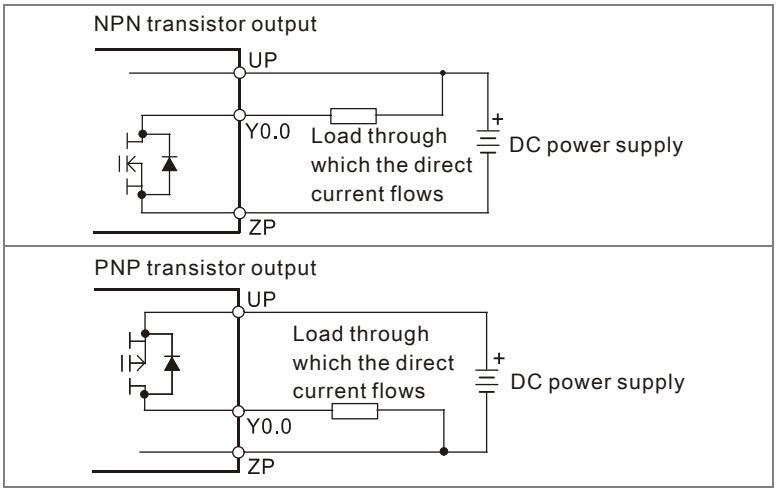
5.5.2.1 Output Circuits

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

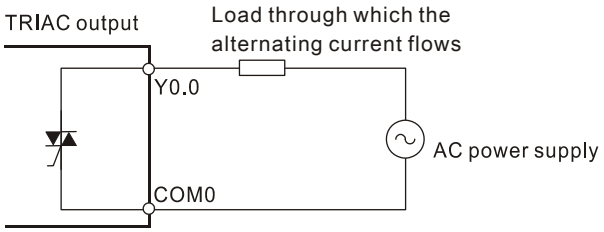
1. The relay output



2. The transistor output

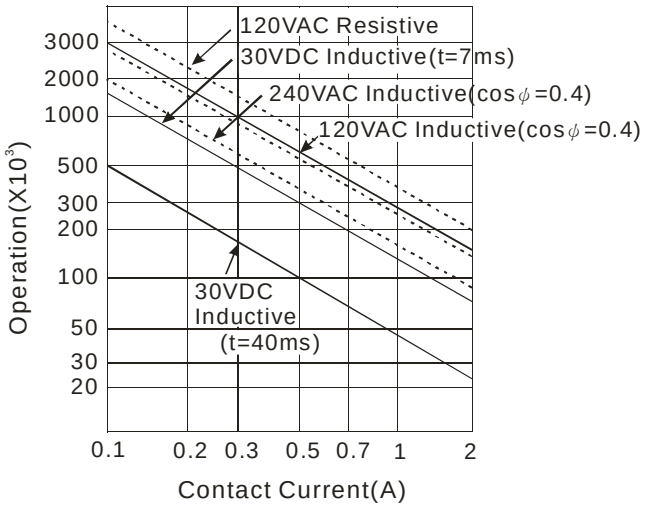


3. The TRIAC output

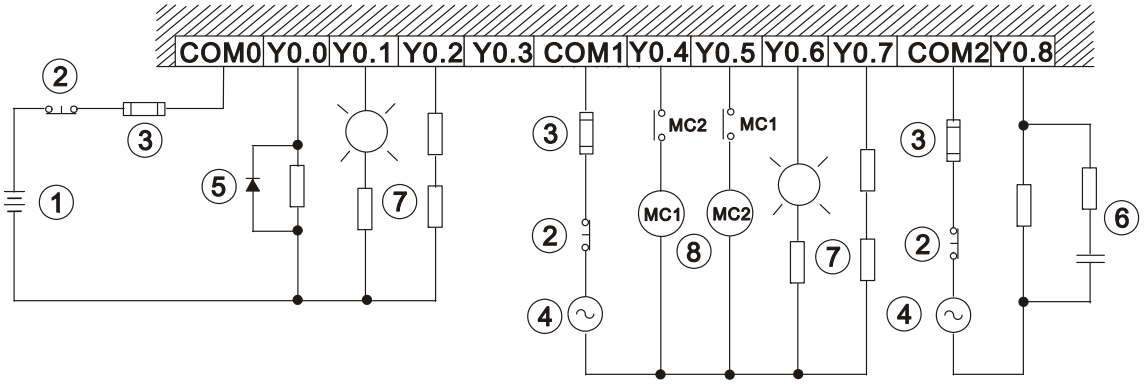


5.5.2.2 Relay Output Circuit

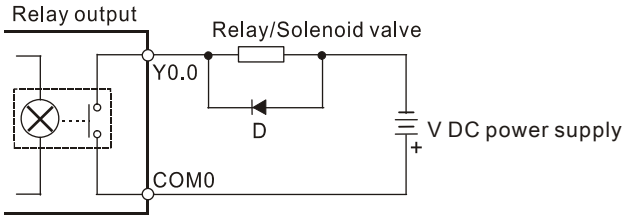
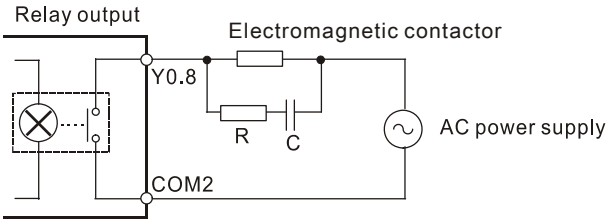
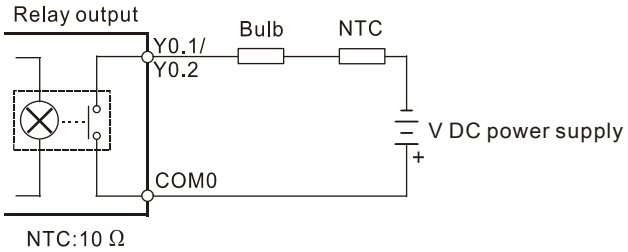
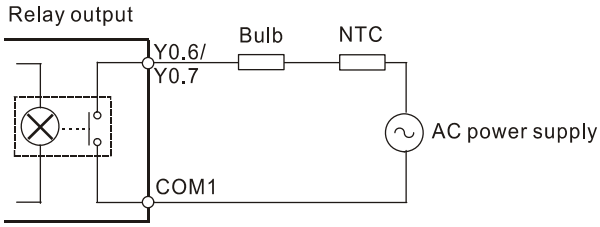
Relay terminals have no polarity. They can be applied to alternating current which passes through a load, or direct current which passes through a load. The maximum current which can passes through every relay terminal is 2 A, and the maximum current which can passes through every common terminal is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



- **The relay output circuit**



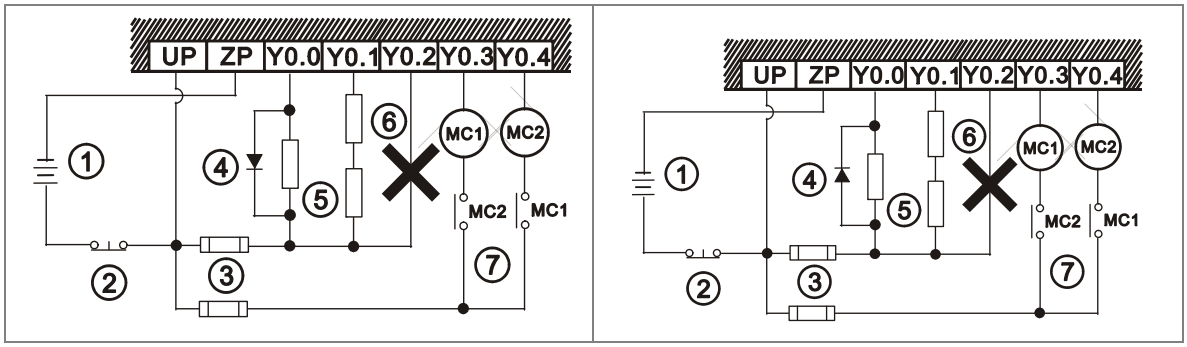
①	Direct-current power supply
②	Emergency stop: An external switch is used.
③	Fuse: To protect the output circuit, a fuse having a breaking capacity within the range between 5 A and 10 A is connected to the common terminal.
④	Alternating-current power supply

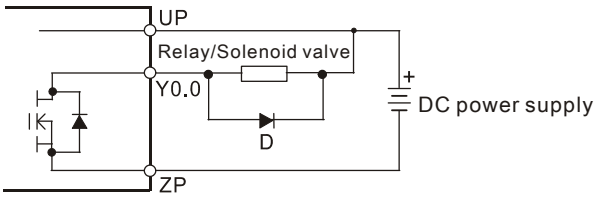
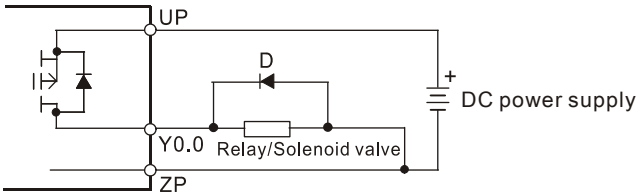
⑤	Relay/Solenoid valve through which the direct current passes: A diode is connected in parallel to absorb the surge voltage which occurs when the load is OFF.  D: 1N4001 diode
⑥	Electromagnetic contactor through which the alternating current passes: A resistor and a capacitor are connected in parallel to absorb the surge voltage which occurs when the load is OFF.  R: 100~120 Ω C: 0.1~0.24 uF
⑦	Bulb (incandescent lamp) through which the direct current passes: A thermistor is connected in series to absorb the surge current which occurs when the load is ON.  NTC:10 Ω Bulb (neon lamp) through which the alternating current passes: A thermistor is connected in series to absorb the surge current which occurs when the load is ON.  NTC: 10 Ω
⑧	Mutually exclusive output: Y0.4 controls the clockwise rotation of the motor, and Y0.5 controls the counterclockwise rotation of the motor. The interlock circuit which is formed, and the program in the PLC ensure that there are protective measures if an abnormal condition occurs.

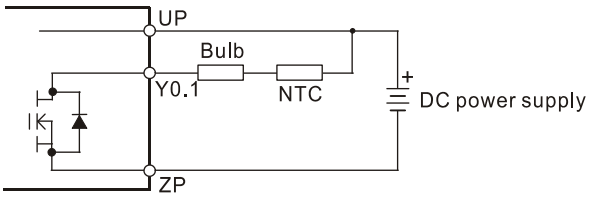
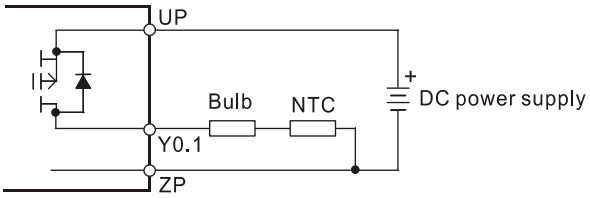
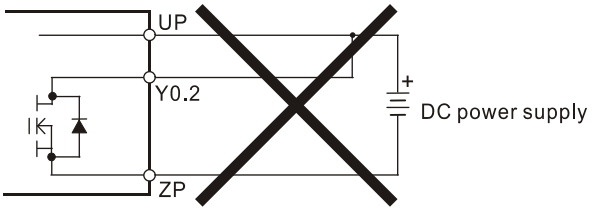
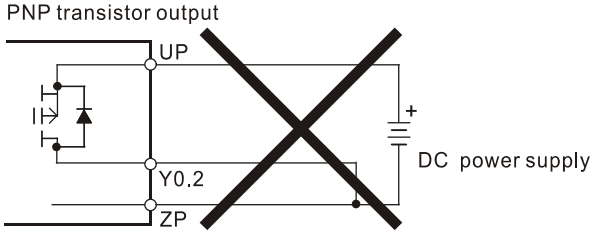
5.5.2.3 Transistor Output Circuit

The AH500 series transistor outputs are equipped with the diodes which provide the counter-electromotive force protection. They can be used if they do not switch between ON and OFF states frequently and there are low-power inductive loads. If they switch between ON and OFF states frequently and there are high-power inductive loads, they must be connected to noise suppression circuits to reduce the noise and prevent the overvoltage or the overheating from damaging the transistor output circuit.

- **The NPN/PNP transistor output circuit**



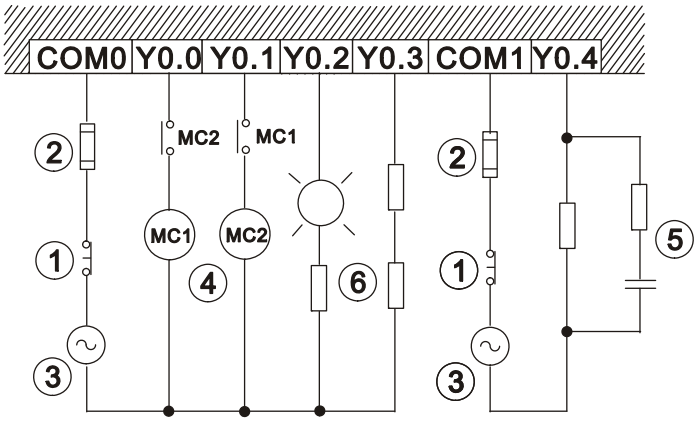
①	Direct-current power supply
②	Emergency stop
③	Fuse
④	The transistor outputs are open collectors. If Y0.0/Y0.1 is a pulse train output, the output current passing through the output pull-up resistor must be larger than 0.1 A to ensure that the transistor operates normally. Relay/Solenoid valve through which the direct current passes: A diode is connected in parallel to absorb the surge voltage which occurs when the load is OFF. NPN transistor output  D: 1N4001 diode PNP transistor output  D: 1N4001 diode

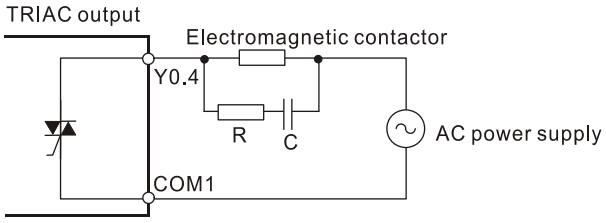
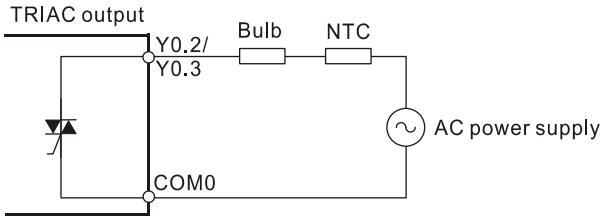
⑤	Bulb (incandescent lamp) through which the direct current passes: A thermistor is connected in series to absorb the surge current which occurs when the load is ON. NPN transistor output  NTC: 10 Ω PNP transistor output  NTC: 10 Ω
⑥	Y0.2 can not be connected to the power supply directly. The output wiring must be connected to a load. NPN transistor output  PNP transistor output 
⑦	Mutually exclusive output: Y0.3 controls the clockwise rotation of the motor, and Y0.4 controls the counterclockwise rotation of the motor. The interlock circuit which is formed, and the program in the PLC ensure that there are protective measures if an abnormal condition occurs.

5.5.2.4 TRIAC Output Circuit

TRIAC terminals only can be applied to alternating current which passes through a load. The maximum current which can passes through every TRIAC terminal is 0.5 A, and the maximum current which can passes through every common terminal is 2 A.

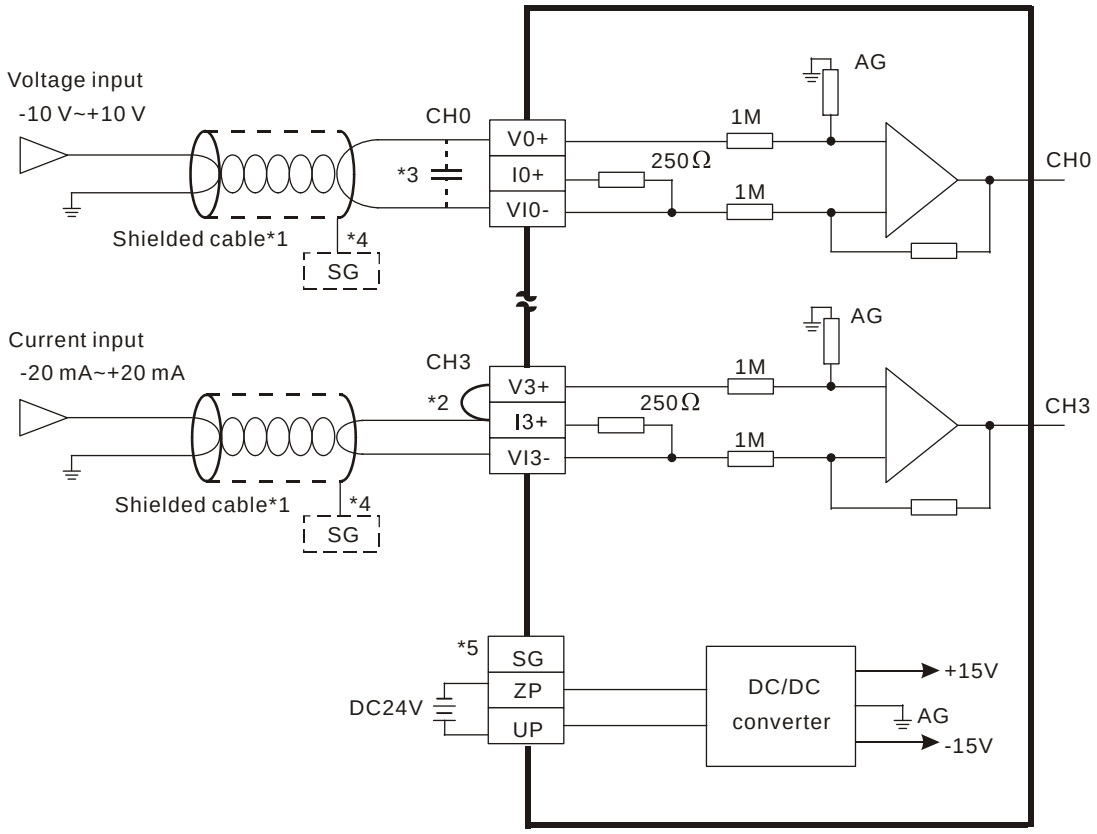
- **The TRIAC output circuit**



①	Emergency stop: An external switch is used.
②	Fuse: To protect the output circuit, a fuse having a breaking capacity within the range between 5 A and 10 A is connected to the common terminal.
③	Alternating-current power supply.
④	Mutually exclusive output: Y0.0 controls the clockwise rotation of the motor, and Y0.1 controls the counterclockwise rotation of the motor. The interlock circuit which is formed, and the program in the PLC ensure that there are protective measures if an abnormal condition occurs.
⑤	Electromagnetic contactor through which the alternating current passes: A resistor and a capacitor are connected in parallel to absorb the surge voltage which occurs when the load is OFF.  R: 100~120 Ω C: 0.1~0.24uF
⑥	Bulb (neon lamp) through which the alternating current passes: A thermistor is connected in series to absorb the surge current which occurs when the load is ON.  NTC:10 Ω

5.6 Wiring Analog Input/Output Modules

5.6.1 Wiring AH04AD-5A



*1. Please isolate the analog input signal cables from other power cables.

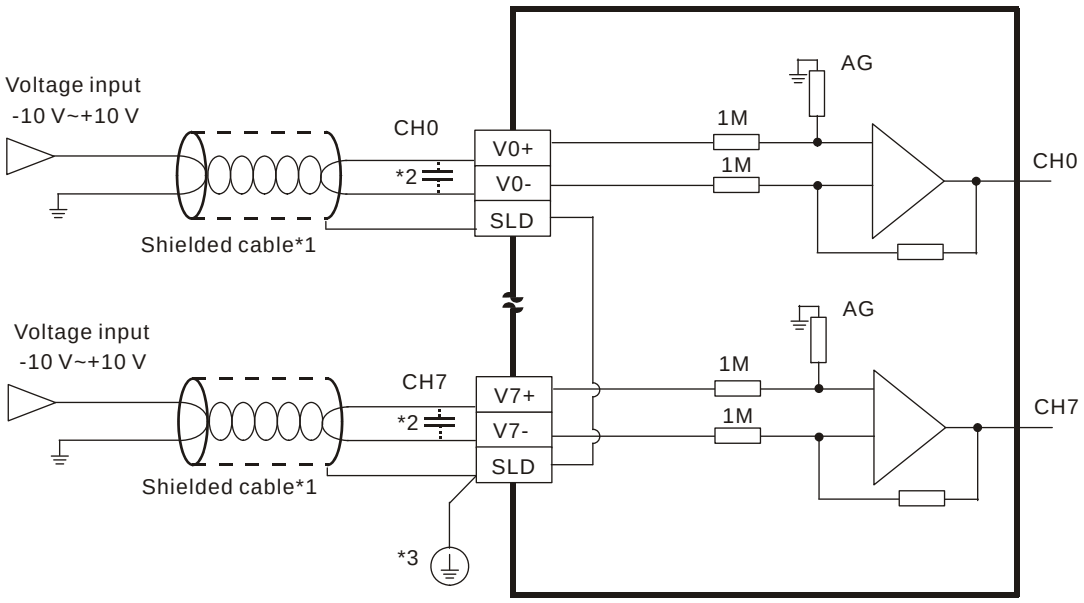
*2. If the module is connected to a current signal, the terminals V+ and I+ have to be short-circuited.

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

*4. Please connect the shielded cables to the terminal SG.

*5. Once AH04AD-5A is installed on a backplane, the terminal SG on AH04AD-5A and the terminal ⏚ on the backplane will be short-circuited. Please connect the terminal ⏚ on the backplane to the ground terminal ⏚.

5.6.2 Wiring AH08AD-5B

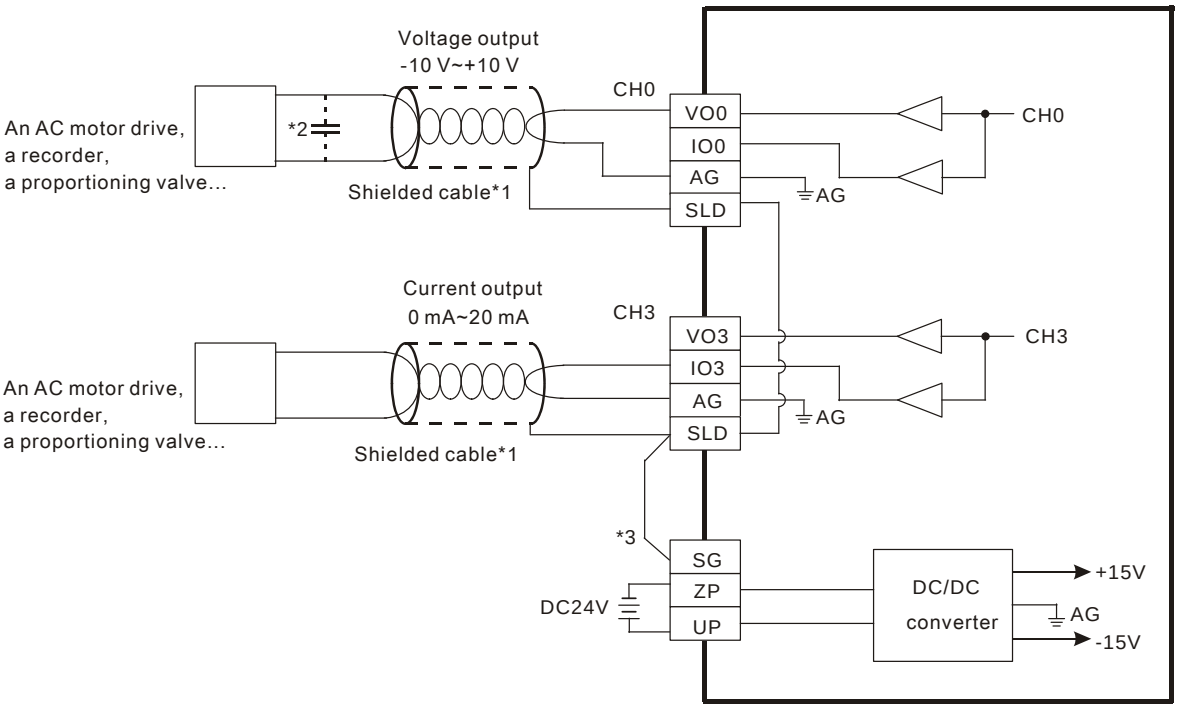


*1. Please isolate the analog input signal cables from other power cables.

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

*3. Please connect the terminal SLD to the ground terminal ⏚.

5.6.3 Wiring AH04DA-5A



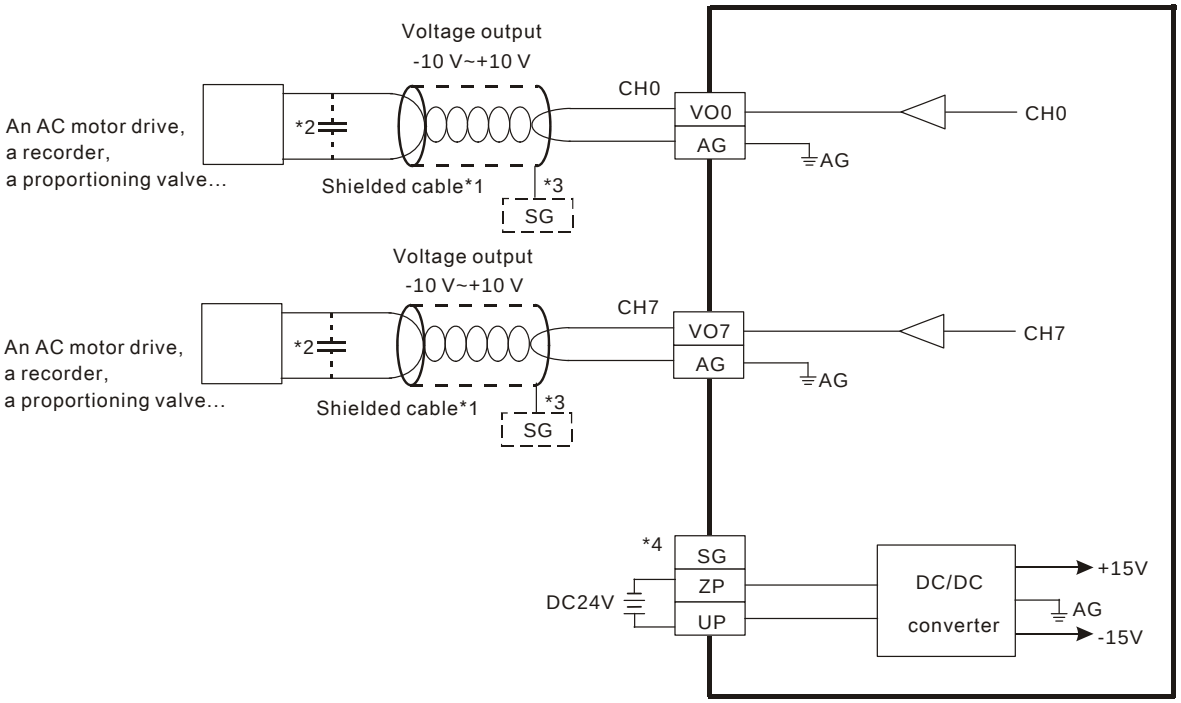
*1. Please isolate the analog output signal cables from other power cables.

*2. If the ripple is large for the input terminal of the load and results in the noise interference with the

wiring, please connect the module to the capacitor having a capacitance within the range between 0.1 μF and 0.47 μF with a working voltage of 25 V.

*3. Please connect the terminal SLD to the terminal SG. Once AH04DA-5A is installed on a backplane, the terminal SG on AH04DA-5A and the terminal ⏚ on the backplane will be short-circuited. Please connect the terminal ⏚ on the backplane to the ground terminal ⏚.

5.6.4 Wiring AH08DA-5B



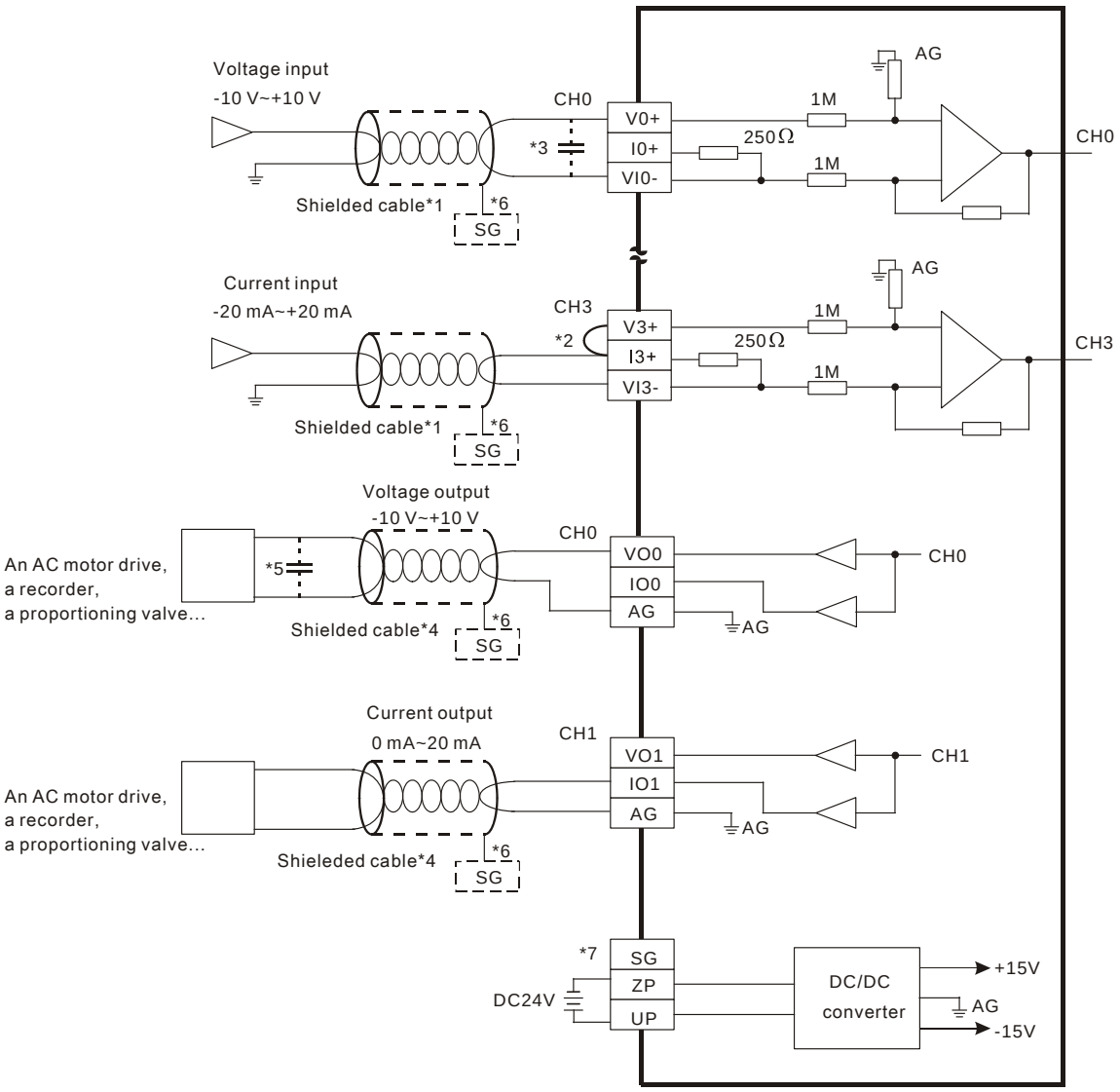
*1. Please isolate the analog output signal cables from other power cables.

*2. If the ripple is large for the input terminal of the load and results in the noise interference with the wiring, please connect the module to the capacitor having a capacitance within the range between 0.1 μF and 0.47 μF with a working voltage of 25 V.

*3. Please connect the shielded cables to the terminal SG.

*4. Once AH08DA-5B is installed on a backplane, the terminal SG on AH08DA-5B and the terminal ⏚ on the backplane will be short-circuited. Please connect the terminal ⏚ on the backplane to the ground terminal ⏚.

5.6.5 Wiring AH06XA-5A



*1. Please isolate the analog input signal cables from other power cables.

*2. If the module is connected to a current signal, the terminals V+ and I+ have to be short-circuited.

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

*4. Please isolate the analog output signal cables from other power cables.

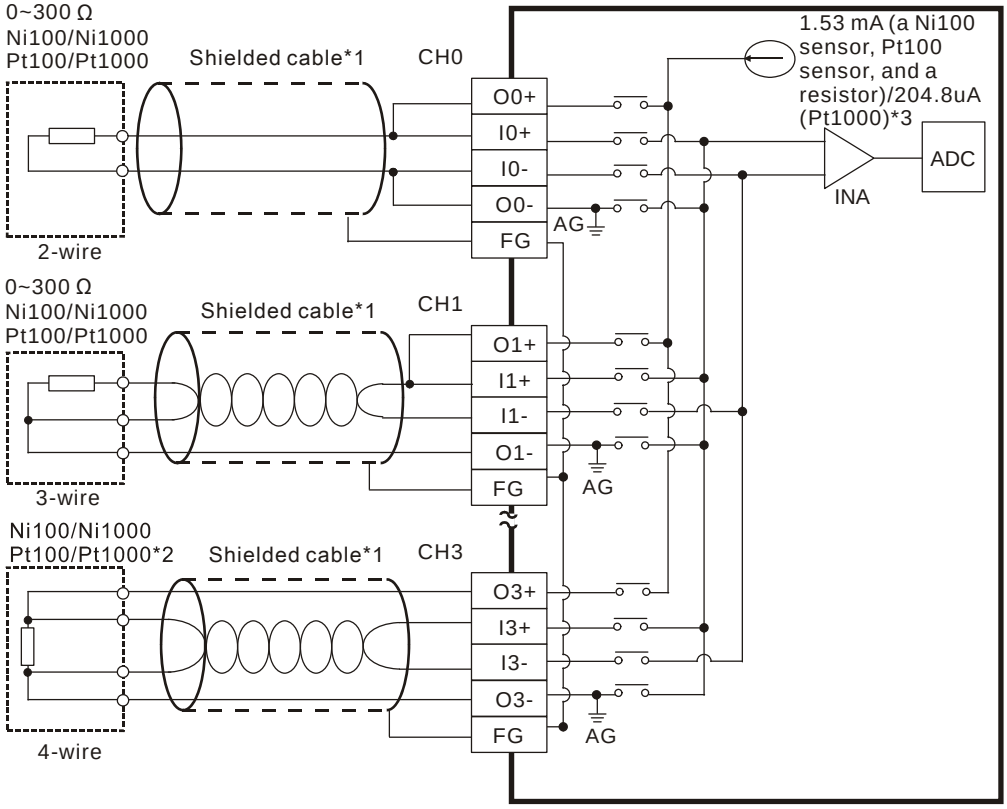
*5. If the ripple is large for the input terminal of the load and results in the noise interference with the wiring, please connect the module to the capacitor having a capacitance within the range between 0.1 μF and 0.47 μF with a working voltage of 25 V.

*6. Please connect the shielded cables to the terminal SG.

*7. Once AH06XA-5A is installed on a backplane, the terminal SG on AH06XA-5A and the terminal ⏚ on the backplane will be short-circuited. Please connect the terminal ⏚ on the backplane to the ground terminal ⏚.

5.7 Wiring Temperature Measurement Modules

5.7.1 Wiring AH04PT-5A

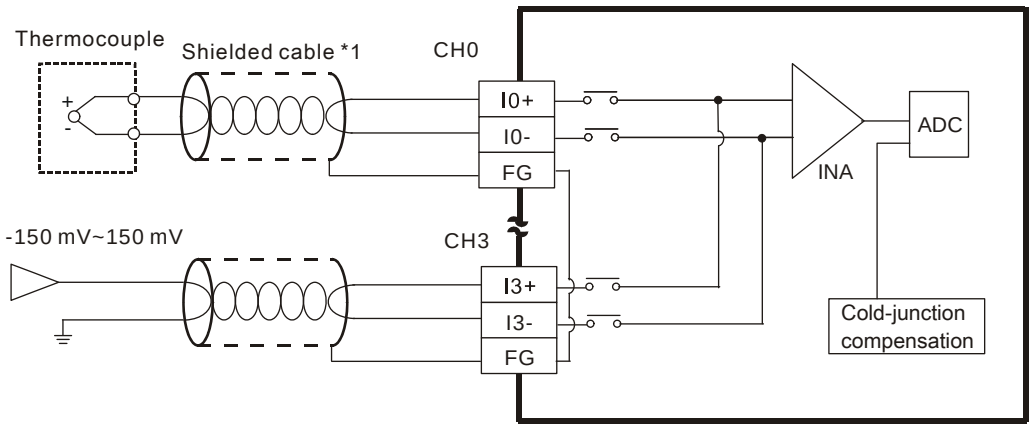


*1. The cables or the shielded twisted pair cables for Ni100/Ni1000/Pt100/Pt1000 temperature sensors are used, and should be kept separate from other power cables and cables which generate noise. Please use a three-wire temperature sensor. If users want to use a two-wire temperature sensor, O**n**+ and I**n**+ have to be short-circuited, and O**n**- and I**n**- have to be short-circuited. (**n** is within the range between 0 and 3.)

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

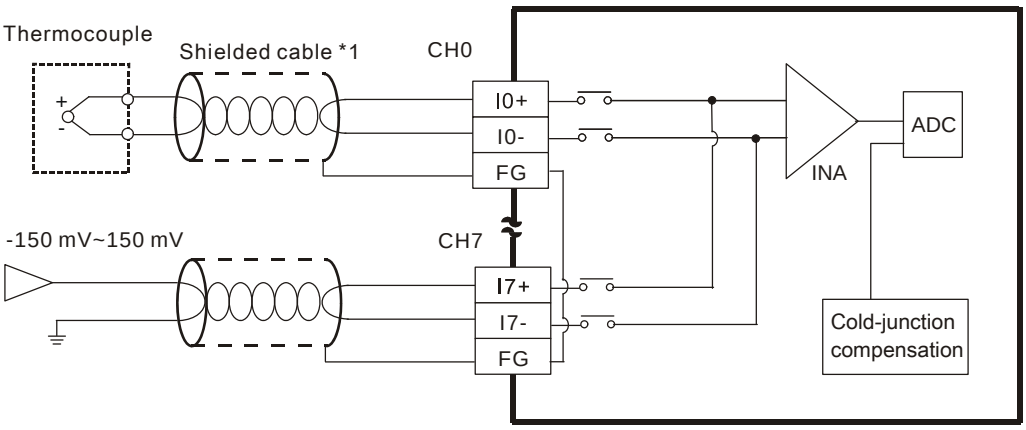
*3. Users need to select an appropriate sensor. If a Ni100 temperature sensor, a Pt100 sensor, and a resistance sensor are used, the internal excitation current is 1.53 mA. If a Ni1000 temperature sensor, and a Pt1000 temperature sensor are used, the internal excitation current is 204.8 μA.

5.7.2 Wiring AH04TC-5A



*1. The cables or the shielded twisted pair cables for Type J, type K, type R, type S, type T, type E, and type N thermocouples are used, and should be kept separate from other power cables and cables which generate noise.

5.7.3 Wiring AH08TC-5A



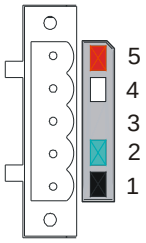
*1. The cables or the shielded twisted pair cables for Type J, type K, type R, type S, type T, type E, and type N thermocouples are used, and should be kept separate from other power cables and cables which generate noise.

5.8 Wiring Network Modules

5.8.1 Wiring AH10DNET-5A

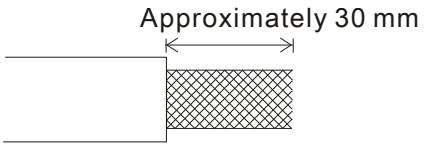
5.8.1.1 DeviceNet Connector

Pin	Signal	Color	Description
5	V+	Red	24 V DC
4	CAN_H	White	Signal +
3	Ground	-	It is connected to a shielded cable.
2	CAN_L	Blue	Signal -
1	V-	Black	0 V DC

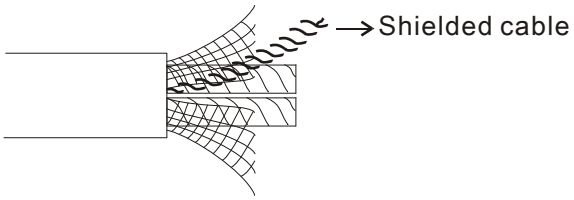


5.8.1.2 Joining the Cable to the DeviceNet Connector

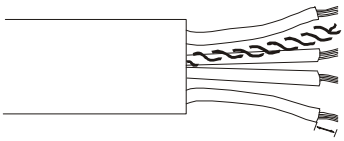
- Remove the 30 millimeter plastic jacket of the cable with a professional tool. Please do not damage the shielded cable when the plastic jacket is removed.



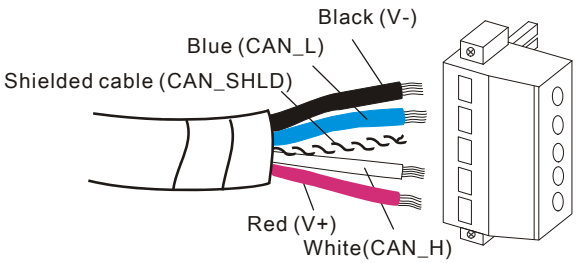
- After users remove the metallic shield and the foil, they can see two power cables (in red and black respectively), two signal cables (in blue and white respectively), and one shielded cable.



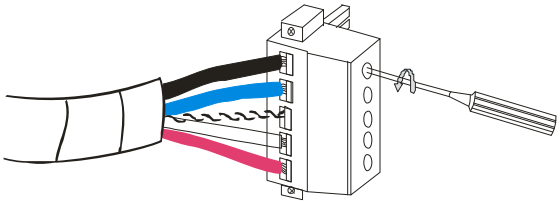
- After the metallic shield and the foil are removed, users need to remove the plastic jackets of the power cables and the plastic jackets of the signal cables properly.



- Insert the communication cable into the holes in the connector.

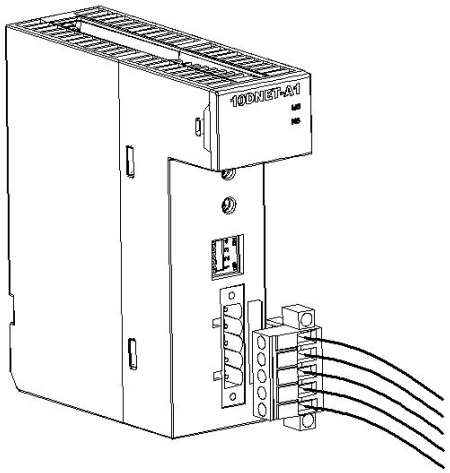


- After the communication cable is inserted into the holes in the connector, tighten the screws on the connector with a slotted screwdriver.



5.8.1.3 Installing the DeviceNet Connector

- After the wiring is complete, users can insert the DeviceNet connector into the interface.
- Tighten the two screws on the DeviceNet connector.



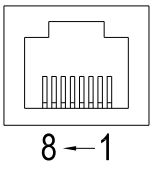
Note:

- After the communication cable is kept separate from the power cable, the electromagnetic interference is reduced.
- Only after the both ends of the shielded cable are grounded can the shielded cable be brought into full play.

5.8.2 Wiring AH10EN-5A

The RJ45 communication port

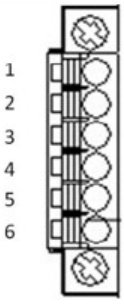
Pin	Signal	Description
1	TX+	Transmitting data +
2	TX-	Transmitting data -
3	RX+	Receiving data +
4	--	N/C
5	--	N/C
6	RX-	Receiving data -
7	--	N/C
8	--	N/C



5.8.3 Wiring AH10SCM-5A

The RS-485/RS-422 communication port

Pin	RS-485	RS-422
1	N/C	TX+
2	N/C	TX-
3	D+	RX+
4	D-	RX-
5	SG	SG
6	N/C	SG

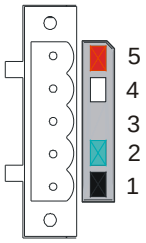


5.9 Wiring the RTU Module

5.9.1 Wiring AHRTU-DNET-5A

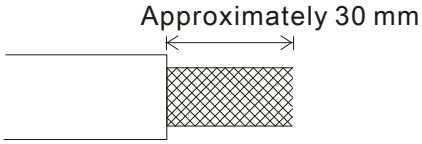
5.9.1.1 DeviceNet Connector

Pin	Signal	Color	Description
5	V+	Red	24 V DC
4	CAN_H	White	Signal+
3	Ground	-	It is connected to a shielded cable.
2	CAN_L	Blue	Signal-
1	V-	Black	0 V DC

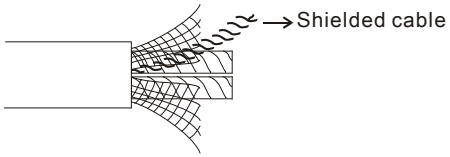


5.9.1.2 Joining the Cable to the DeviceNet Connector

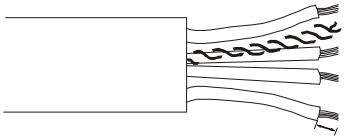
- Remove the 30 millimeter plastic jacket of the cable with a professional tool. Please do not damage the shielded cable when the plastic jacket is removed.



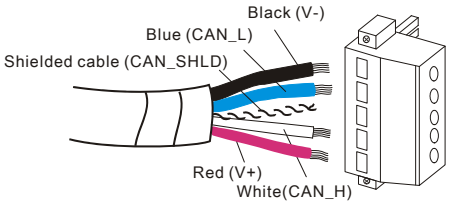
- After users remove the metallic shield and the foil, they can see two power cables (in red and black respectively), two signal cables (in blue and white respectively), and one shielded cable.



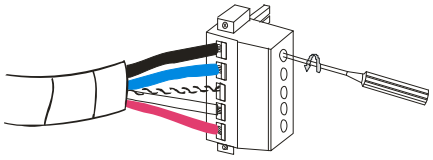
- After the metallic shield and the foil are removed, users need to remove the plastic jackets of the power cables and the plastic jackets of the signal cables properly.



- Insert the communication cable into the holes in the connector.

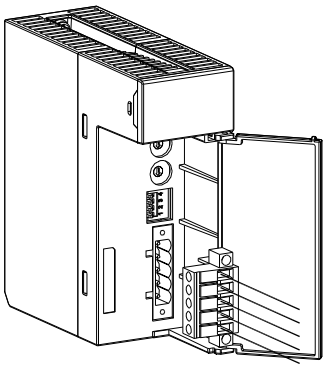


- After the communication cable is inserted into the holes in the connector, tighten the screws on the connector with a slotted screwdriver.



5.9.1.3 Installing the DeviceNet Connector

- After the wiring is complete, users can insert the DeviceNet connector into the interface.
- Tighten the two screws on the DeviceNet connector.



Note:

- After the communication cable is kept separate from the power cable, the electromagnetic interference is reduced.
- Only after the both ends of the shielded cable are grounded can the shielded cable be brought into full play.

5.10 Wiring Motion Control Modules

5.10.1 Specifications for Motion Control Modules

- **AH02HC-5A**

Item		Specifications
Number of channels		2 channels
Input signal	**Input (differential input)**	CH0: X0.8+, X0.8-, X0.9+, and X0.9- CH1: X0.10+, X0.10-, X0.11+, and X0.11-
	Pulse format	Pulse/Direction (one phase and one input) Counting up/Counting down (one phase and two inputs) One time the frequency of A/B-phase inputs (two phases and two inputs) Four times the frequency of A/B-phase inputs (two phases and two inputs)
	Signal level	5~24 V DC
Specifications	**Maximum frequency of counting**	The maximum frequency is 200 kHz.
	Range	The number of sampled pulses is within the range between -200000 and 200000. The number of accumulated pulses is within the range between -99999999 and 99999999. The number of input pulses is within the range between -2147483648 and 2147483648.
	Type	General count Circular count

Item		Specifications
RESET input	**Input (differential input)**	CH0: X0.0+ and X0.0- CH1: X0.1+ and X0.1-
	Signal level	5~24 V DC
	Maximum current	15 mA
Comparison output	**Output type**	CH0: The high-speed pulse output Y0.8 is a transistor whose collector is an open collector. CH1: The high-speed pulse output Y0.9 is a transistor whose collector is an open collector.
	Signal level	24 V DC
	Maximum current	15 mA

- **AH04HC-5A**

Item		Specifications
Number of channels		4 channels
Input signal	**Input (differential input)**	CH0: X0.8+, X0.8-, X0.9+, and X0.9- CH1: X0.10+, X0.10-, X0.11+, and X0.11- CH2: X0.12+, X0.12-, X0.13+, and X0.13- CH3: X0.14+, X0.14-, X0.15+, and X0.15-
	Pulse format	Pulse/Direction (one phase and one input) Counting up/Counting up (one phase and two inputs) One time the frequency of A/B-phase inputs (two phases and two inputs) Four times the frequency of A/B-phase inputs (two phases and two inputs)
	Signal level	5~24 V DC
Specifications	**Maximum frequency of counting**	The maximum frequency is 200 kHz.
	Range	The number of sampled pulses is within the range between -200000 and 200000. The number of accumulated pulses is within the range between -99999999 and 99999999. The number of input pulses is within the range between -2147483648 and 2147483648.
	Type	General count Circular count
RESET input	**Input (differential input)**	CH0: X0.0+ and X0.0- CH1: X0.1+ and X0.1- CH2: X0.2+ and X0.2- CH3: X0.3+ and X0.3-
	Signal level	5~24V DC
	Maximum current	15 mA

Item		Specifications
Comparison output	Output type	CH0: The high-speed pulse output Y0.8 is a transistor whose collector is an open collector. CH1: The high-speed pulse output Y0.9 is a transistor whose collector is an open collector. CH2: The high-speed pulse output Y0.10 is a transistor whose collector is an open collector. CH3: The high-speed pulse output Y0.11 is a transistor whose collector is an open collector.
	Signal level	24 V DC
	Maximum current	15 mA

- **AH05PM-5A**

Item		Specifications		
		AH05PM-5A		
Number of axes		2 axes		
Storage		The capacity of the built-in storage is 64 ksteps.		
Unit		Motor unit	Compound unit	Mechanical unit
Connection with a CPU module		Users can set the initial register involved in the data exchange in a CPU module, and the number of registers involved in the data exchange in the CPU module. Four hundred data registers at most can be involved in the data exchange.		
Motor control		There are three types of pulse output modes. These modes adopt the differential output. 1. Pulse/Direction 2. Counting up/Counting down 3. A/B-phase output		
Maximum speed		Single axis: 500 kpps Multi-axis interpolation: 500 kpps		
Input signal	Detector	X0.0, X0.1, X0.8, X0.9, X0.12, and X0.13		
Output signal	Servo output signal	Y0.0+, Y0.0-, Y0.2+, Y0.2-, Y0.1+, Y0.1-, Y0.3+, Y0.3-, Y0.8, and Y0.9		
External communication port		Mini USB port		
Number of basic instructions		27		
Number of applied instructions		130		
M-code		● OX0~99 (motion subroutine/positioning program): M02 (The execution of the program stops. (END)) ● M00~M01, M03~M101, and M103~M65535: The execution of the program pauses. (WAIT) Users can use them freely.		
G-code		G0 (rapid positioning), G1 (linear interpolation), G2 (circular interpolation, clockwise), G3 (circular interpolation, counterclockwise), G4 (dwell), G17 (XY plane selection), G90 (absolute programming), and G91 (incremental programming)		

The description of the terminals

Terminal	Description	Response characteristic	Maximum input	
			Current	Voltage
X0.0, X0.1, X0.8, X0.9, X0.12, and X0.13	1. They are single/A/B-phase inputs. 2. The functions of the terminals: ● Motion control: ◆ X0.0 is the PG input for axis 1, and X0.1 is the PG input for axis 2. ◆ X0.12 is the DOG input for axis 1, and X0.13 is the DOG input for axis 2. ◆ X0.8 and X0.9 are for a manual pulse generator. ● High-speed count: ◆ X0.0 is the RESET input for counter 0. ◆ X0.8 is an A-phase input for counter 0, and X0.9 is a B-phase input for counter 0. ● High-speed comparison and catch: The terminals can function as trigger signals for a high-speed catch. ● Interrupt inputs	200 kHz	15 mA	24 V
Y0.8 and Y0.9	1. The high-speed pulse outputs are transistors whose collectors are open collector. 2. The functions of the terminals: ● Motion control: Y0.8 is the CLEAR output for axis 1, and Y0.9 is the CLEAR output for axis 2. ● High-speed comparison and catch: The high-speed comparison outputs provide the PWM function.	200 kHz	15 mA	24 V
Y0.0+, Y0.0-, Y0.1+, Y0.1-, Y0.2+, Y0.2-, Y0.3+, and Y0.3-	1. They are differential outputs. 2. The function of the terminals: ● Motion control: ◆ Y0.0+ and Y0.0- are A-phase outputs for axis 1. Y0.2+ and Y0.2- are A-phase outputs for axis 2. ◆ Y0.1+ and Y0.1- are B-phase outputs for axis 1. Y0.3+ and Y0.3- are B-phase outputs for axis 2.	1 MHz	5 mA	5 V

- **AH10PM-5A**

Item		Specifications		
		AH10PM-5A		
Number of axes		6 axes		
Storage		The capacity of the built-in storage is 64 ksteps.		
Unit		Motor unit	Compound unit	Mechanical unit
Connection with a CPU module		Users can set the initial register involved in the data exchange in a CPU module, and the number of registers involved in the data exchange in the CPU module. Four hundred data registers at most can be involved in the data exchange.		
Motor control		There are three types of pulse output modes. These modes adopt the differential output. 1. Pulse/Direction 2. Counting up/Counting down 3. A/B-phase output		
Maximum speed		Single axis: 500 kpps Multi-axis interpolation: 500 kpps		
Input signal	**Operating switch**	STOP/RUN (automatic/manual switch)		
	Detector	X0.8, X0.9, X0.10, X0.11, X0.12, X0.13, X0.14, X0.15, X0.0+, X0.0-, X0.1+, X0.1-, X0.2+, X0.2-, X0.3+, and X0.3-		
Output signal	**Servo output signal**	Y0.0+, Y0.0-, Y0.2+, Y0.2-, Y0.4+, Y0.4-, Y0.6+, Y0.6-, Y0.1+, Y0.1-, Y0.3+, Y0.3-, Y0.5+, Y0.5-, Y0.7+, Y0.7-, Y0.8, Y0.9, Y0.10, and Y0.11		
External communication port		Mini USB port Ethernet port		
Expansion storage device		Mini SD card The maximum capacity is 32 GB.		
Number of basic instructions		27		
Number of applied instructions		130		
M-code		● OX0~99 (motion subroutine/positioning program): M02 (The execution of the program stops. (END)) ● M00~M01, M03~M101, and M103~M65535: The execution of the program pauses. (WAIT) Users can use them freely.		
G-code		G0 (rapid positioning), G1 (linear interpolation), G2 (circular interpolation, clockwise), G3 (circular interpolation, counterclockwise), G4 (dwell), G17 (XY plane selection), G18 (ZX plane selection), G19 (YZ plane selection), G90 (absolute programming), and G91 (incremental programming)		

The description of the terminals

Terminal	Description	Response characteristic	Maximum input	
			Current	Voltage
X0.0+, X0.0-, X0.1+, X0.1-, X0.2+, X0.2-, X0.3+, and X0.3-	1. They are differential inputs. 2. The functions of the terminals: ● Motion control: They are the PG inputs for axis 1~axis 4. ● High-speed counter: X0.0+ and X0.0- are the RESET inputs for counter 0. X0.1+ and X0.1- are the RESET inputs for counter 1. X0.2+ and X0.2- are the RESET inputs for counter 2 and counter 4. X0.3+ and X0.3- are the RESET inputs for counter 3 and counter 5. ● High-speed comparison and catch: The terminals can function as trigger signals for a high-speed catch. ● Interrupt inputs	200 kHz	15 mA	5~24 V
X0.8 and X0.9	1. They are single/A/B-phase inputs. 2. The functions of the terminals: ● Motion control: The terminals are for a manual pulse generator. ● High-speed count: ◆ The terminals are for counter 0. ◆ X0.8 is an A-phase input for counter 0, and X0.9 is a B-phase input for counter 0. ● High-speed comparison and catch: The terminals can function as trigger signals for a high-speed catch. ● Interrupt inputs	200 kHz	15 mA	24 V
X0.10, X0.11, X0.12, X0.13, X0.14, and X0.15	1 They are single/A/B-phase inputs. 2 The functions of the terminals: ● Motion control: They are the DOG inputs for axis 1~axis 6. ● High-speed counter: ◆ The terminals are for counter 1~counter 5. ◆ X0.10 is an A-phase input for counter 1, X0.12 is an A-phase input for counter 2 and counter 4, and X0.14 is an A-phase input for counter 3 and counter 5. ◆ X0.11 is a B-phase input for counter 1, X0.13 is a B-phase input for counter 2 and counter 4, and X0.15 is a B-phase input for counter 3 and counter 5. ● High-speed comparison and catch: The terminals can function as trigger signals for a high-speed catch. ● Interrupt inputs	200 kHz	15 mA	24 V

Terminal	Description	Response characteristic	Maximum input	
			Current	Voltage
Y0.8, Y0.9, Y0.10, and Y0.11	1. The high-speed pulse outputs are transistors whose collectors are open collector. 2. The functions of the terminals: ● Motion control: ◆ The terminals are the CLEAR outputs for axis 1~axis 4, and provide the PWM function. ◆ Y0.8 and Y0.9 are for axis 5. Y0.10 and Y0.11 are for axis 6. Y0.8 is an A-phase output for axis 5, and Y0.10 is an A-phase output for axis 6. Y0.9 is a B-phase output for axis 5, and Y0.11 is a B-phase output for axis 6. ● High-speed comparison and catch: The high-speed comparison outputs provide the PWM function.	200 kHz	15 mA	24 V
Y0.0+, Y0.0-, Y0.1+, Y0.1-, Y0.2+, Y0.2-, Y0.3+, Y0.3-, Y0.4+, Y0.4-, Y0.5+, Y0.5-, Y0.6+, Y0.6-, Y0.7+, and Y0.7-	1. They are differential outputs. 2. The function of the terminals: ● Motion control: ◆ The terminals are for axis 1~axis 4. ◆ Y0.0+ and Y0.0- are A-phase outputs for axis 1. Y0.2+ and Y0.2- are A-phase outputs for axis 2. Y0.4+ and Y0.4- are A-phase outputs for axis 3. Y0.6+ and Y0.6- are A-phase outputs for axis 4. ◆ Y0.1+ and Y0.1- are B-phase outputs for axis 1. Y0.3+ and Y0.3- are B-phase outputs for axis 2. Y0.5+ and Y0.5- are B-phase outputs for axis 3. Y0.7+ and Y0.7- are B-phase outputs for axis 4. ◆ Y0.0+ and Y0.0- are the CLEAR outputs for axis 5. Y0.1+ and Y0.1- are the CLEAR outputs for axis 6.	1 MHz	5 mA	5 V

- **AH20MC-5A**

Item		Specifications		
		AH20MC-5A		
Number of axes		12 axes		
Storage		The capacity of the built-in storage is 64 ksteps.		
Unit		Motor unit	Compound unit	Mechanical unit
Connection with a CPU module		Users can set the initial register involved in the data exchange in a CPU module, and the number of registers involved in the data exchange in the CPU module. Four hundred data registers at most can be involved in the data exchange.		
Motor control		Delta high-speed motion control system DMCNET (Delta Motion Control Network) The response time is one millisecond.		
Maximum speed		Single axis: 500 kpps Two-axis interpolation: 500 kpps		
Input signal	**Operating switch**	STOP/RUN (automatic/manual switch)		
	Detector	X0.10+, X0.10-, X0.11+, X0.11-, X0.12+, X0.12-, X0.13+, X0.13-, X0.14+, X0.14-, X0.15+, X0.15, X0.0+, X0.0-, X0.1+, X0.1-, X0.2+, X0.2-, X0.3+, X0.3-, X0.8+, X0.8-, X0.9+, and X0.9-		
Output signal	**Servo output signal**	Y0.8+, Y0.8-, Y0.9+, Y0.9-, Y0.10+, Y0.10-, Y0.11+ and Y0.11-		
External communication port		Mini USB port Ethernet port DMCNET port		
Expansion storage device		Mini SD card The maximum capacity is 32 GB.		
Number of basic instructions		27		
Number of applied instructions		130		
M-code		● OX0~99 (motion subroutine/positioning program): M02 (The execution of the program stops. (END)) ● M00~M01, M03~M101, and M103~M65535: The execution of the program pauses. (WAIT) Users can use them freely.		
G-code		G0 (rapid positioning), G1 (linear interpolation), G2 (circular interpolation, clockwise), G3 (circular interpolation, counterclockwise), G4 (dwell), G17 (XY plane selection), G18 (ZX plane selection), G19 (YZ plane selection), G90 (absolute programming), and G91 (incremental programming)		

The description of the terminals

Terminal	Description	Response characteristic	Maximum input	
			Current	Voltage
X0.0+, X0.0-, X0.1+, X0.1-, X0.2+, X0.2-, X0.3+, and X0.3-	1. They are differential inputs. 2. The functions of the terminals: ● High-speed count: ◆ The terminals are the RESET inputs for counter 0~counter 5. ◆ X0.0+ and X0.0- are for counter 0. X0.1+ and X0.1- are for counter 1. X0.2+ and X0.2- are for counter 2 and counter 4. X0.3+ and X0.3- are for counter 3 and counter 5. ● High-speed comparison and catch: The terminals can function as trigger signals for a high-speed catch. ● Interrupt inputs	200 kHz	15 mA	5~24 V
X0.8+, X0.8-, X0.9+, and X0.9-	1. They are differential inputs. 2. The functions of the terminals: ● Motion control: The terminals are for a manual pulse generator. ● High-speed count: ◆ The terminals are for counter 0. ◆ X0.8+ and X0.8- are A-phase inputs for counter 0. X0.9+ and X0.9- are B-phase inputs for counter 0. ● High-speed comparison and catch: The terminals can function as trigger signals for a high-speed catch. ● Interrupt inputs	200 kHz	15 mA	5~24 V

Terminal	Description	Response characteristic	Maximum input	
			Current	Voltage
X0.10+, X0.10-, X0.11+, X0.11-, X0.12+, X0.12-, X0.13+, X0.13, X0.14+, X0.14-, X0.15+, and X0.15-	1. They are differential inputs. 2. The functions of the terminals: ● High-speed count: ◆ The terminals are for counter 1~counter 5. ◆ X0.10+ an X0.10- are A-phase inputs for counter 1. X0.12+ and X0.12- are A-phase inputs for counter 2 and counter 4. X0.14+ and X0.14- are A-phase inputs for counter 3 and counter 5. ◆ X0.11+ and X0.11- are B-phase inputs for counter 1. X0.13+ and X0.13- are B-phase inputs for counter 2 and counter 4. X0.15+ and X0.15- are B-phase inputs for counter 3 and counter 5. ● High-speed comparison and catch: The terminals can function as trigger signals for a high-speed catch. ● Interrupt inputs	200 kHz	15 mA	5~24 V
Y0.8, Y0.9, Y0.10, and Y0.11	1. The high-speed pulse outputs are transistors whose collectors are open collector. 2. The function of the terminals: ● High-speed comparison and catch: The high-speed comparison outputs provide the PWM function.	200 kHz	15 mA	24 V

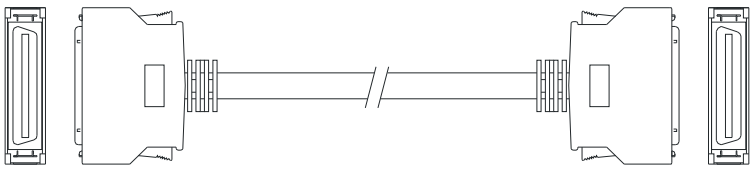
5.10.2 I/O Extension Cables and External Terminal Modules

A connector for a motion control module connects an I/O extension cable to an external terminal module. Users can install wires on the input and output terminal blocks in the external terminal module.

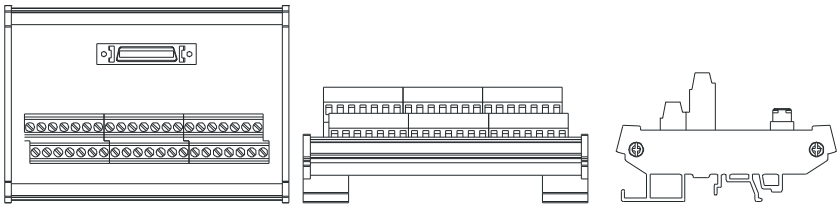
1. The I/O extension cable DVPACAB7D10/DVPACAB7E10

   DVPACAB7D10 is a 36-pin I/O extension cable for AH04HC-5A and AH20MC-5A.

   DVPACAB7E10 is a 50-pin I/O extension cable for AH10PM-5A.

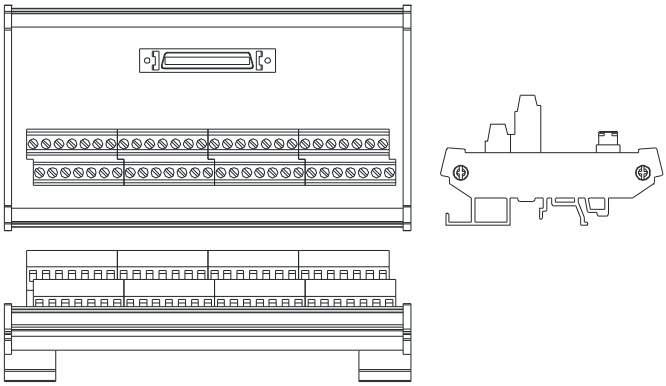


2. The external terminal module for AH04HC-5A and AH20MC-5A: DVPAETB-IO16C



C3	C2	C1	C0	N/C	N/C	X0.3-	X0.15-	X0.14-	X0.2-	X0.13-	X0.12-	X0.1-	X0.11-	X0.10-	X0.0-	X0.9-	X0.8-	24G	24G	FE
Y0.11	Y0.10	Y0.9	Y0.8	N/C	N/C	X0.3+	X0.15+	X0.14+	X0.2+	X0.13+	X0.12+	X0.1+	X0.11+	X0.10+	X0.0+	X0.9+	X0.8+	N/C	24V	24V

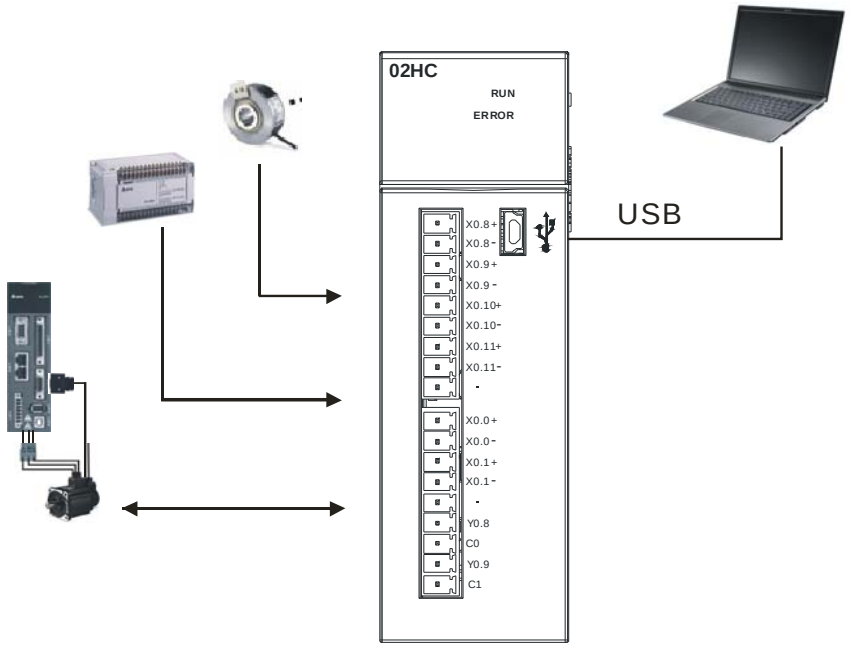
3. The external terminal module for AH10PM-5A: DVPAETB-IO24C



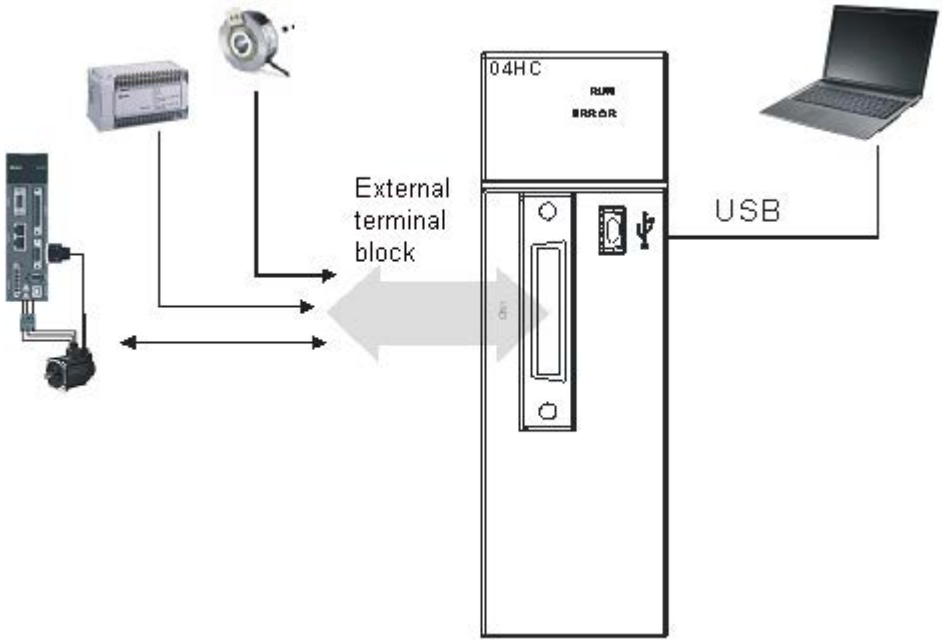
1st from the upper left	**C3**	**C2**	**C1**	**C0**	**N/C**	**Y0.7-**	**Y0.6-**	**Y0.5-**	**Y0.4-**	**Y0.3-**	**Y0.2-**	**Y0.1-**	**Y0.0-**	**N/C**
15th from the upper left	**N/C**	**X0.15**	**X0.13**	**X0.11**	**X0.9**	**N/C**	**N/C**	**X0.3-**	**X0.2-**	**X0.1-**	**X0.0-**	**24G**	**24G**	**FE**
1st from the lower left	**Y0.11**	**Y0.10**	**Y0.9**	**Y0.8**	**N/C**	**Y0.7+**	**Y0.6+**	**Y0.5+**	**Y0.4+**	**Y0.3+**	**Y0.2+**	**Y0.1+**	**Y0.0+**	**N/C**
15th from the lower left	**S/S**	**X0.14**	**X0.12**	**X0.10**	**X0.8**	**N/C**	**N/C**	**X0.3+**	**X0.2+**	**X0.1+**	**X0.0+**	**N/C**	**24V**	**24V**

5.10.3 Wiring AH02HC-5A and AH04HC-5A

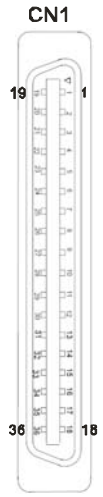
- The external devices for AH02HC-5A



- The external devices for AH04HC-5A



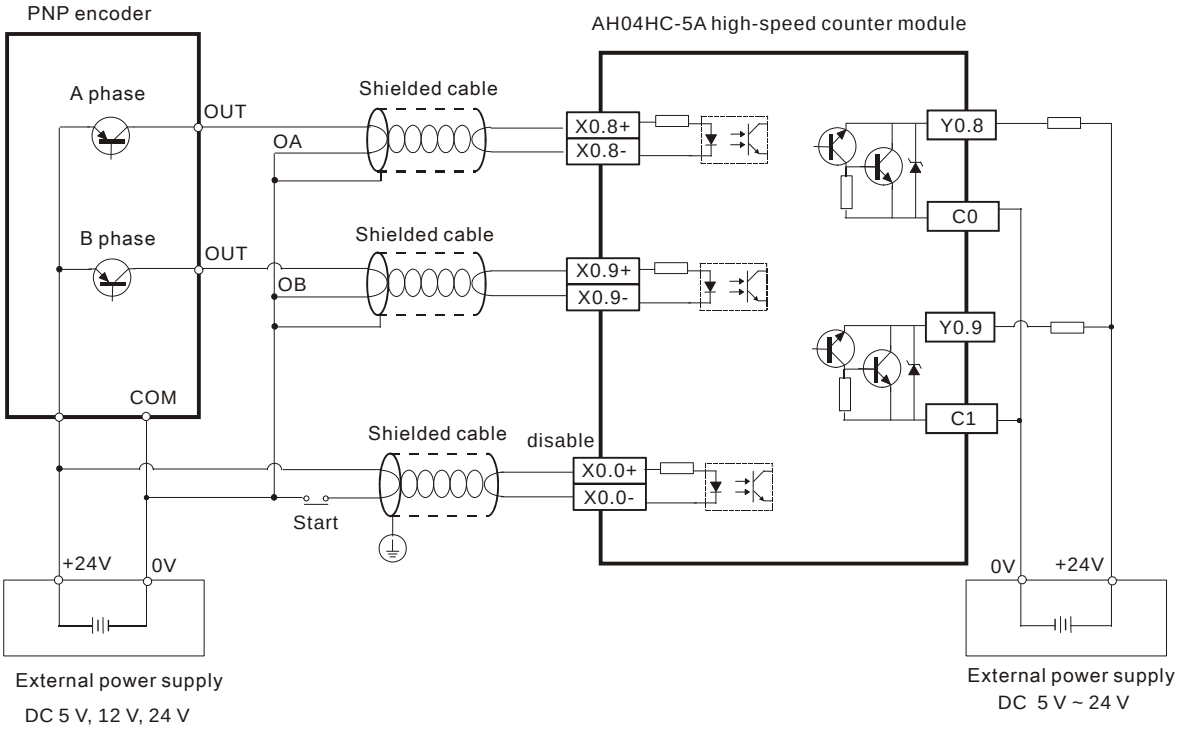
- The connector on AH04HC-5A



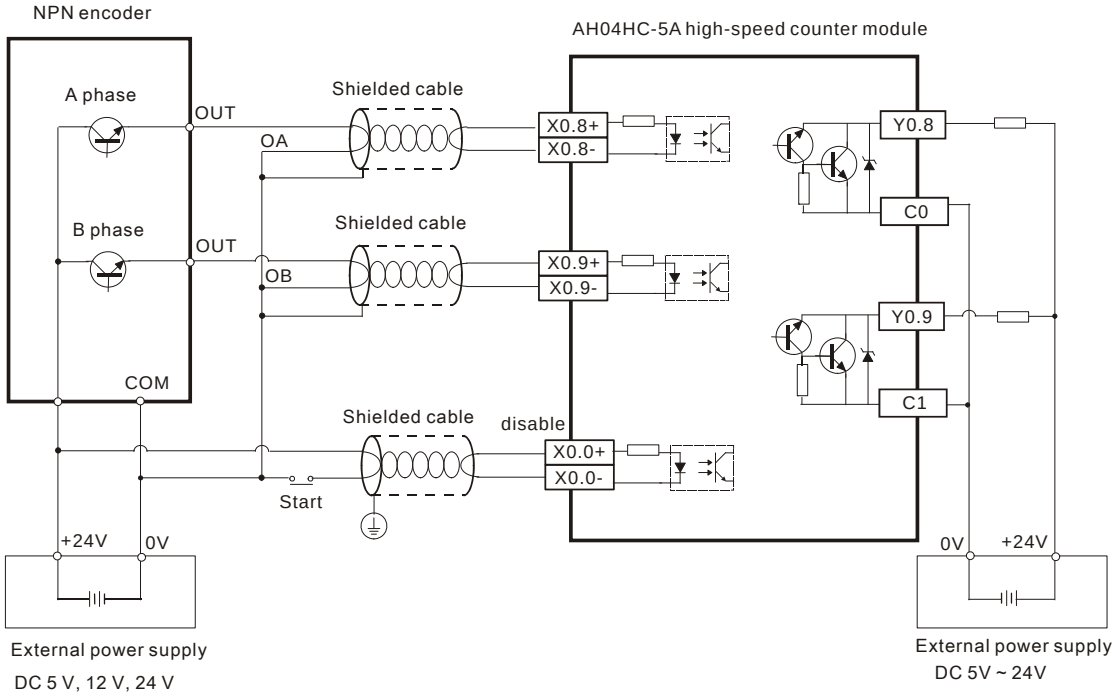
Pin	Terminal	Function Count	Pin	Terminal	Function Count
1	X0.8+	CntA0+	19	X0.14+	CntA3+
2	X0.8-	CntA0-	20	X0.14-	CntA3-
3	X0.9+	CntB0+	21	X0.15+	CntB3+
4	X0.9-	CntB0-	22	X0.15-	CntB3-
5	X0.0+	Rst0+	23	X0.3+	Rst3+
6	X0.0-	Rst0-	24	X0.3-	Rst3-
7	X0.10+	CntA1+	25	.	.
8	X0.10-	CntA1-	26	.	.
9	X0.11+	CntB1+	27	.	.
10	X0.11-	CntB1-	28	.	.
11	X0.1+	Rst1+	29	Y0.8	Out0
12	X0.1-	Rst1-	30	C0	COM0
13	X0.12+	CntA2+	31	Y0.9	Out1
14	X0.12-	CntA2-	32	C1	COM1
15	X0.13+	CntB2+	33	Y0.10	Out2
16	X0.13-	CntB2-	34	C2	COM2
17	X0.2+	Rst2+	35	Y0.11	Out3
18	X0.2-	Rst2-	36	C3	COM3

5.10.3.1 External Wiring

1. A PNP encoder is used.



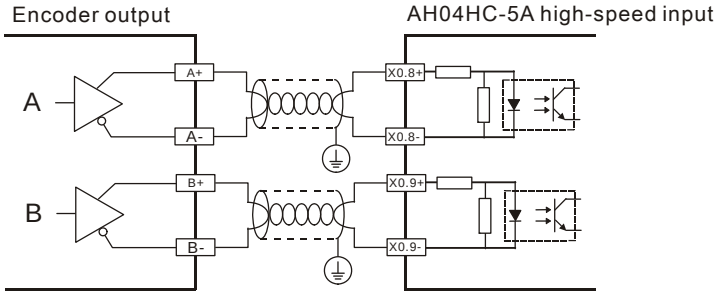
2. An NPN encoder is used.



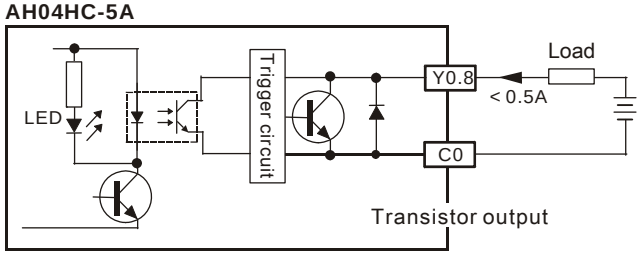
5.10.3.2 Wiring the Differential Inputs

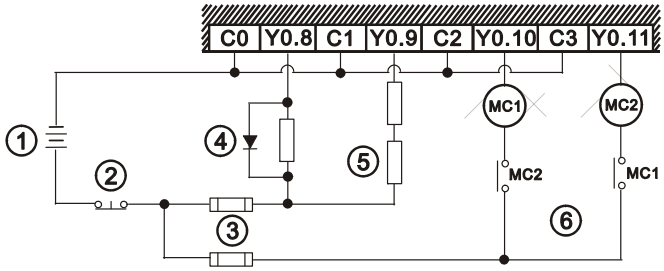
The direct-current signals ranging in voltage from 5 V to 24 V can pass through the high-speed inputs X0.0+~X0.1+, X0.0-~X0.1-, X0.8+~X0.11+, and X0.8-~X0.11- on AH02HC-5A, and the high-speed inputs X0.0+~X0.3+, X0.0-~X0.3-, X0.8+~X0.15+, and X0.8-~X0.15- on AH04HC-5A. The frequency of input signals can be up to 200 kHz. These high-speed inputs are connected to a differential (two-wire) line driver.

The wiring of the differential input (used for the high speed and noise):



5.10.3.3 Transistor Output Circuit



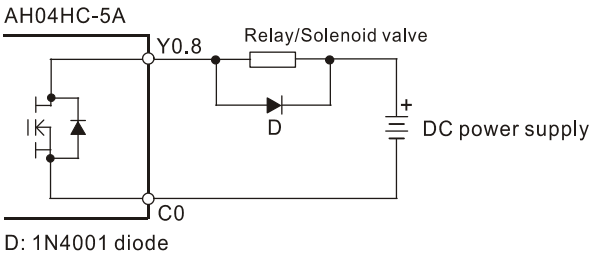


①	Direct-current power supply	②	Emergency stop	③	Fuse

④

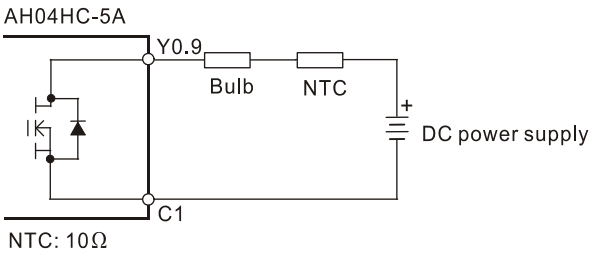
The transistor outputs are open collectors. If Y0.8 is a pulse output, the output current passing through the output pull-up resistor must be larger than 0.1 A to ensure that the transistor operates normally.

Relay/Solenoid valve through which the direct current passes: A diode is connected in parallel to absorb the surge voltage which occurs when the load is OFF.

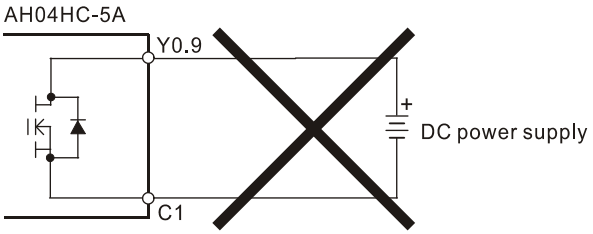


⑤

Bulb (incandescent lamp) through which the direct current passes: A thermistor is connected in series to absorb the surge current which occurs when the load is ON.



Y0.9 can not be connected to the power supply directly. The output wiring must be connected to a load.

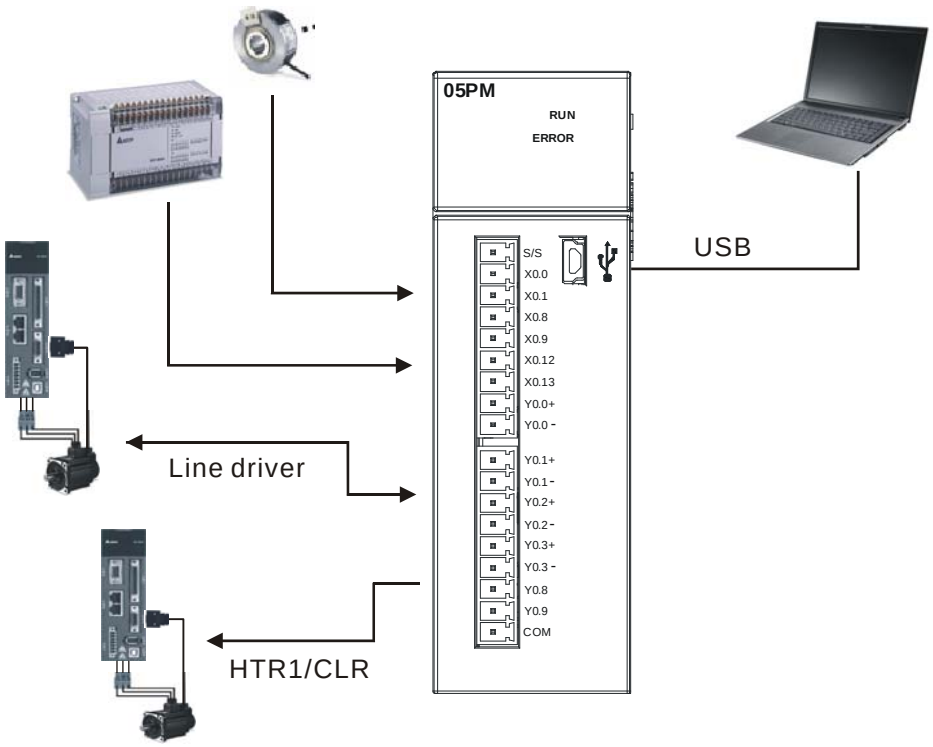


⑥

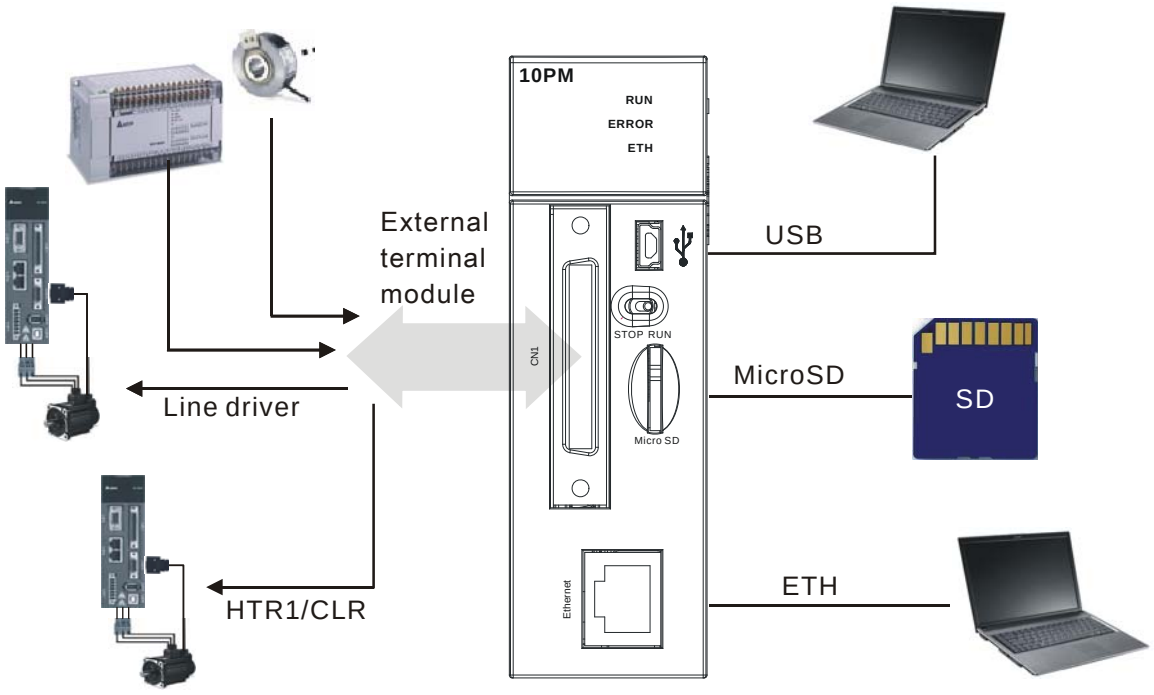
Mutually exclusive output: Y0.10 controls the clockwise rotation of the motor, and Y0.11 controls the counterclockwise rotation of the motor. The interlock circuit which is formed, and the program in the PLC ensure that there are protective measures if an abnormal condition occurs.

5.10.4 Wiring AH05PM-5A and AH10PM-5A

- The external devices for AH05PM-5A

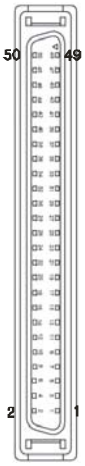


- The external devices for AH10PM-5A



- The connector on AH10PM-5A

CN1



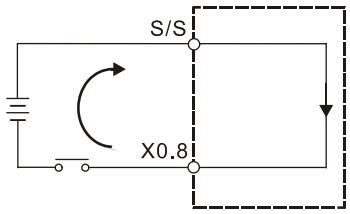
Pin	terminal	Function		Pin	Terminal	Function
		Pulse	Count			Pulse
50	X0.0+	Pg0+	Rst0+	25	Y0.0-	A0-/CLR4-
49	X0.0-	Pg0-	Rst0-	24	Y0.1+	B0+/CLR5+
48	X0.1+	Pg1+	Rst1+	23	Y0.1-	B0-/CLR5-
47	X0.1-	Pg1-	Rst1-	22	Y0.2+	A1+
46	X0.2+	Pg2+	Rst2+/Rst2+	21	Y0.2-	A1-
45	X0.2-	Pg2-	Rst2-/Rst2+	20	Y0.3+	B1+
44	X0.3+	Pg3+	Rst3+/Rst2+	19	Y0.3-	B1-
43	X0.3-	Pg3-	Rst3-/Rst2+	18	Y0.4+	A2+
42	NC	.	.	17	Y0.4-	A2-
41	NC	.	.	16	Y0.5+	B2+
40	NC	.	.	15	Y0.5-	B2-
39	NC	.	.	14	Y0.6+	A3+
38	X0.8	MPGA	CntA0	13	Y0.6-	A3-
37	X0.9	MPGB	CntB0	12	Y0.7+	B3+
36	X0.10	DOG4	CntA1	11	Y0.7-	B3-
35	X0.11	DOG5	CntB1	10	NC	.
34	X0.12	DOG0	CntA2/CntA4	9	NC	.
33	X0.13	DOG1	CntB2/CntB4	8	Y0.8	CLR0/A4
32	X0.14	DOG2	CntB3/CntA5	7	C0	COM0
31	X0.15	DOG3	CntB3/CntB5	6	Y0.9	CLR1/B4
30	S/S	S/S	S/S	5	C1	COM1
29	NC	.	.	4	Y0.10	CLR2/A5
28	NC	.	.	3	C2	COM2
27	NC	.	.	2	Y0.11	CLR3/B5
26	Y0.0+	A0+/CLR4+	.	1	C3	COM3

5.10.4.1 Wiring the Input Terminals

The input signal is the direct-current power input. Sinking and sourcing are the current driving capability of a circuit. They are defined as follows.

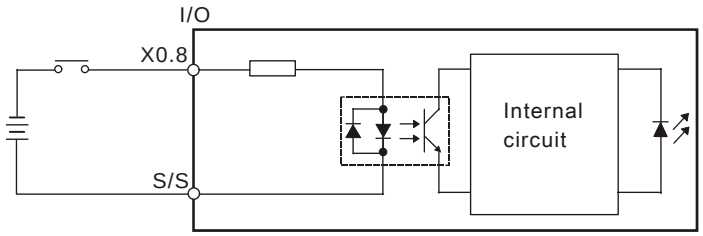
- **Sinking**

Direct current



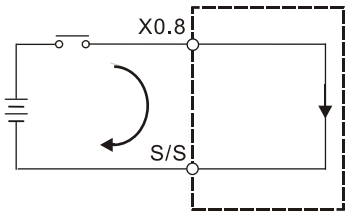
The current flows into the common terminal S/S.

Equivalent circuit of the input circuit



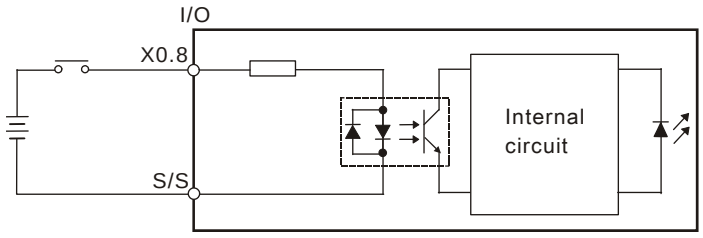
- **Sourcing**

Direct current



The current flows from the common terminal S/S.

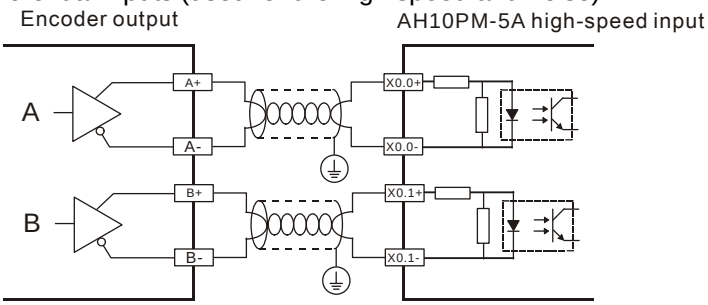
Equivalent circuit of the input circuit



- **Wiring the differential inputs**

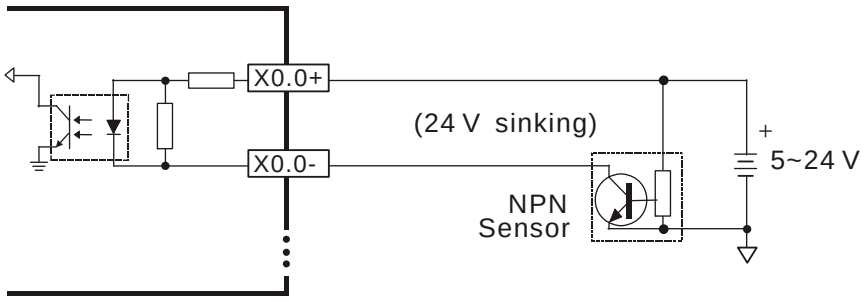
The direct-current signals ranging in voltage from 5 V to 24 V can pass through the high-speed inputs X0.0+~X0.3+, and X0.0-~X0.3- on AH10PM-5A. (Only 24 V DC signals can pass through the other inputs in AH10PM-5A.) The frequency of input signals can be up to 200 kHz. These high-speed inputs are connected to a differential (two-wire) line driver.

The wiring of the differential inputs (used for the high speed and noise):

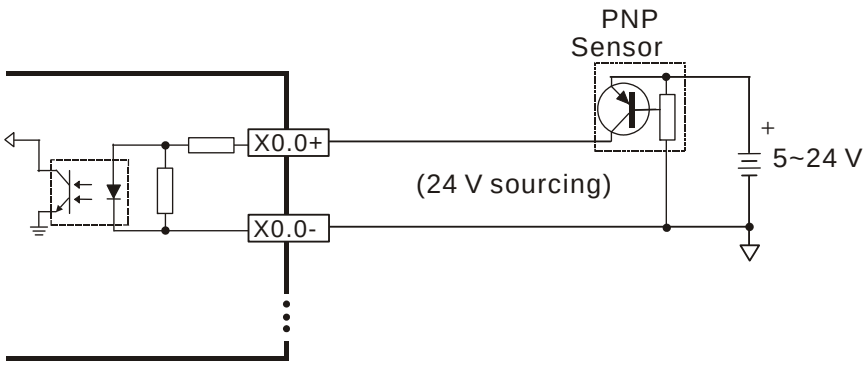


If the frequency of input signals is less than 50 kHz and there is not much noise, these high-speed inputs can be connected to the direct-current power supply whose voltage is within the range between 5 V and 24 V, as shown below.

Sinking:

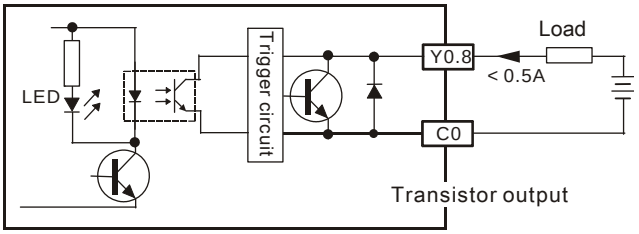


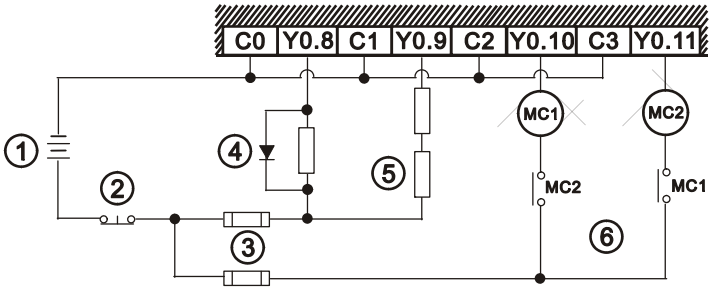
Sourcing:



5.10.4.2 Wiring the Output Terminals

1. The transistor output circuit

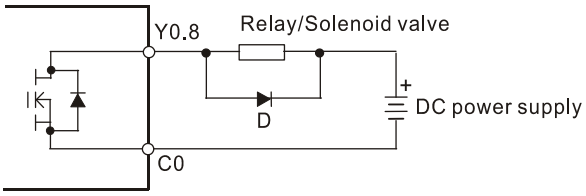




①	Direct-current power supply	②	Emergency stop	③	Fuse

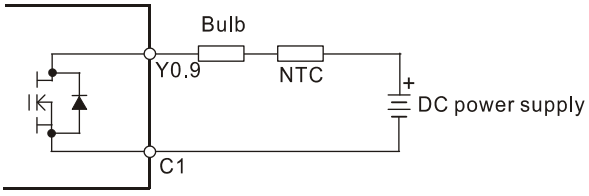
④ The transistor outputs are open collectors. If Y0.8 is a pulse output, the output current passing through the output pull-up resistor must be larger than 0.1 A to ensure that the transistor operates normally.

Relay/Solenoid valve through which the direct current passes: A diode is connected in parallel to absorb the surge voltage which occurs when the load is OFF.



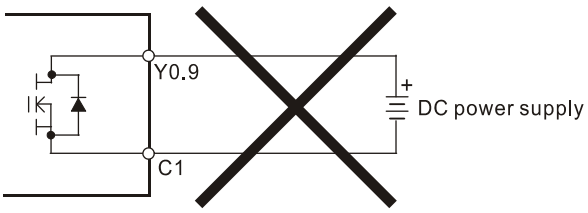
D: 1N4001 diode

⑤ Bulb (incandescent lamp) through which the direct current passes: A thermistor is connected in series to absorb the surge current which occurs when the load is ON.



NTC: 10Ω

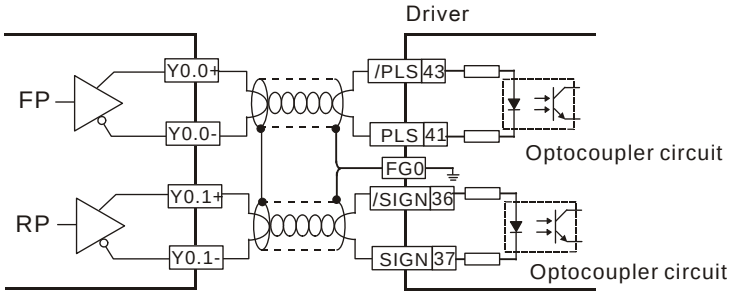
⑤ Y0.9 can not be connected to the power supply directly. The output wiring has to be connected to a load.



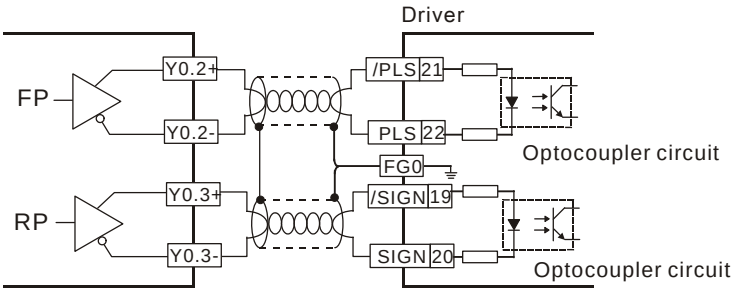
⑥	Mutually exclusive output: Y0.10 controls the clockwise rotation of the motor, and Y0.11 controls the counterclockwise rotation of the motor. The interlock circuit which is formed, and the program in the PLC ensure that there are protective measures if an abnormal condition occurs.

2. The wiring of the differential outputs

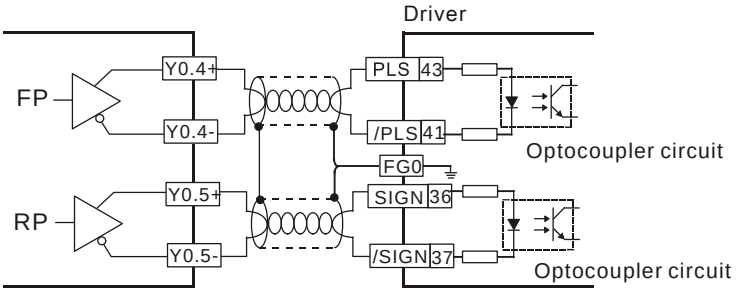
- Wiring the differential outputs on AH05PM-5A/AH10PM-5A, an ASDA-A series AC servo drive, an ASDA-A+ series AC servo drive, and an ASDA-A2 series AC servo drive



- Wiring the differential outputs on AH05PM-5A/AH10PM-5A, and an ASDA-B series AC servo drive

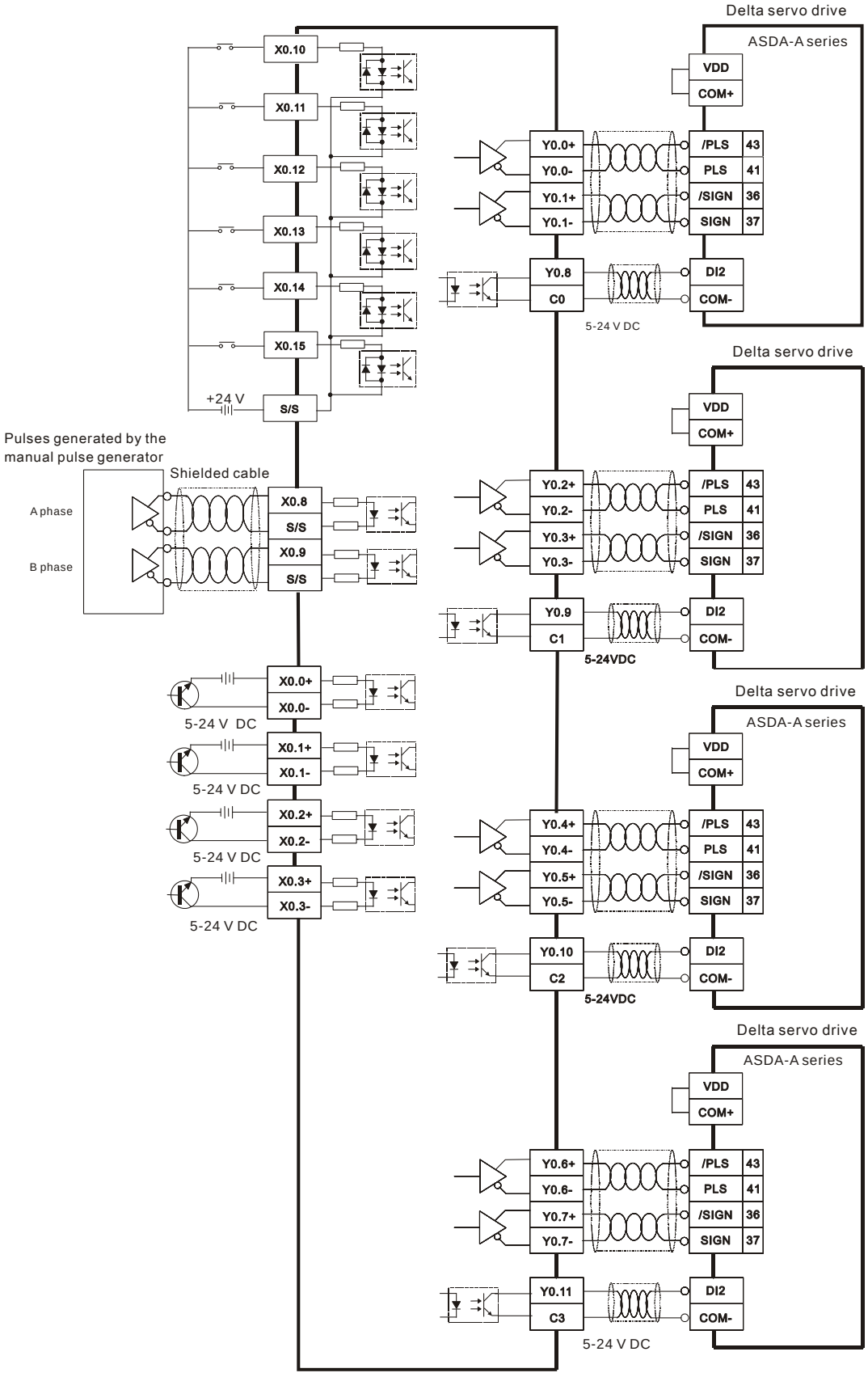


- Wiring the differential outputs on AH05PM-5A/AH10PM-5A, and an ASDA-AB series AC servo drive

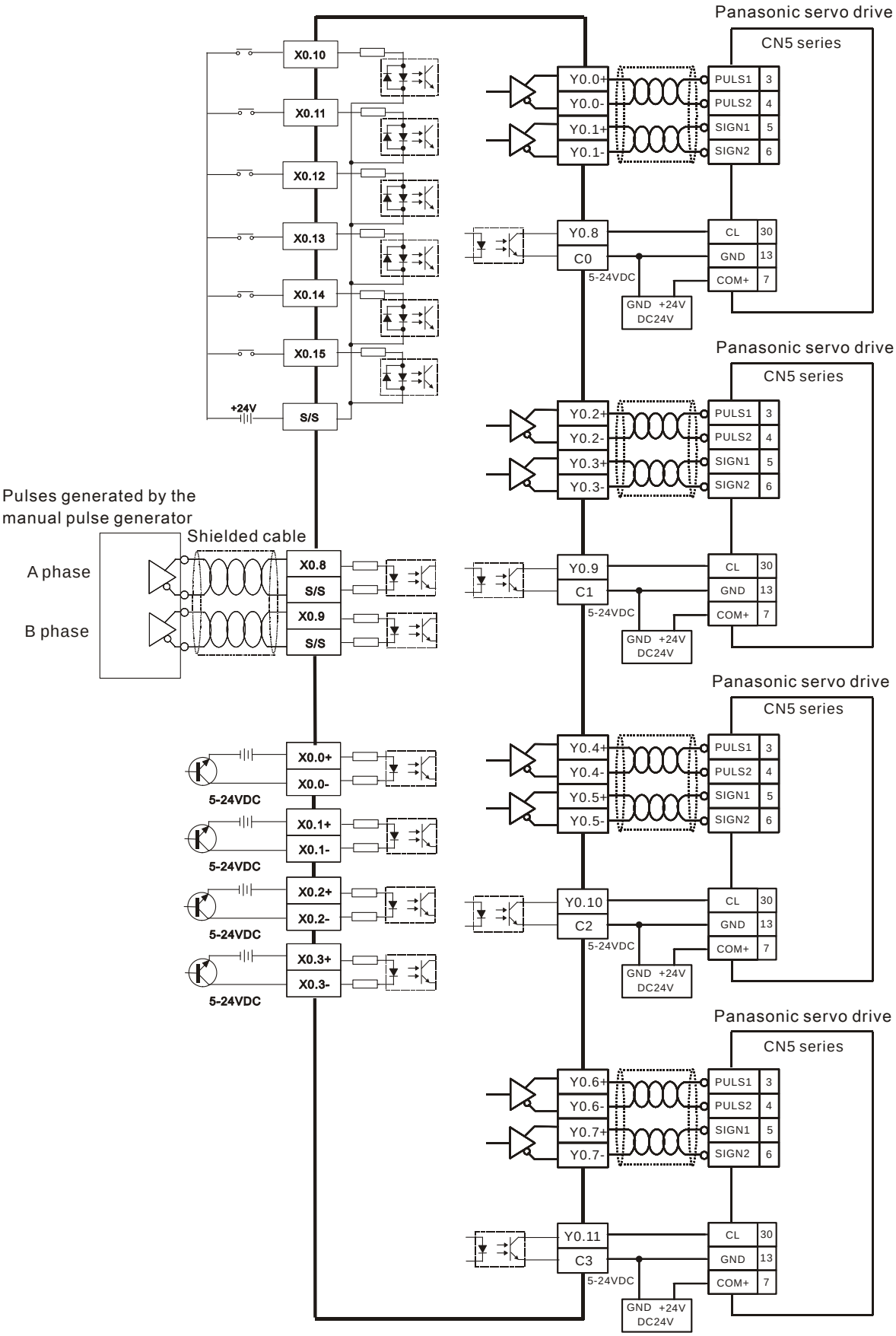


5.10.4.3 Wiring AH10PM-5A and an Inferior Servo Drive

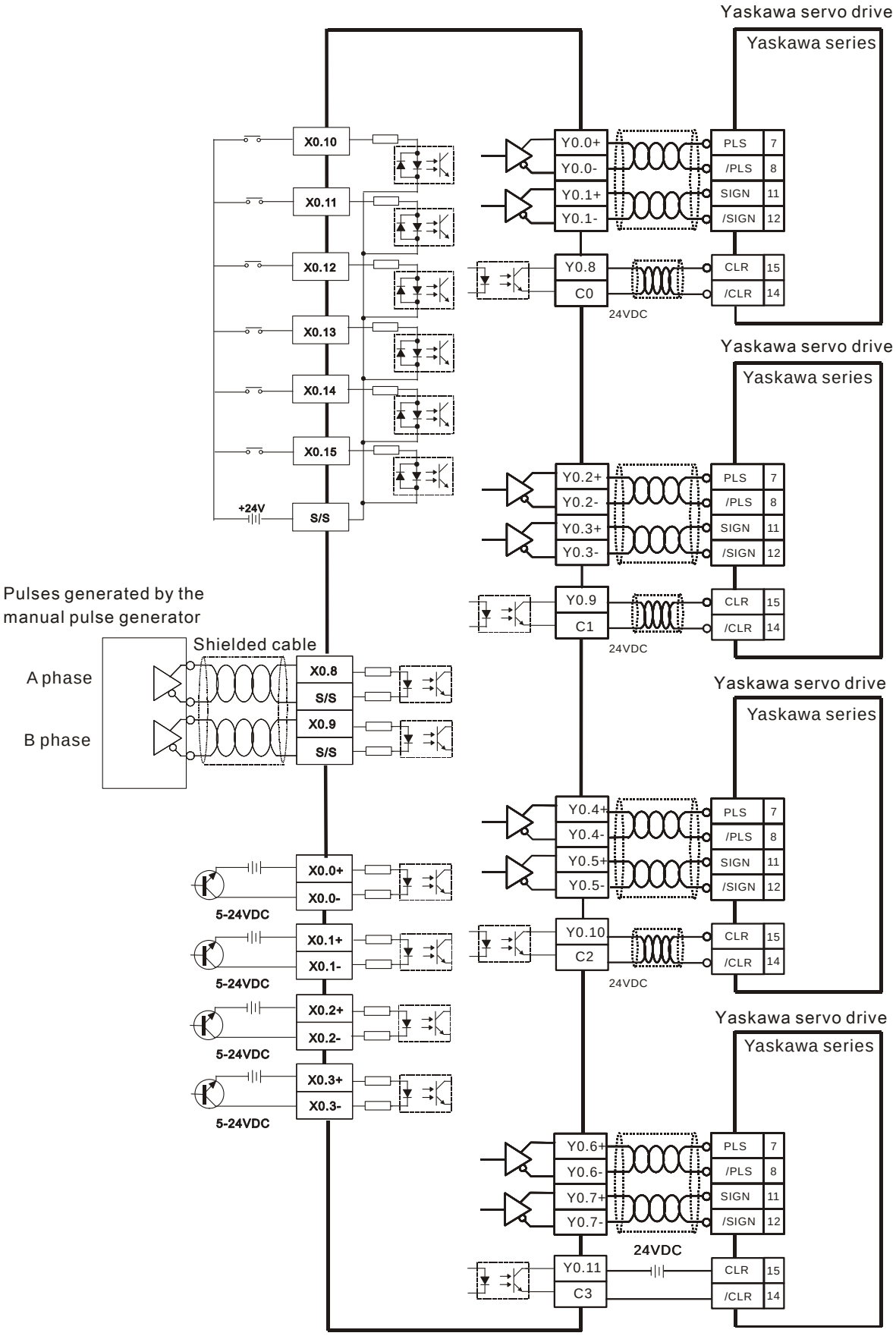
- Wiring AH10PM-5A and a Delta ASDA-A series AC servo drive



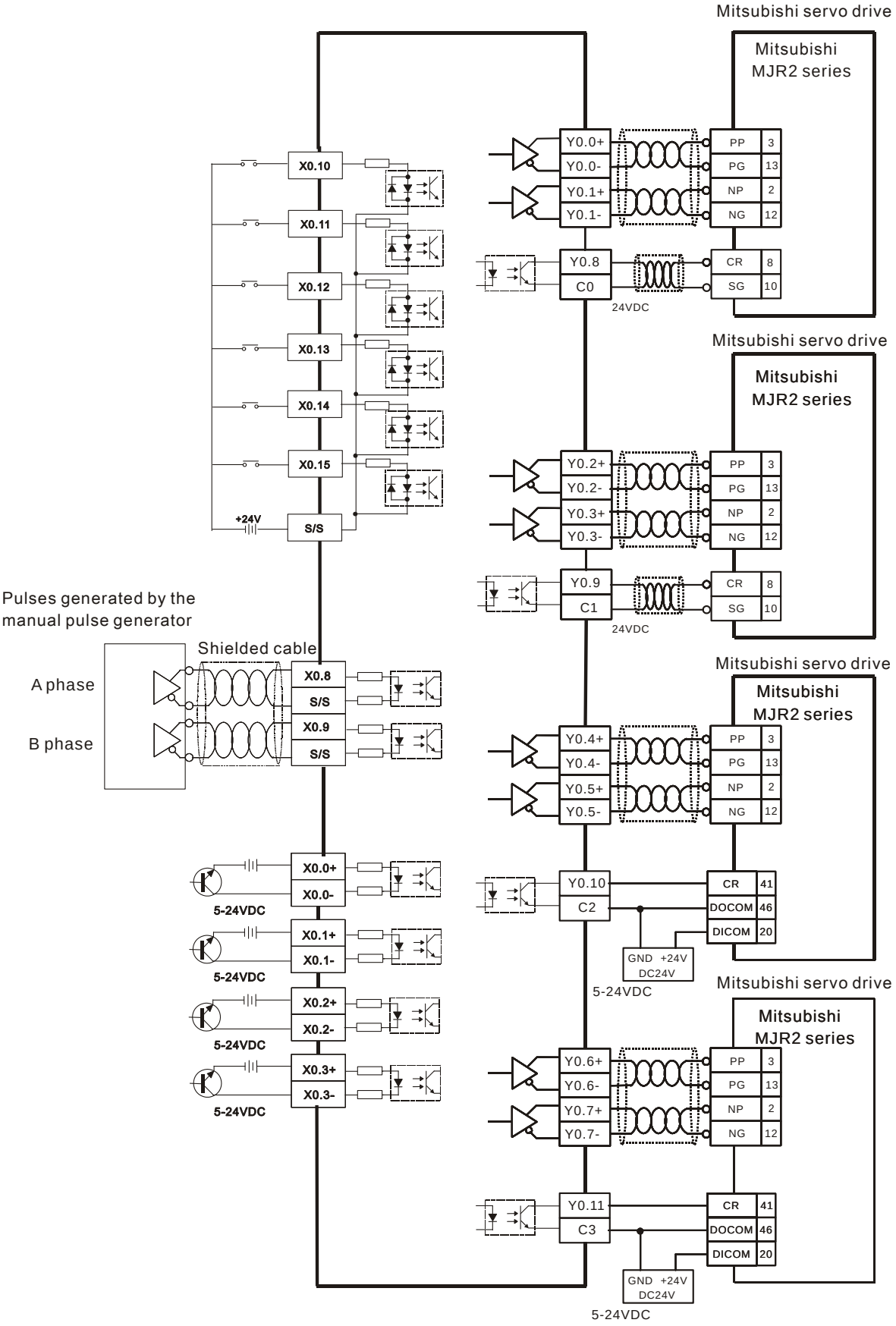
- Wiring AH10PM-5A and a Panasonic CN5 series servo drive



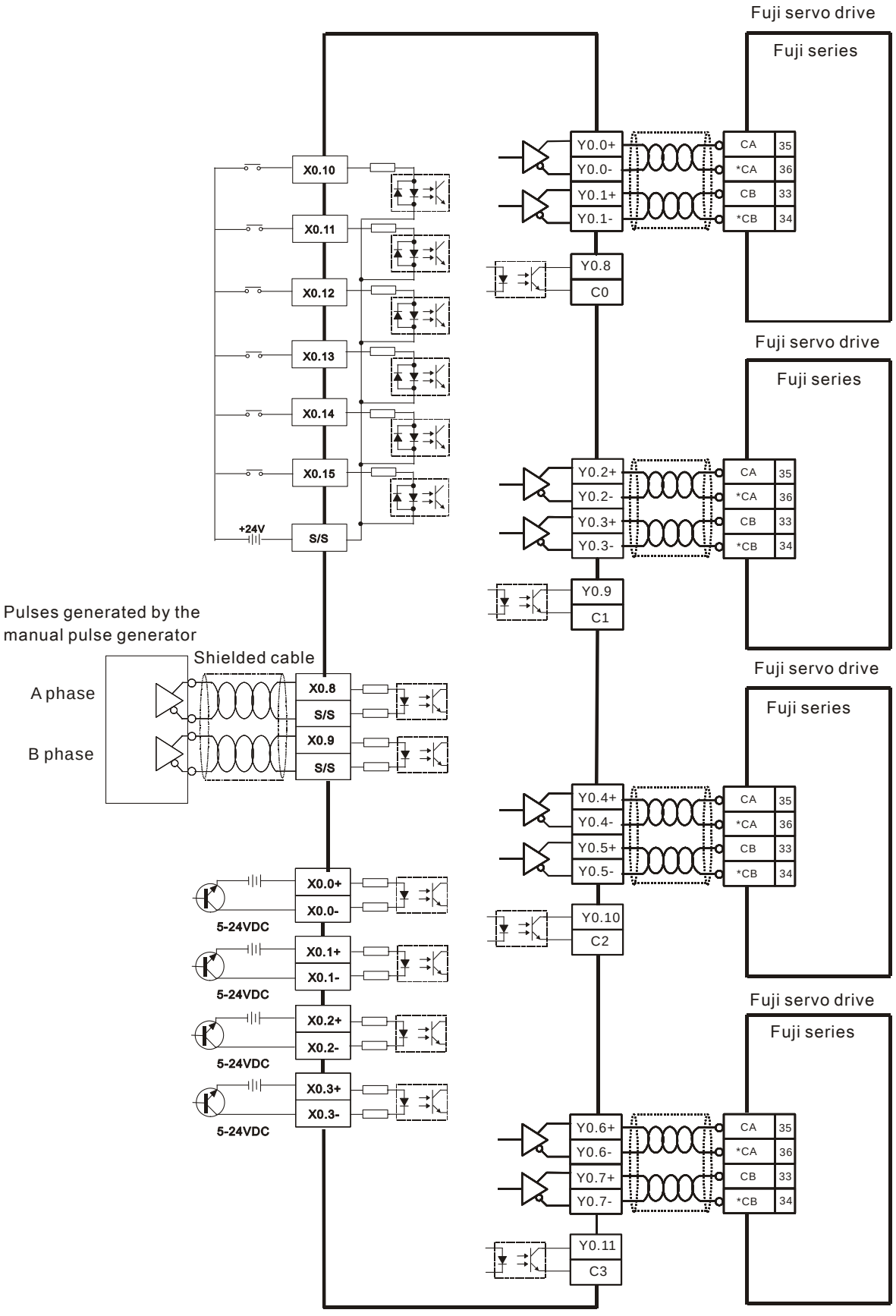
- Wiring AH10PM-5A and an Yaskawa servo drive



- Wiring AH10PM-5A and a Mitsubishi MJR2 series servo drive

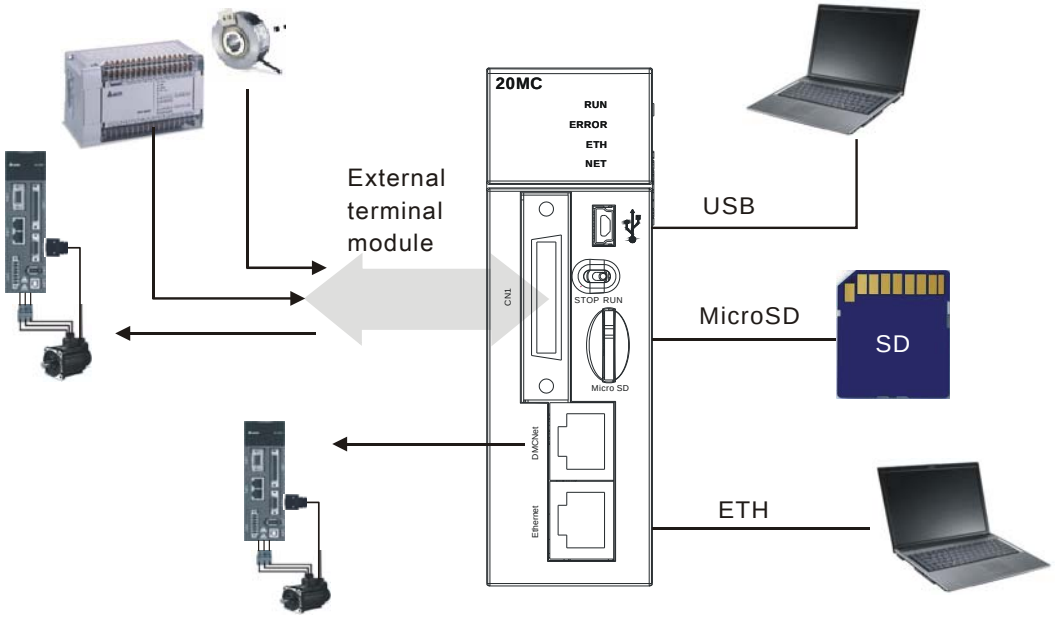


- Wiring AH10PM-5A and a Fuji servo drive



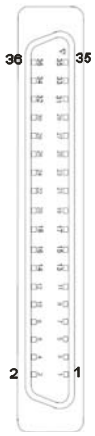
5.10.5 Wiring AH20MC-5A

- The external devices for AH20MC-5A



- The connector on AH20MC-5A

CN1



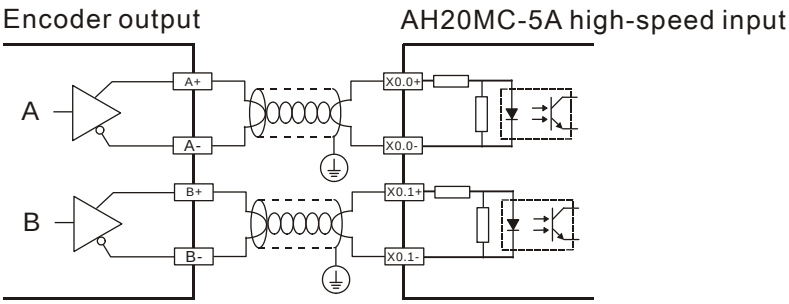
Pin	Terminal	Function		Pin	Terminal	Function	
		Pulse	Count			Pulse	Count
36	X0.8+	MPGA+	CntA0+	36	X0.14+	.	CntA3+/CntA5+
35	X0.8-	MPGA-	CntA0-	35	X0.14-	.	CntA3-/CntA5+
34	X0.9+	MPGB+	CntB0+	34	X0.15+	.	CntB3+/CntB5+
33	X0.9-	MPGB+	CntB0-	33	X0.15-	.	CntB3-/CntB5+
32	X0.0+	.	Rst0+	32	X0.3+	.	Rst3+/Rst5+
31	X0.0-	.	Rst0-	31	X0.3-	.	Rst3-/Rst5-
30	X0.10+	.	CntA1+	30	.	.	.
29	X0.10-	.	CntA1-	29	.	.	.
28	X0.11+	.	CntB1+	28	.	.	.
27	X0.11-	.	CntB1-	27	.	.	.
26	X0.1+	.	Rst1+	26	Y0.8	.	Out0
25	X0.1-	.	Rst1-	25	C0	.	COM0
24	X0.12+	.	CntA2+/CntA4+	24	Y0.9	.	Out1
23	X0.12-	.	CntA2-/CntA4-	23	C1	.	COM1
22	X0.13+	.	CntB2+/CntB4+	22	Y0.10	.	Out2
21	X0.13-	.	CntB2-/CntB4-	21	C2	.	COM2
20	X0.2+	.	Rst2+/Rst4+	20	Y0.11	.	Out3

	19	X0.2-	.	Rst2-/Rst4-	19	C3	.	COM3

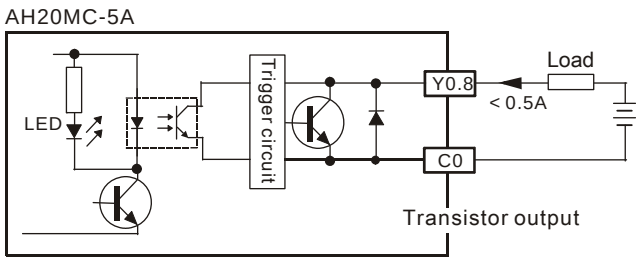
5.10.5.1 Wiring the Differential Input Terminals

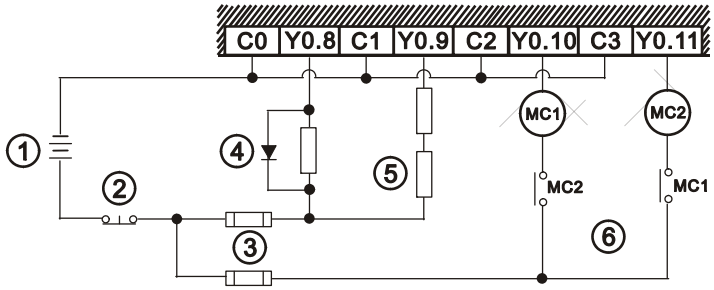
The direct-current signals ranging in voltage from 5 V to 24 V can pass through the high-speed inputs X0.0+~X0.3+, X0.0-~X0.3-, X0.8+~X0.15+, and X0.8-~X0.15- on AH20MC-5A. The frequency of input signals can be up to 200 kHz. These high-speed inputs are connected to a differential (two-wire) line driver.

The wiring of the differential input (used for the high speed and noise):

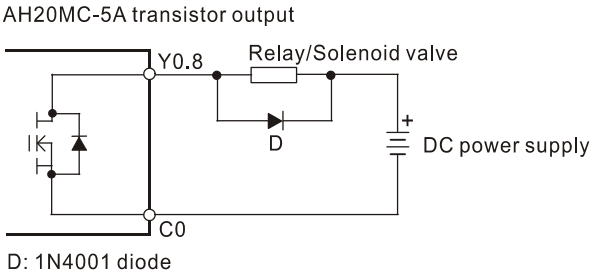
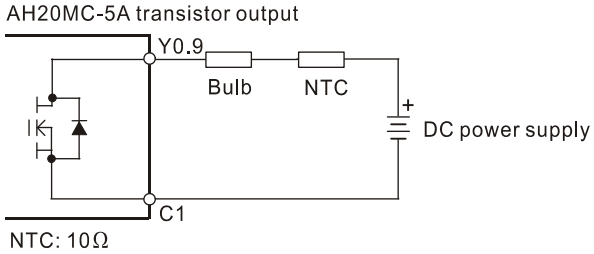
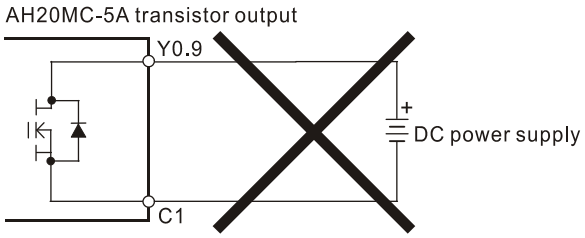


5.10.5.2 Transistor Output Circuit





①	Direct-current power supply	②	Emergency stop	③	Fuse

④	The transistor outputs are open collectors. If Y0.8 is a pulse output, the output current passing through the output pull-up resistor must be larger than 0.1 A to ensure that the transistor operates normally. Relay/Solenoid valve through which the direct current passes: A diode is connected in parallel to absorb the surge voltage which occurs when the load is OFF.  D: 1N4001 diode
⑤	Bulb (incandescent lamp) through which the direct current passes: A thermistor is connected in series to absorb the surge current which occurs when the load is ON.  NTC: 10Ω Y0.9 can not be connected to the power supply directly. The output wiring must be connected to a load. 
⑥	Mutually exclusive output: Y0.10 controls the clockwise rotation of the motor, and Y0.11 controls the counterclockwise rotation of the motor. The interlock circuit which is formed, and the program in the PLC ensure that there are protective measures if an abnormal condition occurs.

MEMO

Chapter 6 Memory Card

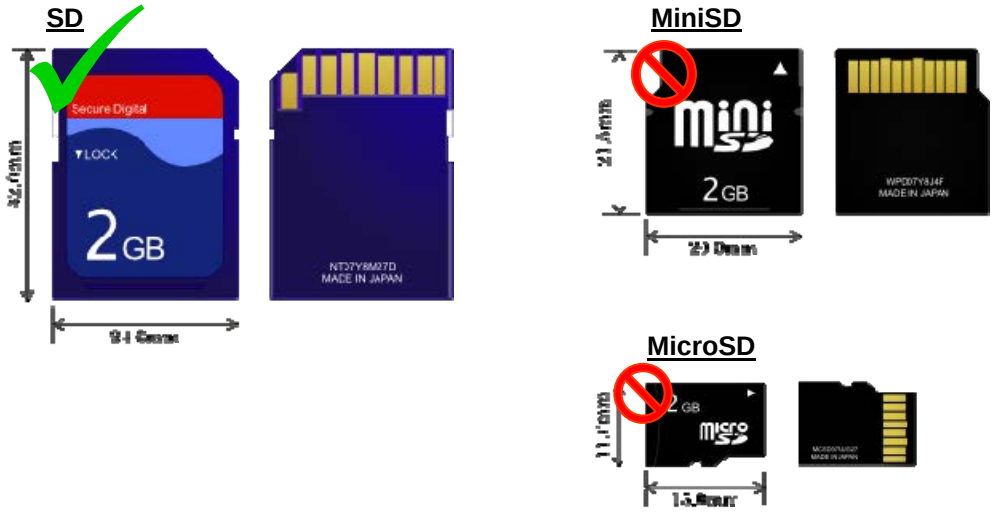
Table of Contents

6.1 Overview of Memory Cards

The AH500 series CPU modules support standard SD cards. Users can purchase products which meet specifications. The specifications for the SD cards supported by the AH500 series CPU modules, and the usage of the SD cards are described in this chapter.

6.1.1 Appearances of Memory Cards

SD cards are classified into three types according to size. They are SD cards, miniSD cards, and microSD cards. The AH500 series CPU modules support standard-sized SD cards.



6.1.2 Specifications for Memory Cards

There are several specifications for SD cards on the market. SD cards not only can be classified according to size, but also can be classified into three types according to capacity. These types are SD cards, SDHC cards, and SDXC cards. The AH500 series CPU modules presently only support basic SD specifications. The following is the table of SD card families. The SD column indicates the specifications supported by the AH500 series CPU modules. Be sure to purchase products which meet the specifications.

- The SD card families

Type	SD	SDHC			SDXC	
Capacity	2 GB Max.	4 GB~32 GB			32 GB~2 TB	
File system	FAT/FAT32	FAT32			exFAT	
Size	SD	SDHC	MiniSDHC	MicroSDHC	SDXC	MicroSDXC
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.)	

* MMC cards are similar to SD cards in appearance. Users have to make sure that they purchase products which meet the specifications.

6.2 Installing and Removing a Memory Card

6.2.1 Formatting of a Memory Card and a Write Protect Tab

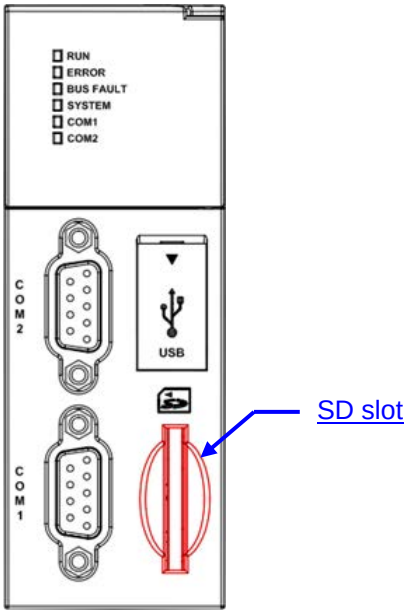
A memory card that users use for the first time may not be formatted. A memory card which is not formatted can not be used in an AH500 series CPU module. Therefore, users need to format the memory card. The file system with which the memory card is formatted is FAT.

In addition, there is usually a write protect tab on the left side of a memory card. If the tab is slid downward, data can not be written into the memory card. As a result, users have to make sure that the tab is slid upward before they use the memory card.

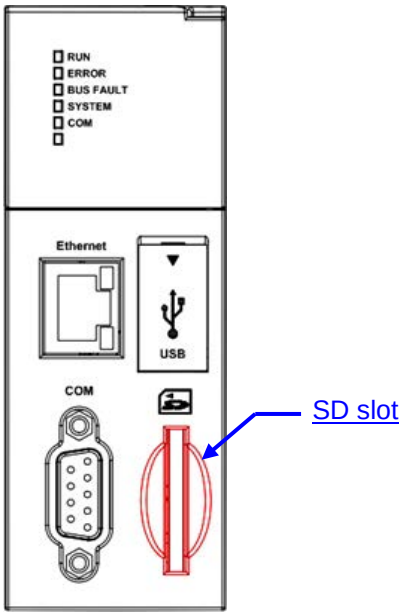
6.2.2 SD Slot in a CPU Module

As shown below, the SD slot is in the lower right corner of the front of a CPU module.

- AHCPU500/510/520/530-RS2

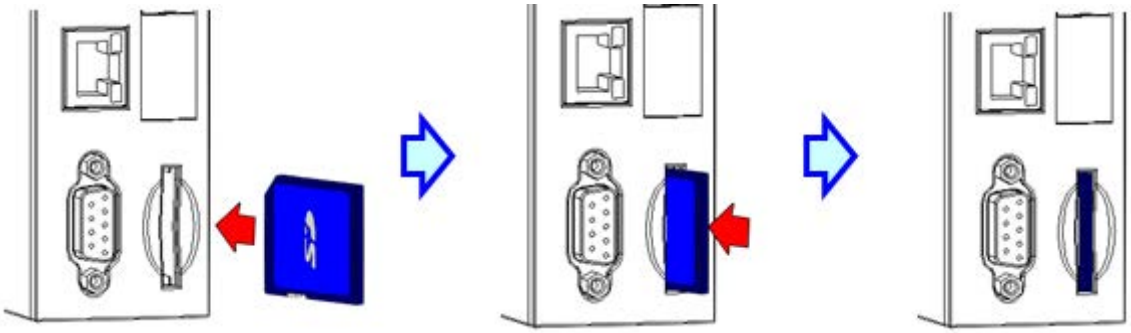


- AHCPU500/510/520/530-EN



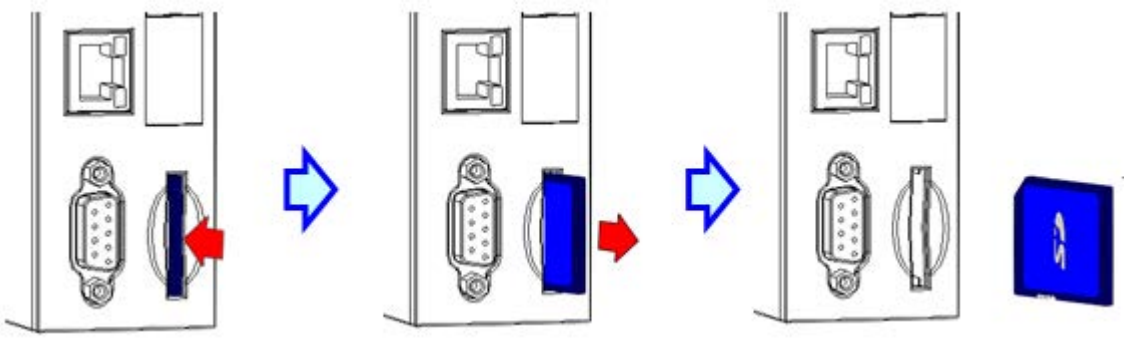
6.2.3 Installing a Memory Card

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



6.2.4 Removing a Memory Card

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



Chapter 7 EMC Standards

Table of Contents

7.1 EMC Standards for an AH500 System

7.1.1 EMC Standards Applicable to an AH500 System

The EMC standards which are applicable to an AH500 system are listed below.

- **EMI**

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

- **EMS**

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

- **The conducted immunity test**

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

7.1.2 Installation Instructions for the EMC Standards

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

(1) Control box

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

(2) Connecting a power cable and a ground

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

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

7.1.3 Cables

Grounding a shielded cable

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

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

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

MEMO

Chapter 8 Maintenance and Inspection

Table of Contents

8.1 Cautions

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


- To prevent a breakdown of an AH500 system or a fire accident, please make sure that the ambient environment is not exposed to corrosive substances such as chloride gas and sulfide gas, flammable substances such as oil mist and cutting powder, or dirt.


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


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


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


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


- Please do not disassemble or alter the modules. Otherwise, the products will break down, a fire accident will occur, or the staff will be injured.
- To prevent a controlled element from malfunctioning, please make sure that the program and the parameters are written into a new CPU module which replaces an old one before restarting the AH500 system.
- To prevent the improper operation which results in the incorrect output or the damage to the equipment, please refer to the related manuals for more information about operating the modules.
- To prevent the damage to the modules, please touch metal which is grounded or wear an antistatic wrist strap to release the static electricity from the body.
- To prevent the noise from resulting in the breakdown of the system, please keep a proper distance from the system when using a cell phone or a communication apparatus.
- Please avoid installing an AH500 system under the sun or in a humid environment.
- To prevent the temperature of an element from being high, please make sure that the AH500 system keeps a proper distance from heat sources such as coils, heating apparatuses, and resistors.
- To protect an AH500 system, please install an emergency stop switch and an overcurrent protection according to the actual needs.
- Inserting and pulling a module several times may lead to the loose contact between the module and the backplane.
- To prevent an unexpected shock from resulting in the damage to an AH500 system and a controlled element, please make sure that the modules are installed firmly.

8.2 Daily Maintenance

To keep an AH500 system operating normally, please make sure that the ambient environment and the AH500 system conform to the cautions listed in section 8.1. Users then can undertake the daily inspection described below. If any abnormal situation occurs, please follow the remedy and carry out the maintenance.

8.2.1 Tools Required for Inspection

- A screwdriver
- Industrial alcohol
- A clean cotton cloth

8.2.2 Daily Inspection

No.	Item		Inspection	Criterion	Remedy
1	Appearance		Check visually.	Dirt must not be present.	Remove the dirt.
2	Installation of a backplane		Check whether the set screws are loose.	The backplane must be installed firmly.	Further tighten the screws.
			Check whether the backplane is installed on the DIN rail properly.		Install the backplane on the DIN rail properly.
3	Installation of a module		Check whether the module is loose, the projection is inserted into the hole on the backplane, and the screw is tightened.	The projection under the module must be inserted into the hole in the backplane, and the screw must be tightened.	Install the module firmly.
4	Connection		Check whether the removable terminal block is loose	The removable terminal block must not be loose.	Install the terminal block firmly.
			Check whether the connector is loose.	The connector must not be loose.	Further tighten the screws on the connector.
5	Power supply module	POWER LED indicator	Check whether the POWER LED indicator is ON.	The POWER LED indicator must be ON.	Please refer to chapter 9 for more information about the troubleshooting.
	CPU module	RUN LED indicator	When the CPU module is running, check whether the RUN LED is ON.	The RUN LED indicator must be ON.	
		ERROR LED indicator	Check whether the ERROR LED indicator is OFF.	The ERROR LED indicator must be OFF.	
		BUS FAULT LED indicator	Check whether the BUS FAULT LED indicator is OFF.	The BUS FAULT LED indicator must be OFF.	
		SYSTEM LED indicator	Check whether the SYSTEM LED indicator is OFF.	The SYSTEM LED indicator must be OFF.	
	LED indicators on an extension module		Check whether the LED indicators on the extension module are ON.	If the LED indicators are ON, the module operates normally.	

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

8.3 Periodic Maintenance

Under the condition that the daily inspection is undertaken, users are suggested that they should carry out the periodic maintenance according to the actual operating environment. After making sure that the ambient environment and the AH500 system conform to the cautions listed in section 8.1, users then can undertake the periodic inspection described below. If any abnormal situation occurs, please follow the remedy and carry out the maintenance.

8.3.1 Tools Required for Inspection

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

8.3.2 Periodic Inspection

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

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

MEMO

Chapter 9 Troubleshooting

Table of Contents

9.1 Troubleshooting for CPU Modules

Users can get the remedies from the tables below according to the statuses of the LED indicators and the error codes.

9.1.1 ERROR LED Indicator's Being ON

Error code	Description	Remedy
16#000B	The program in the PLC is damaged.	Download the program again.
16#000D	The CPU parameter is damaged.	Reset the CPU parameter, and download it.
16#0010	The access to the memory in the CPU is denied.	Download the program or parameters again. If the problem still occurs, please contact the factory.
16#0011	The PLC ID is incorrect. (SM9)	Please check the PLC ID.
16#0012	The PLC password is incorrect. (SM9)	Please check the PLC password.
16#0014	The procedure of restoring the system can not be executed. (SM9)	The contents of the system backup file are incorrect, or the file does not exist in the path specified. If the file exists and the procedure of restoring the system can not be executed, please backing up the system again. If the error still occurs, please contact the factory. (Please refer to section 7.5 in AH500 Operation Manual, and section 18.2 in ISPSoft User Manual for more information about the memory card.)
16#0015	The module table is incorrect. (SM10)	The module table stored in the CPU module is incorrect. Compare the module table in HWCONFIG with the actual module configuration, and download the module table again.
16#0016	The module setting is incorrect. (SM10)	The module setting stored in the CPU module is incorrect. Check whether the version of the module inserted in the slot is the same as the version of the module in HWCONFIG. After the version of the module is updated, users can download the module setting again.
16#0017	The data register exceeds the device range. (SM10)	The data register stored in the CPU module exceeds the device range. Check whether the module parameter in HWCONFIG is correct, and download the module parameter again.
16#001B	Timed interrupt 0 is set incorrectly.	Set the CPU parameter in HWCONFIG again, and download the CPU parameter again.
16#001C	Timed interrupt 1 is set incorrectly.	Set the CPU parameter in HWCONFIG again, and download the CPU parameter again.
16#001D	Timed interrupt 2 is set incorrectly.	Set the CPU parameter in HWCONFIG again, and download the CPU parameter again.
16#001E	Timed interrupt 3 is set incorrectly.	Set the CPU parameter in HWCONFIG again, and download the CPU parameter again.
16#001F	The watchdog timer is set incorrectly.	Set the CPU parameter in HWCONFIG again, and download the CPU parameter again.
16#0020	The setting of the fixed scan time is incorrect.	Set the CPU parameter in HWCONFIG again, and download the CPU parameter again.
16#0021	The setting of the fixed scan time is incorrect.	Set the CPU parameter in HWCONFIG again, and download the CPU parameter again.

Error code	Description	Remedy
16#0022	The CPU parameter downloaded to the PLC is incorrect.	Download the CPU parameter again.
16#0050	The memories in the latched special auxiliary relays are abnormal.	After users reset the CPU module or restore it to the factory setting, they can download the program and the parameter again.
16#0051	The latched special data registers are abnormal.	After users reset the CPU module or restore it to the factory setting, they can download the program and the parameter again.
16#0052	The memories in the latched auxiliary relays are abnormal.	After users reset the CPU module or restore it to the factory setting, they can download the program and the parameter again.
16#0053	The latched timers are abnormal.	After users reset the CPU module or restore it to the factory setting, they can download the program and the parameter again.
16#0054	The latched counters are abnormal.	After users reset the CPU module or restore it to the factory setting, they can download the program and the parameter again.
16#0055	The latched 32-bit counters are abnormal.	After users reset the CPU module or restore it to the factory setting, they can download the program and the parameter again.
16#0056	The memories in the latched timers are abnormal.	After users reset the CPU module or restore it to the factory setting, they can download the program and the parameter again.
16#0057	The memories in the latched counters are abnormal.	After users reset the CPU module or restore it to the factory setting, they can download the program and the parameter again.
16#0058	The memories in the latched 32-bit counters are abnormal.	After users reset the CPU module or restore it to the factory setting, they can download the program and the parameter again.
16#0059	The latched data registers are abnormal.	After users reset the CPU module or restore it to the factory setting, they can download the program and the parameter again.
16#005A	The latched working registers are abnormal.	After users reset the CPU module or restore it to the factory setting, they can download the program and the parameter again.

9.1.2 ERROR LED Indicator's Blinking

Error code	Description	Remedy
16#000A	Scan timeout (SM8: The watchdog timer error)	1. Check the setting of the watchdog timer in HWCONFIG. 2. Check whether the program causes the long scan time
16#000C	The program downloaded to the PLC is incorrect.	After users compile the program again, they can download the program again.
16#000E	The program or the parameter is being downloaded, and therefore the PLC can not run.	After the program or the parameter is downloaded to the PLC, users can try to run the PLC.
16#0018	The serial port is abnormal. (SM9)	Retry the connection. If the error still occurs, please contact the factory.

Error code	Description	Remedy
16#0019	The USB is abnormal. (SM9)	Retry the connection. If the error still occurs, please contact the factory.
16#0033	The communication setting of COM1 is incorrect. (SM9)	1. Check the program and the related special data registers. 2. Set the communication port parameter for the CPU module in HWCONFIG again.
16#0034	The setting of the station address of COM1 is incorrect. (SM9)	1. Check the program and the related special data registers. 2. Set the communication port parameter for the CPU module in HWCONFIG again.
16#0035	The setting of the communication type of COM1 is incorrect. (SM9)	1. Check the program and the related special data registers. 2. Set the communication port parameter for the CPU module in HWCONFIG again.
16#0036	The interval of retrying the sending of the command through COM1 is set incorrectly.(SM9)	1. Check the program and the related special data registers. 2. Set the communication port parameter for the CPU module in HWCONFIG again.
16#0037	The number of times the sending of the command through COM1 is retried is set incorrectly. (SM9)	1. Check the program and the related special data registers. 2. Set the communication port parameter for the CPU module in HWCONFIG again.
16#0038	The communication setting of COM2 is incorrect. (SM9)	1. Check the program and the related special data registers. 2. Set the communication port parameter for the CPU module in HWCONFIG again.
16#0039	The setting of the station address of COM2 is incorrect. (SM9)	1. Check the program and the related special data registers. 2. Set the communication port parameter for the CPU module in HWCONFIG again.
16#003A	The setting of the communication type of COM2 is incorrect. (SM9)	1. Check the program and the related special data registers. 2. Set the communication port parameter for the CPU module in HWCONFIG again.
16#003B	The interval of retrying the sending of the command through COM2 is set incorrectly.(SM9)	1. Check the program and the related special data registers. 2. Set the communication port parameter for the CPU module in HWCONFIG again.
16#003C	The number of times the sending of the command through COM2 is retried is set incorrectly. (SM9)	1. Check the program and the related special data registers. 2. Set the communication port parameter for the CPU module in HWCONFIG again.
16#005E	The memory card is initialized incorrectly. (SM453)	Check whether the memory card breaks down.
16#005F	The data is read from the inexistent file in the memory card, or the data is written into the inexistent file in the memory card. (SM453)	Check whether the file path is correct.
16#0060	The default folder can not be created in the CPU module. (SM453)	Check whether the capacity of the memory card is large enough, or whether the memory card breaks down.

Error code	Description	Remedy
16#0061	The capacity of the memory card is not large enough. (SM453)	Check whether the capacity of the memory card is large enough.
16#0062	The memory card is write protected. (SM453)	Check whether the memory card is write protected.
16#0063	An error occurs when the data is written into the memory card. (SM453)	Check whether the file path is correct, or whether the memory card breaks down.
16#0064	The file in the memory card can not be read. (SM453)	Check whether the file path is correct, or whether the file is damaged.
16#0065	The file in the memory card is a read-only file. (SM453)	Users need to set the file so that the file is not a read-only file.
16#0066	An error occurs when the system is backupped.	1. Check whether the memory card is normal, and whether the capacity of the memory card is large enough. 2. Retry the backup procedure. If the error still occurs, please contact the factory.
16#2000	There is no END in the program in the PLC. (SM5)	1. Compile the program again, and download the program again. 2. Reinstall ISPSoft, compile the program again, and download the program again.
16#2002	GOEND is used incorrectly. (SM5)	Check the program, compile the program again, and download the program again.
16#2003	The devices used in the program exceed the range. (SM0/SM5)	Check the program, compile the program again, and download the program again.
16#2004	The part of the program specified by the label used in CJ/JMP is incorrect, or the label is used repeatedly. (SM0/SM5)	Check the program, compile the program again, and download the program again.
16#2005	The N value used in MC is not the same as the corresponding N value used in MCR, or the number of N values used in MC is not the same as the number of N values used in MCR. (SM5)	Check the program, compile the program again, and download the program again.
16#2006	The N values used in MC do not start from 0, or the N values used in MC are not continuous. (SM5)	Check the program, compile the program again, and download the program again.
16#2007	The operands used in ZRST are not used properly. (SM5)	Check the program, compile the program again, and download the program again.
16#200A	Invalid instruction (SM5)	Check the program, compile the program again, and download the program again.
16#200B	The operand **n** or the other constant operands exceed the range. (SM0/SM5)	Check the program, compile the program again, and download the program again.
16#200C	The operands overlap. (SM0/SM5)	Check the program, compile the program again, and download the program again.

Error code	Description	Remedy
16#200D	An error occurs when the binary number is converted into the binary-coded decimal number. (SM0/SM5)	Check the program, compile the program again, and download the program again.
16#200E	The string does not end with 0x00. (SM0/SM5)	Check the program, compile the program again, and download the program again.
16#200F	The instruction does not support the modification by an index register. (SM5)	Check the program, compile the program again, and download the program again.
16#2010	1. The instruction does not support the device. 2. Encoding error 3. The instruction is a 16-bit instruction, but the constant operand is a 32-bit code. (SM5)	Check the program, compile the program again, and download the program again.
16#2011	The number of operands is incorrect. (SM5)	Check the program, compile the program again, and download the program again.
16#2012	Incorrect division operation (SM0/SM5).	Check the program, compile the program again, and download the program again.
16#2013	The value exceeds the range of values which can be represented by the floating-point numbers. (SM0/SM5)	Check the program, compile the program again, and download the program again.
16#2014	The task designated by TKON/YKOFF is incorrect, or exceeds the range. (SM5)	Check the program, compile the program again, and download the program again.
16#2015	There are more than 32 levels of nested program structures supported by CALL. (SM0)	Check the program, compile the program again, and download the program again.
16#2016	There are more than 32 levels of nested program structures supported by FOR/NEXT. (SM0/SM5)	Check the program, compile the program again, and download the program again.
16#2017	The number of times FOR is used is different from the number of times NEXT is used. (SM5)	Check the program, compile the program again, and download the program again.
16#2018	There is a label after FEND, but there is no SRET. There is SRET, but there is no label. (SM5)	1. Compile the program again, and download the program again. 2. Reinstall ISPSoft, compile the program again, and download the program again.
16#2019	The interrupt task is not after FEND. (SM5)	1. Compile the program again, and download the program again. 2. Reinstall ISPSoft, compile the program again, and download the program again.
16#201A	IRET/SRET is not after FEND. (SM5)	1. Compile the program again, and download the program again. 2. Reinstall ISPSoft, compile the program again, and download the program again.

Error code	Description	Remedy
16#201B	There is an interrupt task, but there is no IRET. There is IRET, but there is not interrupt task. (SM5)	1. Compile the program again, and download the program again. 2. Reinstall ISPSoft, compile the program again, and download the program again.
16#201C	End is not at the end of the program. (SM5)	1. Compile the program again, and download the program again. 2. Reinstall ISPSoft, compile the program again, and download the program again.
16#201D	There is CALL, but there is no MAR. (SM5)	1. Compile the program again, and download the program again. 2. Reinstall ISPSoft, compile the program again, and download the program again.
16#201E	The function code used in MODRW is incorrect. (SM102/SM103)	Check the usage of the instruction and the setting of the operands. Please refer to the explanation of the instruction MODRW in AH500 Programming Manual for more information.
16#201F	The length of the data set in MODRW is incorrect. (SM102/SM103)	Check the usage of the instruction and the setting of the operands. Please refer to the explanation of the instruction MODRW in AH500 Programming Manual for more information.
16#2020	The communication command received by using MODRW is incorrect. (SM102/SM103)	Check whether the slave supports the function code and the specified operation.
16#2021	The checksum of the command received is incorrect. (SM102/SM103)	1. Check whether there is noise, and retry the sending of the command. 2. Check whether the slave operates normally.
16#2022	The format of the command used in MODRW does not conform to the ASCII format. (SM102/SM103)	Make sure that the format of the command conforms to the ASCII format.
16#2023	There is a communication timeout when MODRW is executed. (SM120/SM103)	Check whether the slave operates normally, and whether the connection is normal.
16#2024	The setting value of the communication timeout is invalid. (SM120/SM103)	1. Check the program and the related special data registers. 2. Set the communication port parameter for the CPU module in HWCONFIG again.
16#2025	There is a communication timeout when RS is executed. (SM120/SM103)	Check whether the slave operates normally, and whether the connection is normal.
16#6000	Ethernet connection error (SM1106)	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG again.
16#6001	Illegal IP address (SM1107)	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG again.
16#6002	Illegal netmask address (SM1107)	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG again.

Error code	Description	Remedy
16#6003	Illegal gateway mask (SM1107)	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG again.
16#6004	The IP address filter is set incorrectly. (SM1108)	Set the Ethernet parameter for the CPU module in HWCONFIG again.
16#6006	The static ARP table is set incorrectly. (SM1108)	Set the Ethernet parameter for the CPU module in HWCONFIG again.
16#6008	Illegal network number (SM1107)	Check the network configuration in NWCONFIG, and download it again.
16#6009	Illegal node number (SM1107)	Check the network configuration in NWCONFIG, and download it again.
16#6101	The trigger in the email is set incorrectly. (SM1112)	Set the Ethernet parameter for the CPU module in HWCONFIG again.
16#6102	The interval of sending the email is set incorrectly. (SM1112)	Set the Ethernet parameter for the CPU module in HWCONFIG again.
16#6103	The device containing the data specified as the attachment exceeds the device range. (SM1112)	Set the Ethernet parameter for the CPU module in HWCONFIG again.
16#6106	The SMTP server address is incorrect. (SM1112)	Make sure that the address is correct, and set the Ethernet parameter for the CPU module in HWCONFIG again.
16#6108	SMTP authentication error (SM1112)	Check the user name, and the password. Set the Ethernet parameter for the CPU module in HWCONFIG again.
16#6110	The SMTP server needs to be authenticated. (SM1112)	Check the user name, and the password. Set the Ethernet parameter for the CPU module in HWCONFIG again.
16#6111	The specified email address does not exist. (SM1112)	1. Check whether the email address is correct. 2. Set the Ethernet parameter for the CPU module in HWCONFIG again.
16#6200	The remote IP address set in the TCP socket function is illegal. (SM1196)	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG again.
16#6209	The remote IP address set in the UDP socket function is illegal. (SM1196)	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG again.
16#6300	Only auxiliary relays, data registers, and link registers can be used in the Ether Link.	Check the setting of the Ether Link in NWCONFIG, and download it again.
16#6301	The device used in the Ether Link exceeds the device range.	Check whether the device used in the Ether Link is within the device range supported by the CPU module.
16#6302	The length of the data exchanged in the Ether Link exceeds the limit.	Check whether the length of the data exchanged in the Ether Link is within the range supported by the CPU module.
16#6305	The node used in the communication command is different from the local node.	Check the setting of the Ether Link in NWCONFIG, and download it again.

Error code	Description	Remedy
16#630A	The module ID or the setting of the module is different from the setting in the Ether Link.	1. Check the setting of the parameter in HWCONFIG. 2. Check the setting of the Ether Link in NWCONFIG.
16#630B	The setting of the netmask address for the CPU or the module is different from the setting in the Ether Link.	1. Check the setting of the parameter in HWCONFIG. 2. Check the setting of the Ether Link in NWCONFIG.
16#6602	The node number exceeds the limit. (SM1598)	Check the network configuration in NWCONFIG, and download it again.
16#6603	The device is undefined. (SM1599)	Check the network configuration in NWCONFIG, and download it again.
16#8230	The CPU parameter downloaded is incorrect. The IP address is illegal.	1. Check the Ethernet parameter in the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#8231	The CPU parameter downloaded is incorrect. The netmask address is illegal.	1. Check the Ethernet parameter in the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#8232	The CPU parameter downloaded is incorrect. The gateway address is illegal.	1. Check the Ethernet parameter in the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#8233	The CPU parameter downloaded is incorrect. The IP address filter is set incorrectly.	1. Check the Ethernet parameter in the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#8235	The CPU parameter downloaded is incorrect. The static ARP table is set incorrectly.	1. Check the Ethernet parameter in the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#8237	The CPU parameter downloaded is incorrect. The network number is illegal.	1. Check the network configuration in NWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#8238	The CPU parameter downloaded is incorrect. The node number is illegal.	1. Check the network configuration in NWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#8239	The CPU parameter downloaded is incorrect. The email is set incorrectly.	1. Check the Ethernet parameter in the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#823A	The CPU parameter downloaded is incorrect. The trigger in the email is set incorrectly.	1. Check the Ethernet parameter in the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#823B	The CPU parameter downloaded is incorrect. The TCP socket is set incorrectly.	1. Check the Ethernet parameter in the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.

Error code	Description	Remedy
16#823C	The CPU parameter downloaded is incorrect. The UDP socket is set incorrectly.	1. Check the Ethernet parameter in the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.

9.1.3 BUS FAULT LED Indicator's Being ON

When a CPU module detects an error, the BUS FAULT LED indicator on the CPU module is ON. The BUS FAULT LED indicator on the CPU module corresponds to the ERROR LED indicator on an I/O module. If an error occurs in an I/O module, the status of the BUS FAULT LED indicator on the CPU module is the same as that of the ERROR LED indicator on the I/O module. If there are errors occurring in the I/O modules, the BUS FAULT LED indicator on the CPU module will be ON. For example, the BUS FAULT LED indicator on the CPU module will be ON if the ERROR LED indicator on I/O module A is ON and the ERROR LED indicator on I/O module B blinks. If the ERROR LED indicator on I/O module B still blinks after the error occurring in I/O module A is eliminated, the BUS FAULT LED indicator on the CPU module will blink. Please refer to sections 12.4.2~12.4.8 in AH500 Operation Manual for more information about the LED indicators.

Users can get the remedies for the errors detected by a CPU module from the table below. If the error code which users get is not listed in the table below, users need to check whether the I/O module operates normally. Please refer to section 9.2 in this manual for more information about the troubleshooting for I/O modules.

Error code	Description	Remedy
16#0013	The I/O module can not run/stop. (SM10)	Check whether the setting of the parameter for the module is correct. If the setting is correct, please check whether the module breaks down. If the error still occurs, please contact the factory.
16#0014	The procedure of restoring the system can not be executed. (SM9)	The contents of the system backup file are incorrect, or the file does not exist in the path specified. If the file exists and the procedure of restoring the system can not be executed, please backing up the system again. If the error still occurs, please contact the factory. (Please refer to section 7.5 in AH500 Operation Manual, and section 18.2 in ISPSoft User Manual for more information about the memory card.)
16#1400	An error occurs when the data is accessed through the auxiliary processor. (SM9)	Please contact the factory.
16#1401	An error occurs when the data in the I/O module is accessed. (SM9)	Please contact the factory.
16#1402	The actual arrangement of the I/O modules is not consistent with the module table. (SM9)	Check whether the module table in HWCONFIG is consistent with the actual arrangement of the I/O modules.
16#1403	An error occurs when the data is read from the module. (SM9)	Check whether the module operates normally. If the error still occurs, please contact the factory.
16#1404	A watchdog timer error occurs in the module. (SM9)	Check whether the module breaks down. If the module breaks down, please replace it and contact the factory.
16#1405	The setting parameter of the module is not found. (SM9)	Set the parameter in HWCONFIG again, and download it.

Error code	Description	Remedy
16#1406	A communication error occurs when the data is accessed through the main processor. (SM9)	Check whether there is noise, and eliminate the noise. If the error still occurs, please contact the factory.
16#1407	A communication error occurs when the data is accessed through the auxiliary processor. (SM9)	Check whether there is noise, and eliminate the noise. If the error still occurs, please contact the factory.
16#1408	The communication with the module is incorrect. (SM9)	Check whether there is noise, and eliminate the noise. If the error still occurs, please contact the factory.
16#1409	The extension backplane is disconnected. (SM9)	1. Check whether the extension backplane is connected properly. 2. Check whether the extension backplane operates normally, and make sure that the extension backplane is not affected by noise.
16#140A	The communication with the extension backplane is incorrect. (SM9)	1. Check whether the extension backplane is connected properly. 2. Check whether the extension backplane operates normally, and make sure that the extension backplane is not affected by noise.
16#140B	The number of network modules exceeds the limit. (SM9)	Please decrease the number of network modules to the number supported by the system.

9.1.4 BUS FAULT LED Indicator's Blinking

If the BUS FAULT LED blinks, please check the operating state of the module. Please refer to sections 12.4.2~12.4.8 in AH500 Operation Manual for more information about the LED indicators, and section 9.2 in this manual for more information about the troubleshooting for I/O modules.

9.1.5 Others

Error code	Description	Remedy
16#000F	The original program in the PLC is damaged.	After users compile the program again, they can download the program again.
16#2026	The interrupt number used in RS is incorrect.	Compile the program again, and download the program again. If the error still occurs, please contact the factory.
16#600A	TCP connection failure (SM1090)	1. Check the actual network configuration, and check whether the number of TCP connections exceeds the upper limit supported by the CPU module. 2. Retry the TCP connection later. (This error does not cause the PLC to stop running. Users can perform the corresponding remedy by means of the related flag in the program.)

Error code	Description	Remedy
16#600B	UDP connection failure (SM1091)	1. Check the actual network configuration, and check whether the number of UDP connections exceeds the upper limit supported by the CPU module. 2. Retry the TCP connection later. (This error does not cause the PLC to stop running. Users can perform the corresponding remedy by means of the related flag in the program.)
16#600C	The TCP socket has been used. (SM1109)	1. Check whether the actual data access results in the use of the same socket. 2. Change the socket number, or retry the socket later. (This error does not cause the PLC to stop running. Users can perform the corresponding remedy by means of the related flag in the program.)
16#600D	The RJ45 port is not connected.	Check the communication cable.
16#6100	The email connection is busy. (SM1113)	Retry the email connection later. (This error does not cause the PLC to stop running. Users can perform the corresponding remedy by means of the related flag in the program.)
16#6104	The attachment in the email does not exist. (SM1113)	Check whether the attachment exists in the memory card.
16#6105	The attachment in the email is oversized. (SM1113)	Check the size of the file which is specified as the attachment. If the size is over 2 MB, the file can not be specified as the attachment.
16#6107	There is an SMTP server response timeout. (SM1113)	1. Check whether the status of the SMTP server is normal. 2. Retry the sending of the email later. (This error does not cause the PLC to stop running. Users can perform the corresponding remedy by means of the related flag in the program.)
16#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 again.
16#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 again.
16#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 again.
16#6204	The transmitted data length 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 again.
16#6205	The data which is sent 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 again.

Error code	Description	Remedy
16#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 again.
16#6207	The received data length 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 again.
16#6208	The data which is received through the TCP socket exceeds the device range.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG again.
16#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 again.
16#620B	The remote 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 again.
16#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 again.
16#620D	The transmitted data length 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 again.
16#620E	The data which is sent 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 again.
16#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 again.
16#6210	The received data length 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 again.
16#6211	The data which is received through the UDP socket exceeds the device range.	1. Check the program and the related special data registers. 2. Set the Ethernet parameter for the CPU module in HWCONFIG again.
16#6212	There is no response from the remote device after the timeout period.	Make sure that the remote device is connected.
16#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 again.

Error code	Description	Remedy
16#6214	The remote device refuses the connection.	Make sure that the remote device operates normally.
16#6215	The socket is not opened.	Check whether operational sequence in the program is correct.
16#6217	The socket is opened.	Check whether operational sequence in the program is correct.
16#6218	The data has been sent through the socket.	Check whether operational sequence in the program is correct.
16#6219	The data has been received through the socket.	Check whether operational sequence in the program is correct.
16#621A	The socket is closed.	Check whether operational sequence in the program is correct.
16#6303	The remote device in the Ether Link aborts the connection.	1. Check the connection and the status of the remote device. 2. Check whether the remote device supports the Ether Link.
16#6304	The connection in the Ether Link is busy.	1. Check whether the number of connections in the Ether Link exceeds the system load. 2. Retry the connection in the Ether Link later.
16#6309	The remote device in the Ether Link does not respond after the timeout period.	1. Check whether the CPU module in the Ether Link operates normally. 2. Check whether the CPU modules are connected normally.
16#6400	The number of TCP connections reaches the upper limit, or the flag which is related to the sending of the data is not set to ON.	1. Check whether the flag which is related to the sending of the data in the program is modified. 2. Retry the setting of the flag and the sending of the packet.
16#6401	The remote device aborts the connection.	Check whether the remote device support the Modbus port (502).
16#6402	There is no response from the remote device after the timeout period.	Check whether the remote device operate normally.
16#6403	The remote IP address used in the applied instruction is illegal.	Check whether the program is correct.
16#6404	The Modbus function code not supported is received.	Check the command transmitted from the remote device.
16#6405	The number of data which will be received is not consistent with the actual length of the data.	Check the command transmitted from the remote device.
16#6600	The network number which receives the command exceeds the range.	Check the command transmitted from the remote device.
16#6601	The network is undefined in the network configuration parameter.	Check the network configuration in NWCONFIG, and download it again.
16#6604	The number of routing connections reaches the upper limit.	Resend the packet later. ((This error does not cause the PLC to stop running. Users can perform the corresponding remedy by means of the related flag in the program.)
16#6605	The unexpected packet is received.	Check the command transmitted from the remote device.

Error code	Description	Remedy
16#6606	There is a routing response timeout.	1. Check the network configuration in NWCONFIG. 2. Check whether the setting of the communication timeout conform to the practical application.
16#8105	The contents of the program downloaded are incorrect. The program syntax is incorrect.	1. Check whether the program syntax which is not supported by the CPU module is used, and check whether the version of the firmware has its special limitation. 2. Check whether the version of ISPSoft used to create the program is the same as the version of ISPSoft used now.
16#8106	The contents of the program downloaded are incorrect. The length of the execution code exceeds the limit.	1. Shorten the length of the program, and download the program again. 2. Check whether the version of ISPSoft used to create the program is the same as the version of ISPSoft used now.
16#8107	The contents of the program downloaded are incorrect. The length of the source code exceeds the limit.	1. Shorten the length of the program, and download the program again. 2. Check whether the version of ISPSoft used to create the program is the same as the version of ISPSoft used now.
16#820E	The communication port parameter downloaded is incorrect. The communication protocol is incorrect.	1. Check the setting of the communication port parameter for the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#820F	The communication port parameter downloaded is incorrect. The setting of the station address is incorrect.	1. Check the setting of the communication port parameter for the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#8210	The communication port parameter downloaded is incorrect. The choice among RS-232, RS-485, and SR-422 is incorrect.	1. Check the setting of the communication port parameter for the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#8211	The communication port parameter downloaded is incorrect. The interval of retrying the sending of the command is set incorrectly.	1. Check the setting of the communication port parameter for the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#8212	The communication port parameter downloaded is incorrect. The number of times the sending of the command is retried is set incorrectly.	1. Check the setting of the communication port parameter for the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#8215	The CPU parameter downloaded is incorrect. The interval of executing interrupt 0 is set incorrectly.	1. Check the setting of the basic parameter for the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.

Error code	Description	Remedy
16#8216	The CPU parameter downloaded is incorrect. The interval of executing interrupt 1 is set incorrectly.	1. Check the setting of the basic parameter for the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#8217	The CPU parameter downloaded is incorrect. The interval of executing interrupt 2 is set incorrectly.	1. Check the setting of the basic parameter for the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#8218	The CPU parameter downloaded is incorrect. The interval of executing interrupt 3 is set incorrectly.	1. Check the setting of the basic parameter for the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#8219	The CPU parameter downloaded is incorrect. The watchdog timer is set incorrectly.	1. Check the setting of the basic parameter for the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#821A	The CPU parameter downloaded is incorrect. The setting of the scan time is incorrect.	1. Check the setting of the basic parameter for the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#821B	The CPU parameter downloaded is incorrect. The setting of the remote execution function is incorrect.	1. Check the setting of the basic parameter for the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#821D	The CPU parameter downloaded is incorrect. An error occurs in the latched area.	1. Check the setting of the basic parameter for the CPU module in HWCONFIG. 2. Check whether the version of HWCONFIG used now is compatible with the version of the CPU.
16#9A01	The setting of the data exchange for slave 1 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A02	The setting of the data exchange for slave 2 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A03	The setting of the data exchange for slave 3 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A04	The setting of the data exchange for slave 4 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A05	The setting of the data exchange for slave 5 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A06	The setting of the data exchange for slave 6 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.

Error code	Description	Remedy
16#9A07	The setting of the data exchange for slave 7 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A08	The setting of the data exchange for slave 8 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A09	The setting of the data exchange for slave 9 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A0A	The setting of the data exchange for slave 10 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A0B	The setting of the data exchange for slave 11 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A0C	The setting of the data exchange for slave 12 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A0D	The setting of the data exchange for slave 13 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A0E	The setting of the data exchange for slave 14 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A0F	The setting of the data exchange for slave 15 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A10	The setting of the data exchange for slave 16 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A11	The setting of the data exchange for slave 17 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A12	The setting of the data exchange for slave 18 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A13	The setting of the data exchange for slave 19 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.

Error code	Description	Remedy
16#9A14	The setting of the data exchange for slave 20 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A15	The setting of the data exchange for slave 21 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A16	The setting of the data exchange for slave 22 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A17	The setting of the data exchange for slave 23 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A18	The setting of the data exchange for slave 24 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A19	The setting of the data exchange for slave 25 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A1A	The setting of the data exchange for slave 26 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A1B	The setting of the data exchange for slave 27 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A1C	The setting of the data exchange for slave 28 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A1D	The setting of the data exchange for slave 29 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A1E	The setting of the data exchange for slave 30 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A1F	The setting of the data exchange for slave 31 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.
16#9A20	The setting of the data exchange for slave 32 in the PLC Link is incorrect. (SM1590)	1. Check the program and the related special data registers. 2. Set the PLC Link parameter in HWCONFIG again.

Error code	Description	Remedy
16#9A21	An error occurs when the master communicates with slave 1 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 1. 2. Check the communication cable.
16#9A22	An error occurs when the master communicates with slave 2 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 2. 2. Check the communication cable.
16#9A23	An error occurs when the master communicates with slave 3 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 3. 2. Check the communication cable.
16#9A24	An error occurs when the master communicates with slave 4 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 4. 2. Check the communication cable.
16#9A25	An error occurs when the master communicates with slave 5 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 5. 2. Check the communication cable.
16#9A26	An error occurs when the master communicates with slave 6 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 6. 2. Check the communication cable.
16#9A27	An error occurs when the master communicates with slave 7 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 7. 2. Check the communication cable.
16#9A28	An error occurs when the master communicates with slave 8 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 8. 2. Check the communication cable.
16#9A29	An error occurs when the master communicates with slave 9 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 9. 2. Check the communication cable.
16#9A2A	An error occurs when the master communicates with slave 10 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 10. 2. Check the communication cable.
16#9A2B	An error occurs when the master communicates with slave 11 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 11. 2. Check the communication cable.
16#9A2C	An error occurs when the master communicates with slave 12 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 12. 2. Check the communication cable.
16#9A2D	An error occurs when the master communicates with slave 13 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 13. 2. Check the communication cable.

Error code	Description	Remedy
16#9A2E	An error occurs when the master communicates with slave 14 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 14. 2. Check the communication cable.
16#9A2F	An error occurs when the master communicates with slave 15 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 15. 2. Check the communication cable.
16#9A30	An error occurs when the master communicates with slave 16 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 16. 2. Check the communication cable.
16#9A31	An error occurs when the master communicates with slave 17 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 17. 2. Check the communication cable.
16#9A32	An error occurs when the master communicates with slave 18 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 18. 2. Check the communication cable.
16#9A33	An error occurs when the master communicates with slave 19 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 19. 2. Check the communication cable.
16#9A34	An error occurs when the master communicates with slave 20 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 20. 2. Check the communication cable.
16#9A35	An error occurs when the master communicates with slave 21 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 21. 2. Check the communication cable.
16#9A36	An error occurs when the master communicates with slave 22 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 22. 2. Check the communication cable.
16#9A37	An error occurs when the master communicates with slave 23 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 23. 2. Check the communication cable.
16#9A38	An error occurs when the master communicates with slave 24 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 24. 2. Check the communication cable.
16#9A39	An error occurs when the master communicates with slave 25 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 25. 2. Check the communication cable.
16#9A3A	An error occurs when the master communicates with slave 26 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 26. 2. Check the communication cable.

Error code	Description	Remedy
16#9A3B	An error occurs when the master communicates with slave 27 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 27. 2. Check the communication cable.
16#9A3C	An error occurs when the master communicates with slave 28 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 28. 2. Check the communication cable.
16#9A3D	An error occurs when the master communicates with slave 29 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 29. 2. Check the communication cable.
16#9A3E	An error occurs when the master communicates with slave 30 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 30. 2. Check the communication cable.
16#9A3F	An error occurs when the master communicates with slave 31 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 31. 2. Check the communication cable.
16#9A40	An error occurs when the master communicates with slave 32 in the PLC Link. (SM1591)	1. Check the communication setting in the master, and the communication setting in slave 32. 2. Check the communication cable.
16#9A41	There is no response from slave 1 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 1. 2. Check the communication cable.
16#9A42	There is no response from slave 2 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 2. 2. Check the communication cable.
16#9A43	There is no response from slave 3 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 3. 2. Check the communication cable.
16#9A44	There is no response from slave 4 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 4. 2. Check the communication cable.
16#9A45	There is no response from slave 5 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 5. 2. Check the communication cable.
16#9A46	There is no response from slave 6 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 6. 2. Check the communication cable.
16#9A47	There is no response from slave 7 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 7. 2. Check the communication cable.
16#9A48	There is no response from slave 8 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 8. 2. Check the communication cable.
16#9A49	There is no response from slave 9 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 9. 2. Check the communication cable.

Error code	Description	Remedy
16#9A4A	There is no response from slave 10 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 10. 2. Check the communication cable.
16#9A4B	There is no response from slave 11 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 11. 2. Check the communication cable.
16#9A4C	There is no response from slave 12 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 12. 2. Check the communication cable.
16#9A4D	There is no response from slave 13 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 13. 2. Check the communication cable.
16#9A4E	There is no response from slave 14 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 14. 2. Check the communication cable.
16#9A4F	There is no response from slave 15 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 15. 2. Check the communication cable.
16#9A50	There is no response from slave 16 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 16. 2. Check the communication cable.
16#9A51	There is no response from slave 17 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 17. 2. Check the communication cable.
16#9A52	There is no response from slave 18 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 18. 2. Check the communication cable.
16#9A53	There is no response from slave 19 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 19. 2. Check the communication cable.
16#9A54	There is no response from slave 20 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 20. 2. Check the communication cable.
16#9A55	There is no response from slave 21 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 21. 2. Check the communication cable.
16#9A56	There is no response from slave 22 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 22. 2. Check the communication cable.
16#9A57	There is no response from slave 23 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 23. 2. Check the communication cable.
16#9A58	There is no response from slave 24 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 24. 2. Check the communication cable.
16#9A59	There is no response from slave 25 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 25. 2. Check the communication cable.
16#9A5A	There is no response from slave 26 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 26. 2. Check the communication cable.

Error code	Description	Remedy
16#9A5B	There is no response from slave 27 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 27. 2. Check the communication cable.
16#9A5C	There is no response from slave 28 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 28. 2. Check the communication cable.
16#9A5D	There is no response from slave 29 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 29. 2. Check the communication cable.
16#9A5E	There is no response from slave 30 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 30. 2. Check the communication cable.
16#9A5F	There is no response from slave 31 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 31. 2. Check the communication cable.
16#9A60	There is no response from slave 32 in the PLC Link. (SM1592)	1. Check the communication setting in the master, and the communication setting in slave 32. 2. Check the communication cable.
16#9A61	The setting of the PLC Link mode is incorrect. (SM1589)	Make sure that SM1586 and SM1587 are not both ON.
16#9A62	The number of polling cycles in the PLC Link is incorrect. (SM1592)	If the PLC Link is in the manual mode, please make sure that the number of polling cycles is within the range between 1 and 65535.
16#9A63	There is a handshaking timeout when the CPU module establishes a connection with the network module. (SM1596)	Check whether the network module operates normally.
16#9A64	There is no network module parameter in the CPU module. (SM1596)	Download the parameter in HWCONFIG again.

9.2 Troubleshooting for I/O Modules

- **The introduction of modules**

  Digital I/O modules, analog I/O modules, network modules, temperature measurement modules, and motion control modules can be installed in an AH500 system. Please refer to AH500 Module Manual for more information about the specifications for I/O modules. The error codes and the remedies for the errors are listed below.

9.2.1 Troubleshooting for Analog I/O Modules and Temperature Measurement Modules

Error code	Description	Remedy
16#A000	The signal received by channel 0 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator blinks.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 0 exceeds the range of inputs which can be received by the hardware.

Error code	Description	Remedy
16#A001	The signal received by channel 1 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator blinks.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 1 exceeds the range of inputs which can be received by the hardware.
16#A002	The signal received by channel 2 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator blinks.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 2 exceeds the range of inputs which can be received by the hardware.
16#A003	The signal received by channel 3 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator blinks.)	Check the module parameter in HWCONFIG. Check whether The signal received by channel 3 exceeds the range of inputs which can be received by the hardware.
16#A004	The signal received by channel 4 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator blinks.)	Check the module parameter in HWCONFIG. Check whether The signal received by channel 4 exceeds the range of inputs which can be received by the hardware.
16#A005	The signal received by channel 5 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator blinks.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 5 exceeds the range of inputs which can be received by the hardware.
16#A006	The signal received by channel 6 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator blinks.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 6 exceeds the range of inputs which can be received by the hardware.
16#A007	The signal received by channel 7 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator blinks.)	Check the module parameter in HWCONFIG. Check whether the input signal in channel 7 exceeds the specifications.
16#A400	The signal received by channel 0 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is ON.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 0 exceeds the range of inputs which can be received by the hardware.
16#A401	The signal received by channel 1 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is ON.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 1 exceeds the range of inputs which can be received by the hardware.

Error code	Description	Remedy
16#A402	The signal received by channel 2 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is ON.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 2 exceeds the range of inputs which can be received by the hardware.
16#A403	The signal received by channel 3 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is ON.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 3 exceeds the range of inputs which can be received by the hardware.
16#A404	The signal received by channel 4 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is ON.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 4 exceeds the range of inputs which can be received by the hardware.
16#A405	The signal received by channel 5 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is ON.)	Check the module parameter in HWCONFIG. Check whether The signal received by channel 5 exceeds the range of inputs which can be received by the hardware.
16#A406	The signal received by channel 6 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is ON.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 6 exceeds the range of inputs which can be received by the hardware.
16#A407	The signal received by channel 7 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is ON.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 7 exceeds the range of inputs which can be received by the hardware.
16#A600	Hardware failure	1. Check whether the backplane is normal. 2. Check whether the module operate normally.
16#A601	The external voltage is abnormal.	Check whether the external 24 V power supply to the module is normal.
16#A602	Internal error The CJC is abnormal.	Please contact the factory.
16#A603	Internal error The factory correction is abnormal.	Please contact the factory.
16#A800	The signal received by channel 0 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is OFF.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 0 exceeds the range of inputs which can be received by the hardware.

Error code	Description	Remedy
16#A801	The signal received by channel 1 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is OFF.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 1 exceeds the range of inputs which can be received by the hardware.
16#A802	The signal received by channel 2 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is OFF.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 2 exceeds the range of inputs which can be received by the hardware.
16#A803	The signal received by channel 3 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is OFF.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 3 exceeds the range of inputs which can be received by the hardware.
16#A804	The signal received by channel 4 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is OFF.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 4 exceeds the range of inputs which can be received by the hardware.
16#A805	The signal received by channel 5 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is OFF.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 5 exceeds the range of inputs which can be received by the hardware.
16#A806	The signal received by channel 6 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is OFF.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 6 exceeds the range of inputs which can be received by the hardware.
16#A807	The signal received by channel 7 exceeds the range of inputs which can be received by the hardware. (The ERROR LED indicator is OFF.)	Check the module parameter in HWCONFIG. Check whether the signal received by channel 7 exceeds the range of inputs which can be received by the hardware.

9.2.2 Troubleshooting for AH02HC-5A/AH04HC-5A

Error code	Description	Remedy
16#A001	The linear accumulation in channel 1 exceeds the range.	To clear the linear accumulation, users need to set bit 1 in CR0 to ON by means of FROM/TO.
16#A002	The prescale value for channel 1 exceeds the range.	Check the module parameter in HWCONFIG. The prescale value for channel 1 should be within the range between 0 and 32767.
16#A003	The moving average for channel 1 exceeds the range.	Check the module parameter in HWCONFIG. The moving average for channel 1 should be within the range between 2 and 60.

Error code	Description	Remedy
16#A004	The comparison value for channel 1 exceeds the range.	Check the module parameter in HWCONFIG. The comparison value for channel 1 should be within the range between -999999999 and 999999999.
16#A005	The limit value of the alarm output for channel 1 is incorrect.	Check the module parameter in HWCONFIG. The limit value of the alarm output for channel 1 should be within the range between -200000 and 200000.
16#A006	The interrupt number for channel 1 exceeds the range.	Check the module parameter in HWCONFIG. The interrupt number for channel 1 should be within the range between 0 and 31.
16#A011	The linear accumulation in channel 2 exceeds the range.	To clear the linear accumulation, users need to set bit 1 in CR28 to ON by means of FROM/TO.
16#A012	The prescale value for channel 2 exceeds the range.	Check the module parameter in HWCONFIG. The prescale value for channel 2 should be within the range between 0 and 32767.
16#A013	The moving average for channel 2 exceeds the range.	Check the module parameter in HWCONFIG. The moving average for channel 2 should be within the range between 2 and 60.
16#A014	The comparison value for channel 2 exceeds the range.	Check the module parameter in HWCONFIG. The comparison value for channel 2 should be within the range between -999999999 and 999999999.
16#A015	The limit value of the alarm output for channel 2 is incorrect.	Check the module parameter in HWCONFIG. The limit value of the alarm output for channel 2 should be within the range between -200000 and 200000.
16#A016	The interrupt number for channel 2 exceeds the range.	Check the module parameter in HWCONFIG. The interrupt number for channel 2 should be within the range between 0 and 31.
16#A021	The linear accumulation in channel 3 exceeds the range.	To clear the linear accumulation, users need to set bit 1 in CR56 to ON by means of FROM/TO.
16#A022	The prescale value for channel 3 exceeds the range.	Check the module parameter in HWCONFIG. The prescale value for channel 3 should be within the range between 0 and 32767.
16#A023	The moving average for channel 3 exceeds the range.	Check the module parameter in HWCONFIG. The moving average for channel 3 should be within the range between 2 and 60.
16#A024	The comparison value for channel 3 exceeds the range.	Check the module parameter in HWCONFIG. The comparison value for channel 3 should be within the range between -999999999 and 999999999.
16#A025	The limit value of the alarm output for channel 3 is incorrect.	Check the module parameter in HWCONFIG. The limit value of the alarm output for channel 3 should be within the range between -200000 and 200000.
16#A026	The interrupt number for channel 3 exceeds the range.	Check the module parameter in HWCONFIG. The interrupt number for channel 3 should be within the range between 0 and 31.
16#A031	The linear accumulation in channel 4 exceeds the range.	To clear the linear accumulation, users need to set bit 1 in CR84 to ON by means of FROM/TO.

Error code	Description	Remedy
16#A032	The prescale value for channel 4 exceeds the range.	Check the module parameter in HWCONFIG. The prescale value for channel 4 should be within the range between 0 and 32767.
16#A033	The moving average for channel 4 exceeds the range.	Check the module parameter in HWCONFIG. The moving average for channel 4 should be within the range between 2 and 60.
16#A034	The comparison value for channel 4 exceeds the range.	Check the module parameter in HWCONFIG. The comparison value for channel 4 should be within the range between -999999999 and 999999999.
16#A035	The limit value of the alarm output for channel 4 is incorrect.	Check the module parameter in HWCONFIG. The limit value of the alarm output for channel 4 should be within the range between -200000 and 200000.
16#A036	The interrupt number for channel 4 exceeds the range.	Check the module parameter in HWCONFIG. The interrupt number for channel 4 should be within the range between 0 and 31.

9.2.3 Troubleshooting for AH05PM-5A/AH10PM-5A

The programs and the setting which are mentioned in the table below are edited in PMSoft version 2.02 or above.

Error code	Description	Remedy
16#A002	The subroutine has no data.	A program should be written in the subroutine.
16#A003	CJ, CJN, and JMP have no matching pointers.	Write the pointers which match CJ, CJN, and JMP respectively.
16#A004	There is a subroutine pointer in the main program.	The subroutine pointer can not be in the main program.
16#A005	Lack of the subroutine	The nonexistent subroutine can not be called.
16#A006	The pointer is used repeatedly in the same program.	The pointer can not be used repeatedly in the same program.
16#A007	The subroutine pointer is used repeatedly.	The subroutine pointer can not be used repeatedly.
16#A008	The pointer used in JMP is used repeatedly in different subroutines.	The pointer used in JMP can not be used repeatedly in different subroutines.
16#A009	The pointer used in JMP is the same as the pointer used in CALL.	The pointer used in JMP can not be the same as the pointer used in CALL.
16#A00B	Target position (I) of the single speed is incorrect.	The target position (I) of the single speed should be set correctly.
16#A00C	Target position (II) of the single-axis motion is incorrect.	Check whether target position (II) of the single-axis motion and target position (I) of the single-axis motion are in opposite directions.
16#A00D	The setting of speed (I) of the single-axis motion is incorrect.	Set the speed of the single-axis motion.
16#A00E	The setting of speed (II) of the single-axis motion is incorrect.	The setting value can not be zero.
16#A00F	The setting of the speed (V_{RT}) of returning to zero is incorrect.	Set the speed of returning to zero properly. (The setting value can not be zero.)

Error code	Description	Remedy
16#A010	The setting of the deceleration (V_{CR}) of returning to zero is incorrect.	Set the speed of returning to zero. The deceleration should be less than the speed of returning to zero. (The setting value can not be zero.)
16#A011	The setting of the JOG speed is incorrect.	The setting value can not be zero.
16#A012	The positive pulses generated by the single-axis clockwise motion are inhibited.	The error occurs because the limit sensor is triggered. Check the status of the limit sensor, and check whether the motor operates normally.
16#A013	The negative pulses generated by the single-axis counterclockwise motion are inhibited.	The error occurs because the limit sensor is triggered. Check the status of the limit sensor, and check whether the motor operates normally.
16#A014	The limit switch is reached.	The error occurs because the limit sensor is triggered. Check the status of the limit sensor, and check whether the motor operates normally.
16#A015	The device which is used exceeds the device range.	Use the device which does not exceed the device range.
16#A017	An error occurs when the device is modified by a 16-bit index register/32-bit index register.	Use the 16-bit index register/32-bit index register which does not exceed the device range.
16#A018	The conversion into the floating-point number is incorrect.	Modify the operation to prevent the abnormal number from occurring.
16#A019	The conversion into the binary-coded decimal number is incorrect.	Modify the operation to prevent the abnormal number from occurring.
16#A01A	Incorrect division operation (The divisor is 0.)	Modify the operation to prevent the divisor from being zero.
16#A01B	General program error	Modify the program to make the syntax correct.
16#A01C	LD/LDI has been used more than nine times.	Modify the program to prevent LD/LDI from being used more than nine times.
16#A01D	There is more than one level of nested program structure supported by RPT/RPE.	Modify the program to prevent more than one level of nested program structure supported by RPT/RPE from being used.
16#A01E	SRET is used between RPT and RPE.	Modify the program to prevent SRET from being used between RPT and RPE.
16#A01F	There is no M102 in the main program, or there is no M2 in the motion program.	Modify the program so that there is M102 in the main program, or modify the program so that there is M2 in the motion program.
16#A020	The wrong instruction is used, or the device used exceeds the range.	Check and modify the program to prevent the wrong instruction from being used, or check whether the device used exceeds the device range.

9.2.4 Troubleshooting for AH20MC-5A

The programs and the setting which are mentioned in the table below are edited in PMSoft version 2.02 or above.

Error code	Description	Remedy
16#A002	The subroutine has no data.	A program should be written in the subroutine.

Error code	Description	Remedy
16#A003	CJ, CJN, and JMP have no matching pointers.	Write the pointers which match CJ, CJN, and JMP respectively.
16#A004	There is a subroutine pointer in the main program.	The subroutine pointer can not be in the main program.
16#A005	Lack of the subroutine	The nonexistent subroutine can not be called.
16#A006	The pointer is used repeatedly in the same program.	The pointer can not be used repeatedly in the same program.
16#A007	The subroutine pointer is used repeatedly.	The subroutine pointer can not be used repeatedly.
16#A008	The pointer used in JMP is used repeatedly in different subroutines.	The pointer used in JMP can not be used repeatedly in different subroutines.
16#A009	The pointer used in JMP is the same as the pointer used in CALL.	The pointer used in JMP can not be the same as the pointer used in CALL.
16#A00B	Target position (I) of the single speed is incorrect.	The target position (I) of the single speed should be set correctly.
16#A00C	Target position (II) of the single-axis motion is incorrect.	Check whether target position (II) of the single-axis motion and target position (I) of the single-axis motion are in opposite directions.
16#A00D	The setting of speed (I) of the single-axis motion is incorrect.	Set the speed of the single-axis motion.
16#A00E	The setting of speed (II) of the single-axis motion is incorrect.	The setting value can not be zero.
16#A00F	The setting of the speed (V_{RT}) of returning to zero is incorrect.	Set the speed of returning to zero properly. (The setting value can not be zero.)
16#A010	The setting of the deceleration (V_{CR}) of returning to zero is incorrect.	Set the speed of returning to zero. The deceleration should be less than the speed of returning to zero. (The setting value can not be zero.)
16#A011	The setting of the JOG speed is incorrect.	The setting value can not be zero.
16#A012	The positive pulses generated by the single-axis clockwise motion are inhibited.	The error occurs because the limit sensor is triggered. Check the status of the limit sensor, and check whether the motor operates normally.
16#A013	The negative pulses generated by the single-axis counterclockwise motion are inhibited.	The error occurs because the limit sensor is triggered. Check the status of the limit sensor, and check whether the motor operates normally.
16#A014	The limit switch is reached.	The error occurs because the limit sensor is triggered. Check the status of the limit sensor, and check whether the motor operates normally.
16#A015	The device which is used exceeds the device range.	Use the device which does not exceed the device range.
16#A017	An error occurs when the device is modified by a 16-bit index register/32-bit index register.	Use the 16-bit index register/32-bit index register which does not exceed the device range.
16#A018	The conversion into the floating-point number is incorrect.	Modify the operation to prevent the abnormal number from occurring.
16#A019	The conversion into the binary-coded decimal number is incorrect.	Modify the operation to prevent the abnormal number from occurring.

Error code	Description	Remedy
16#A01A	Incorrect division operation (The divisor is 0.)	Modify the operation to prevent the divisor from being zero.
16#A01B	General program error	Modify the program to make the syntax correct.
16#A01C	LD/LDI has been used more than nine times.	Modify the program to prevent LD/LDI from being used more than nine times.
16#A01D	There is more than one level of nested program structure supported by RPT/RPE.	Modify the program to prevent more than one level of nested program structure supported by RPT/RPE from being used.
16#A01E	SRET is used between RPT and RPE.	Modify the program to prevent SRET from being used between RPT and RPE.
16#A01F	There is no M102 in the main program, or there is no M2 in the motion program.	Modify the program so that there is M102 in the main program, or modify the program so that there is M2 in the motion program.
16#A020	The wrong instruction is used, or the device used exceeds the range.	Check and modify the program to prevent the wrong instruction from being used, or check whether the device used exceeds the device range.

9.2.5 Troubleshooting for AH10EN-5A

Error code	Description	Remedy
16#A001	The IP address of host 1 conflicts with another system on the network.	1. Contact the network administrator, and check whether the IP address is correct. 2. Check the module parameter in HWCONFIG.
16#A002	The IP address of host 2 conflicts with another system on the network.	1. Contact the network administrator, and check whether the IP address is correct. 2. Check the module parameter in HWCONFIG.
16#A003	DHCP for host 1 fails.	Please contact the network administrator
16#A004	DHCP for host 2 fails.	Please contact the network administrator
16#A401	Hardware error	Please restore the hardware to the factory setting. If the error still occurs, please contact the factory.
16#A402	The initialization of the system fails.	Please restore the system to the factory setting. If the error still occurs, please contact the factory.

9.2.6 Troubleshooting for AH10SCM-5A

Error code	Description	Remedy
16#A002	The setting of the UD Link is incorrect, or the communication fails.	Check the setting in SCMSoft, and download the setting again.
16#A401	Hardware error	Please contact the factory.
16#A804	The communication through the communication port is incorrect.	1. Check whether the communication cable is connected well. 2. Check the parameter in HWCONFIG, and the parameter. Download the parameter again.
16#A808	Modbus communication error	1. Check whether the communication cable is connected well. 2. Check the parameter in HWCONFIG, and the parameter. Download the parameter again.

9.2.7 Troubleshooting for AH10DNET-5A

The parameters which are mentioned in the table below are set in DeviceNet Builder version 1.07 or above.

Error code	Description	Remedy
16#A080	AH10DNET-5A stops running.	Switch the operating status of the CPU module to the running status.
16#A0F1	No slave is put in the scan list of AH10DNET-5A.	Put slaves in the scan list, and then download the scan list to AH10DNET-5A.
16#A0E2	AH10DNET-5A functions as a master. The slave in the scan list is disconnected or does not exist.	1. Check whether the node ID of the slave changes. 2. Check whether the communication cable is disconnected or loose. 3. Check whether the length of the cable is larger than the maximum transmission distance. If the length of the cable is larger than the maximum transmission distance, the stability of the system can not be ensured.
	AH10DNET-5A as a slave does not connect to the I/O module as a master.	1. Check whether the node ID of the slave changes. 2. Check whether the communication cable is disconnected or loose. 3. Check whether the length of the cable is larger than the maximum transmission distance. If the length of the cable is larger than the maximum transmission distance, the stability of the system can not be ensured.
16#A0E7	AH10DNET-5A is checking whether its node ID is the same as the node ID of other device on the network.	If the error has occurred for a long time, please eliminate the error in the following way. 1. Make sure that there are at least two nodes working normally on the network. 2. Check whether the both ends of the cable are connected to 121 Ω terminal resistors. 3. Check whether the serial transmission speeds of other devices on the network are the same. 4. Check whether the communication cable is disconnected or loose. 5. Check whether the length of the communication cable is larger than the maximum transmission distance. If the length of the communication cable is larger than the maximum transmission distance, the stability of the system can not be ensured. 6. Check whether the shielded cable is grounded. 7. Supply power to AH10DNET-5A again.
16#A0E8	AH10DNET-5A is being initialized.	If the error has occurred for a long time, please supply power to the module again.
16#A0F0	The node ID of AH10DNET-5A is the same as other node ID on the network, or exceeds the range.	Make sure that the node ID of AH10DNET-5A is the only one on the network. If the node ID of AH10DNET-5A is not the only one on the network, please change the node ID, and supply power to AH10DNET-5 again.
16#A0F2	The working voltage of AH10DNET-5A is low.	Check whether the working voltage of AH10DNET-5A and that of an AH500 series CPU module are normal.
16#A0F3	AH10DNET-5A enters the test mode.	Switch IN 1 on the module OFF, and supply power to AH10DNET-5A again.

Error code	Description	Remedy
16#A0F4	The bus of AH10DNET-5A becomes OFF.	1. Check whether the communication cable is normal, and whether the shielded cable is grounded. 2. Check whether the serial transmission speeds of other devices on the network are the same. 3. Check whether the both ends of the cable are connected to 121 Ω terminal resistors. 4. Supply power to AH10DNET-5A again.
16#A0F5	AH10DNET-5A detects that there is no network power supply to the DeviceNet.	Check whether the communication cable is normal, and whether the network power supply is normal.
16#A0F6	Something is wrong with the internal memory of AH10DNET-5A.	Supply power to AH10DNET-5A again. If the error still occurs, please contact the factory.
16#A0F7	Something is wrong with the data exchange unit of AH10DNET-5A.	Supply power to AH10DNET-5A again. If the error still occurs, please contact the factory.
16#A0F8	The product ID of AH10DNET-5A is incorrect.	Supply power to AH10DNET-5A again. If the error still occurs, please contact the factory.
16#A0F9	An error occurs when the data is read from AH10DNET-5A, or when the data is written into AH10DNET-5A.	Supply power to AH10DNET-5A again. If the error still occurs, please contact the factory.
16#A0FA	The node ID of AH10DNET-5A is the same as that of the slave set in the scan list.	1. Set the node ID of AH10DNET-5A again. The new node ID can not be the same as the node ID of the slave set in the scan list. Supply power to AH10DNET-5A again. 2. Put no slave in the scan list, and download the blank scan list to AH10DNET-5A through the simulated online mode in the software. Supply power to AH10DNET-5A again.

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