



南大傲拓科技  
Nanda Automation Technology



# NA2000系列 PLC

硬件手册 V1.0



南大傲拓科技江苏股份有限公司

## Basic description

- Thank you for purchasing the Nandaauto NA2000 series of programmable logic controllers.
- This manual mainly introduces the hardware features of the NA2000 series of programmable logic controllers.

Before using the product, please read this manual carefully and make the wiring under the premise of understanding the contents of the manual fully

- Please refer to the relevant manual about the introduction of software and programming.
- Please deliver this manual to the end user.

## User notice

- Only operators with certain electrical knowledge can perform wiring and other operations on the product. If you do not understand anything, please consult our technical department.
- The examples listed in the manual and other technical materials are only supported for understanding and referencing, certain actions are not guaranteed.
- When using this product in combination with other products, please confirm whether it meets the relevant specifications and principles.
- When using this product, please confirm whether it meets the requirements and safety. In case of failure of the product which may cause machine failure or loss, please set up backup and safety functions by yourself.

## Copyright statement

- The contents of this manual, including text, graph, mark, logo, trademark, product models, software programs, layouts, etc. which are subject to the protection of the <Copyright Law of the People's Republic of China>, the <Trademark Law of the People's Republic of China> and the <Patent Law of the People's Republic of China>. At the same time, they are also protected by ownership laws in the international conventions, including copyright, trademarks, patent or other property and so on. They are exclusively owned or held by Nanda

Automation Technology Co., Ltd.

- This manual is only to read and inquire for commercial users . The contents of this manual shall not be reproduced or transmitted in any form by any electronic or mechanical means for any reason or purpose. Otherwise, the company will pursue legal responsibility according to law.
- We have checked that the contents and diagrams in this manual are consistent with the hardware devices, but the error is difficult to avoid. It cannot be guaranteed to be completely consistent. At the same time, we will regularly check, modify and maintain the contents and diagrams of the manual without further notice.
- Nanda Automation Technology Co., Ltd. reserves all rights.
- Other trademarks or registered trademarks mentioned in this manual are the property of their respective owners.

## **Contact information**

If you have any questions about the use of this product, please contact the office where you purchased the product, or you can contact Nandaauto Company.

- Phone: (+86) 025-68530188
- Fax: (+86) 025-68530178
- Website: <http://www.nandaauto.com>

# CONTENT

0 Preface .....	6
Product features .....	6
Content composition .....	7
1 Hardware System Overview .....	9
1.1 Component and Structure of NA2000-PLC Hardware System .....	9
1.2 System Specifications .....	11
1.3 Product List .....	12
1.4 NA2000-PLC Software Support .....	14
2 CPU Modules .....	18
2.1 Description of outlook .....	18
2.2 Instructions for use .....	19
2.2.1 CPU external hardware interface .....	19
2.3 The definition of Special IO .....	24
2.3.1 The definition of IO wiring .....	24
2.3.2 The definition of interrupt number .....	25
2.4 Terminal definition and wiring instructions .....	26
2.4.1 DI terminal definition of CPU module .....	26
2.4.2 DO terminal definition of CPU module .....	28
2.5 Technical specifications .....	33
3 Digital I/O Module .....	36
3.1 Digital input module .....	36
3.1.1 Overview .....	36
3.1.2 Indicator LED description: .....	36
3.1.3 Terminal definition and wiring instructions .....	37
3.1.4 Technical Specification .....	42
3.2 Digital output module .....	42
3.2.1 Overview .....	42
3.2.2 Indicator LED description: .....	43
3.2.3 Terminal definition and wiring instructions .....	44
3.2.4 Technical Specification .....	49
4 Analog Expansion Module .....	51
4.1 Analog Input module .....	51
4.1.1 Overview .....	51
4.1.2 LED indicators instructions .....	51
4.1.3 Terminal definition and Wiring instructions .....	52
4.1.4 Technical specification .....	54
4.2 Temperature Input module .....	55
4.2.1 Overview .....	55
4.2.2 LED indicators instructions .....	56
4.2.3 Terminal definition and Wiring instructions .....	56
4.2.4 Technical specification .....	63
4.3 Analog output module .....	64

---

4.3.1 Overview .....	64
4.3.2 LED indicators.....	64
4.3.3 Terminal definition and Wiring instructions .....	65
4.3.4 Technical specification .....	68
5 Module of BD signal board .....	69
5.1 Analog input signal board.....	69
5.1.1 Overview .....	69
5.1.2 Terminal definition and wiring instruction.....	69
5.1.3 Technical Specification .....	71
5.2 Temperature input signal board .....	72
5.2.1 Overview .....	72
5.2.2 Terminal definition and wiring instructions.....	72
5.2.3 Technical Specification .....	73
6 Module of Wireless signal .....	74
6.1 GRPS communication expansion board.....	74
6.1.1 Overview .....	74
6.1.2 Features of product.....	74
6.1.3 Technical Specification .....	74
6.2 ZigBee communication expansion board.....	75
6.2.1 Overview .....	75
6.2.2 Features of Product .....	76
6.2.3 Technical Specification .....	76
6.3 LORA communication expansion board .....	77
6.3.1 Overview .....	77
6.3.2 Features of Product .....	77
6.3.3 Technical Specification .....	77
7 System Configurationand installation.....	79
7.1 Selection of CPU module.....	79
7.2 Selection of I/O modules.....	79
7.3 Ordering instructions .....	81
7.4 Hardware installation.....	81
7.4.1 Guideline.....	81
7.4.2 Installation of rail.....	84
7.4.3 Size of product.....	86
8 Guide of quick application .....	88
8.1 Inventory of products.....	88
8.2 Installation and wiring of Equipment .....	88
8.3 Connection of power line .....	88
8.4 Establishment of PC communication.....	89
8.5 Download the programforthefirsttime.....	89
8.6 Compile control program.....	91
8.7 Put equipment into operation .....	92

## 0 Preface

The NA2000 series of Programmable Logic Controller (NA2000-PLC) are designed and developed independently by Nanda Automation Technology Co., Ltd. NA2000-PLC draws on the successful experiences of the international main stream PLCs to improve their deficiencies. It aims at the latest development of today's PLCs, and adopts a combined world-leading advanced technologies in information, communication, electronics, automatic control technology and other areas. From the aspects of CPU operating system, I/O signal processing, network communication, software development and production process, NA2000-PLC has a superior performance and is suitable for all kinds of automatic control. NA2000-PLCs are high-performance intelligent PLC product series, which are based on integrated, intelligent and networked development ideas, orienting to the core applications of IoT terminal control units and automation terminal mechanical equipment control units.

### Product features

- CPU, I/O, Communication network and Power supply are electrically isolated.
- Using micro embedded real-time multitasking operating system to support multi-task allocation for a better use of CPU resources.
- Open network with 100Mbps Ethernet which supports MODBUS/TCP protocol.
- Multiple serial communications. MODBUS and customized protocols are supported.
- Bus type Ethernet cascading mode is supported.
- A variety of wireless communication methods (ZigBee, GPRS, 3G/4G, LoRa) are supported. It can perform wireless data transmission between PLC and remote data center. It can also realize wireless data transmission between PLC and PLC, and realize wireless data transmission between PLC and wireless terminal equipment.
- A variety function of BD board are supported to select, which improve cost-performance.

- Configuration TFT screen display is supported (optional).
- Remote downloading and debugging are supported.
- SD card data storage is supported.
- The expansion module adopts the design of ultra-thin structure, which is very suitable for occasions with small space.
- Supporting high-speed pulse output, high-speed counting input, IO interrupt, which are suitable for mechanical motion control of intelligent automation equipment.

## Content composition

This manual covers the selection and system configuration of NA2000-PLC. It mainly introduces the specification parameters, input and output wiring, operation and maintenance of the basic unit of the NA2000 PLC, and also records the parameters, shape and characteristics of expansion modules, wireless modules and expansion BD Board. This manual is divided into 8 chapters according to different content. The contents of each chapter are as follows:

1. Overview of the hardware system of the series products. This chapter mainly introduces the performance features, model composition of the NA2000-PLC, as well as the full range of product components, descriptions of various parts of the product, etc.

2. This chapter mainly introduces the general specifications, performance specifications, terminal arrangement, product dimensions, interface description of the basic unit of the CPU.

3. This chapter mainly introduces the general specifications, performance parameters, terminal arrangement, product dimensions, interface description of the digital I/O expansion module.

4. This chapter mainly introduces the general specifications, performance parameters, terminal arrangement, product dimensions, interface description of the analog I/O expansion module.

5. This chapter mainly introduces the general specifications, performance parameters,

terminal arrangement, product dimensions, interface description of the BD signal board module.

6. This chapter mainly introduces the general specifications, product features, technical specifications of wireless signal modules.

7. This chapter mainly introduces hardware selection configuration, installation, debugging, maintenance instructions, etc.

8. This chapter mainly introduces the guide for quick application.

## 1 Hardware System Overview

NA2000-PLC is a new series of products based on years of Nandaauto proud extension in PLC research and development experience, which improves the performance of existing PLC. Products use low-power embedded processors which have fast processing speed, large memory and rich communication interface. NA2000-PLC is based on integrated, intelligent and networked development ideas, and is oriented to the core applications of IoT terminal control units and automation terminal mechanical equipment control units. The whole series of CPU units are designed with dual network port and integrated with wireless communication unit inside. A wide range of expansion modules provide individual solutions for different industrial fields. It can be widely used in metallurgy, building materials, light industry, transportation, power, petrochemical, automotive, mining, water treatment, food processing and other industries.

### 1.1 Component and Structure of NA2000-PLC Hardware System

The NA2000-PLC includes controller modules, digital expansion modules, analog expansion modules, BD signal boards, wireless communication expansion boards, TFT screens, optional accessories and other modules.

Controller module: also called CPU module. The controller has built-in dual network port 10/100Mbps Ethernet (shares one IP address) and dual RS485 serial communication interfaces and data storage SD card which used for program upgrading. 16 channels DI, 8 channels DO. The wireless signal expansion board, BD signal board and TFT configuration screen can be selected.

Digital module: mainly general I/O modules. It is connected to the controller housing through the side plug-in method and connected to the controller data through the internal bus.

Analog module: mainly includes voltage, current, RTD, TC and other signal acquisition modules and analog signal output modules.

BD signal board: the gold finger PCB board, which is installed in the CPU module housing, it is a low-cost, small-volume design option. This module is optional.

Wireless communication expansion board: the internal function PCB board of the

CPU module. It can be optional when purchasing, and assembled and shipped by the manufacturer.

TFT screen: It adopts configuration design and can provide customers with a window for querying PLC internal data, which is easy to use. It is optional when purchasing.



- |                         |                       |
|-------------------------|-----------------------|
| 1、 Power input terminal | 7、 Ethernet interface |
| 2、 TFT screen / cover   | 8、 IO terminal        |
| 3、 Left side cover      | 9、 Right side cover   |
| 4、 Wireless antenna     | 10、 SD card slot      |
| 5、 U-shaped slot buckle | 11、 DIP switch        |
| 6、 BD board slot/cover  | 12、 Expansion module  |

## 1.2 System Specifications

Table 1. General system specifications of NA2000 Hardware System

System power	24VDC/ 220VAC	Supply voltage	24VDC(20VDC~28VDC) 220VAC(±20%)
Electro magnetic Compatibility (EMC)	Immunity	Surge Immunity	IEC61000-4-5 2kV(CM)/1kV(DM)
		Oscillatory Wave Immunity	IEC61000-4-12 2.5kV(CM)/1kV(DM)
		Electrical Fast Transient	IEC61000-4-4 ±2kV(Power)/±1kV(I/O)
		Electrical Static Discharge	IEC61000-4-2 ±8kV(Air)/±6kV(Contact)
		Radiation Electromagnetic Immunity	IEC61000-4-3 10V/m, Frequency 80MHz~1GHz
Electro magnetic Radiation	Electro magnetic Radiation	Radiated Interference Measure	CISPR 16-2-3 2006 30~230MHz 10m Quasi-peak value <40dB(µV/m) 230~1000MHz 10m Quasi-peak value <47dB(µV/m)
		Conducted Interference Measure	CISPR 16-2-1 2005 0.15 ~ 0.5MHz Quasi-peak value < 79dB(µV) Average value <66dB(µV) 0.5~30MHz Quasi-peak value < 73dB(µV) Average value <60dB(µV)
Environmental Adaptation	Climatic Environment	Operating Temperature	-10 °C ~ +55 °C
		Operating Humidity	5%~95%, non-condensation
		Operating Altitude	0~3000m
		Storage	-40 °C ~ +70 °C

		Temperature		
		Storage Humidity	5%~95%, non-condensation	
	Environment	Mechanical	Vibration	IEC 60068-2-6: Part 2-6/10 up 58 Hz, uniform amplitude 0.075 mm 1G (gravity acceleration), amplitude 0.3mm, Frequency 58~150Hz
			Shock	IEC 60068-2-27: 15G, duration 11ms
			Drop and topple	IEC 60068-2-31: 50mm, drop 4 times (unpacked)
		Free-Fall	IEC 60068-2-32: 1m, drop 5 times (shipping package)	
	Shell Protection	Degrees of protection provided by enclosure	IEC60529 IP20 (prevent foreign articles larger than 12mm from access, but not waterproof)	

### 1.3 Product List

Table 2. Product List ofNA2000-PLC

Module Type	Type	Notes
Basic Controller CPU	CPU2001-2401	16 points DI, 8 points transistor DO (sink type NPN), DC24V power supply, 2 high-speed counting, 2 high-speed outputs
	CPU2001-2402	16 points DI, 8points relay DO, DC24V power supply, 2high-speed counting
	CPU2001-2403	16 points DI, 8 points transistor DO (sink type NPN), AC220V power supply, 2 high-speed counting, 2 high-speed outputs
	CPU2001-2404	16 points DI, 8points relay DO, AC220V power supply, 2 high-speed counting
	CPU2001-2411	16 points DI, 8 points transistor DO (sink type), DC24V power supply, 2 high-speed counting, 4 high-speed output. Interpolation is not supported.

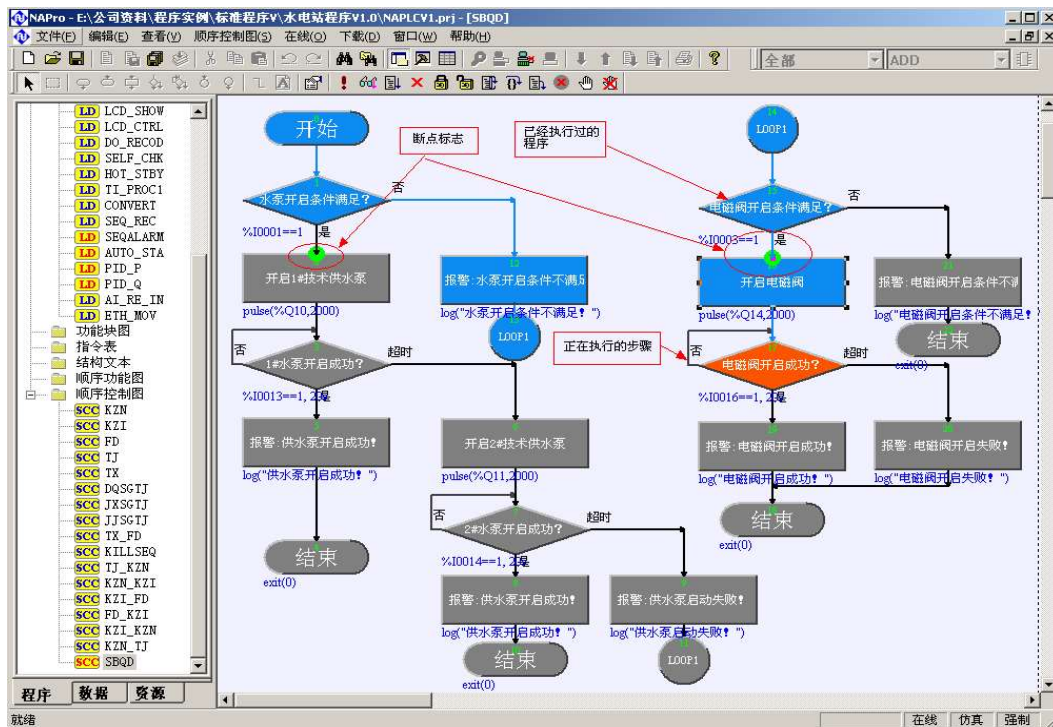
Digital Input	DIM2001-0801	8 points input 24VDC (Two-way input)
	DIM2001-1601	16 points input 24VDC (Two-way input)
Digital Output	DOM2001-0801	8 points output 24VDC transistor (sink type NPN)
	DOM2001-1601	16 points output 24VDC transistor (sink type NPN)
	DOM2001-0802	8 points output relay
Analog Input	AIM2001-0401	4 points, Voltage/Current
	AIM2001-0802	8 points, Current
	AIM2001-0203	2 points, RTD Input
	AIM2001-0403	4 points, RTD Input
	AIM2001-0204	2 points, Thermocouple Input
	AIM2001-0404	4 points, Thermocouple Input
Analog Output	AOM2001-0201	2 points, Voltage/Current
	AOM2001-0401	4 points, Voltage/Current
BD Signal Board	CAI2001-0201	Analog Input BD Board, 2 points, Current/Voltage
	CAI2001-0402	Analog Input BD Board, 4 points, Current
	CAI2001-0203	RTD Input BD Board, 2 points
Accessories	CCM2001-0101	GRPS Communication Board (2G)
	CCM2001-0201	ZIGBEE Communication Board
	CCM2001-0301	LoRa Communication Board
	MSD2001-0101	SD Card, 16G
	ATD2001-0101	GPRS Antenna 1 meter
	ATD2001-0102	GPRS Antenna 2 meter
	ATD2001-0201	ZIGBEE Antenna 1 meter

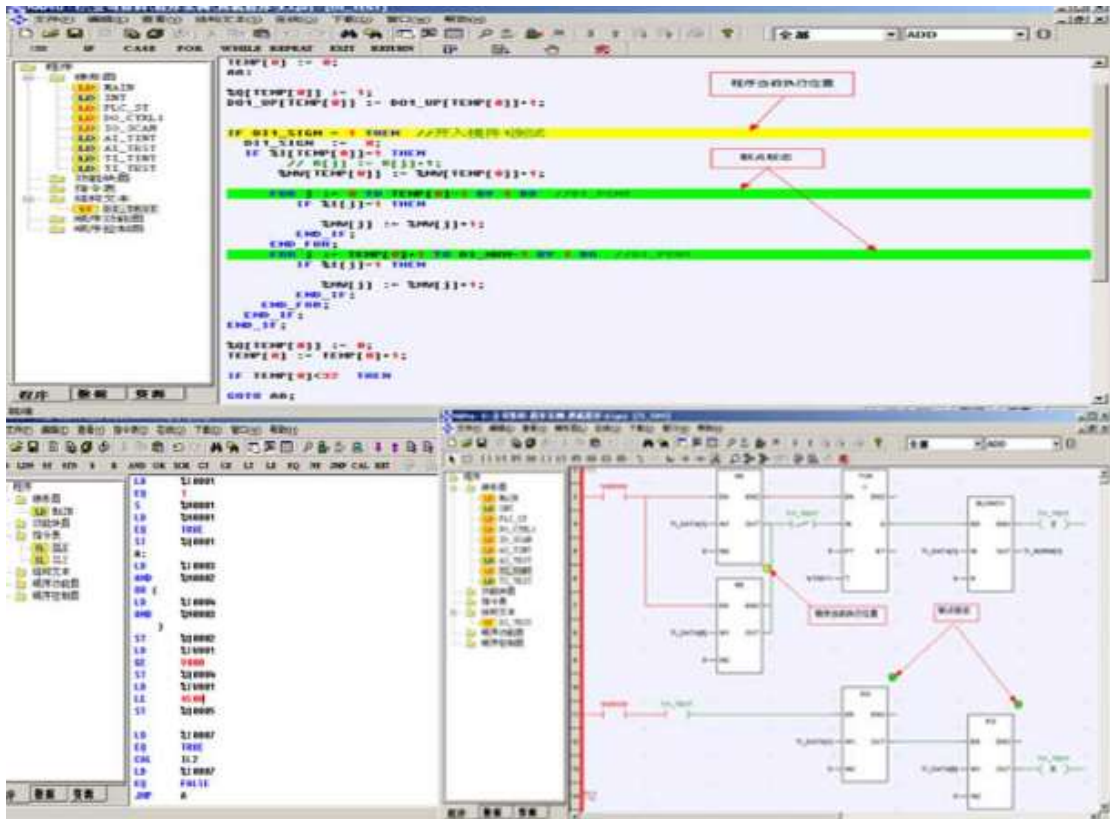
ATD2001-0202	ZIGBEE Antenna 2 meter
ATD2001-0301	LoRa Antenna 1 meter
ATD2001-0401	LoRa Antenna 2 meter

### 1.4 NA2000-PLC Software Support

NA2000-PLC uses NAPro software (V6.0 or above) developed by Nanda Automation to program the software and debug the system. NAPro software, an IEC61131-3 standardized programming, debugging and running software, can also be used with , NA200H, NA300 and NA400 PLC. It consists of an editor, a compiler a debugger, a simulator and GUI tools. It can be used to do hardware configuration, test point configuration, software programming, simulation, debug and download.

NAPro processes a series of full functions which makes it a good choice to improve productivity and software collaboration. With the development cost decrease and optimal operation, NAPro can ensure optimizing customer’s software investment, lowering the training cost, and a peerless potential in development and compatibility.





Features of NAPro programming software are as following:

**Comply with IEC-61131 international standard**

NAPro complies with IEC-61131 international standard and provides an uniform and effective system configuration environment which makes it possible for the engineers to “learn once, and use everywhere”.

**Fully support Chinese programming environment**

Chinese is fully supported in NAPro. Chinese variables, comment, descriptions can be used in programs. Working windows, menus, tabs, online help and user manuals are also in Chinese.

**Tree structure for project management**

Under the concepts of project management, NAPro has a project browser with a tree structure, displaying multi-document of programs in a visualized mode, which makes it convenient to programming development and maintenance.

**Supporting five programming languages specified in IEC61131-3**

NAPro supports all five programming languages specified in IEC61131-3. Different languages could be used within a project and could be called by each other. These four

languages include:

LD: Ladder Diagram

ST: Structured text

IL: Instruction List

SFC: Sequential Function Chart

### **An original Sequential Control Chart (SCC) Programming Language**

As most of control operations in control area are sequential controls, NAPro creates a Sequential Control Chart, which is a simple graphic process description and easy to be accepted by users due to its visualization and convenience.

### **Rich operation control functions**

NAPro not only embeds many standard modules, standard operators and functions, but also provides many practical modules such as pulse digital output, serial communication, network communication etc.

### **Online real-time monitoring function**

When online, NAPro can monitor all test points and variables, view SOE events and warning messages, and watch the program execution.

### **Perfect online editing function**

When online, parameters of Ladder Diagram function can be modified directly, and the modified results can be directly transferred to running PLC on the base of ensuring program continuity. In this way, the modifications could get into effect within the same scan cycle. Module delete or movement can also be carried out but require download before real execution.

### **Powerful online debugging function**

When online, programs can be automatically executed, monitor the execution and debug. Break point can be set and single step can be taken. One can stop the execution or restart it at any time. It is very convenient to debug the program.

### **Perfect simulation function**

A PLC simulator is integrated in NAPro, which could precisely reproduce the activity of a target program. This process of programming and debugging can be done without the hardware so as to reduce the length of program development cycle.

### **Friendly software design interface**

NAPro makes the best use of the advantages of Windows graphic and context interface. It improves greatly user friendly experience by optimizing the use of display area, direct visit to tools and information, and bilingual comments, etc.

### **Effective diagnostic tool**

NAPro has an overall function of diagnosing application programs. The compiler window can display all the system and application faults clearly. In this window, modifications can be easily made by simply clicking the mouse and entering the editor where the programs go wrong.

For more detailed information about NAPro programmable software, please refer to <NAPro Programmable Software Manual for NA series PLC> and <NA2000 System PLC Application Manual>.

## 2 CPU Modules

The CPU module is the core part of NA2000-PLC. It constructs a complete hardware system of PLC by connecting the expansion bus and expansion modules. The CPU module is responsible for self-diagnosis, data acquisition, control of implementation, external communications, and external output functions, etc.

The CPU module is the system control center. Users download the completed program into the CPU module, then CPU module is activated and run the user program in a loop manner, and in each loop cycle it needs to read the process information, to do logical calculation, and to output the result of the operations. At the same time, it also needs to handle the communications, high-speed counting, event interruption processes etc.

### 2.1 Description of outlook

The user's interface of the NA2000CPU module are located on the front panel of the module, including DIP switch, memory card slot, indicators, terminal blocks, communication interface and label, as shown in Figure 2-1-1.



Figure 2-1-1 Outlook of the NA2000 CPU module

## 2.2 Instructions for use

### 2.2.1 CPU external hardware interface

The user interfaces of the NA2000-PLC series of CPU module are located on the front panel of the module, including indicators, terminal blocks, communication interface and label, as shown in Figure 2-2-1.

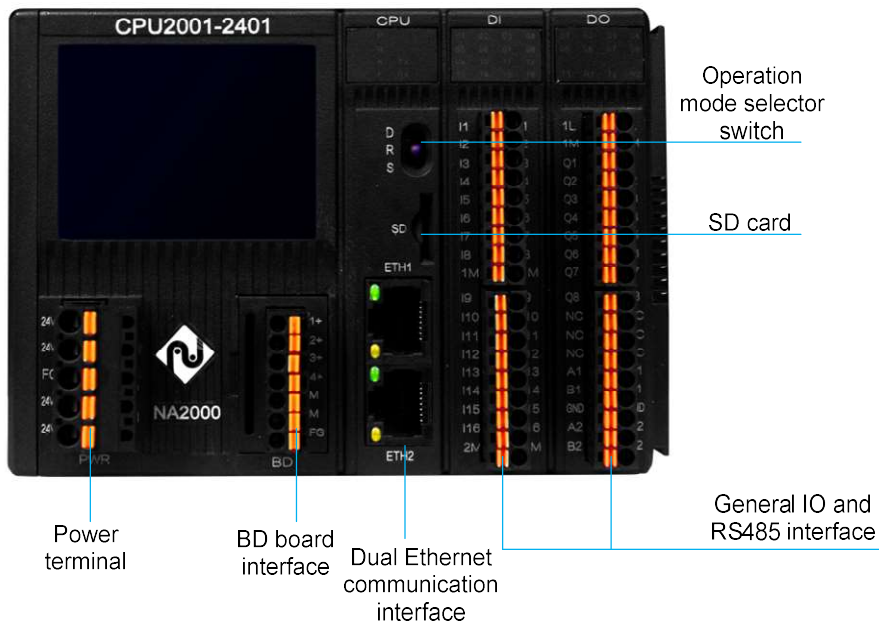
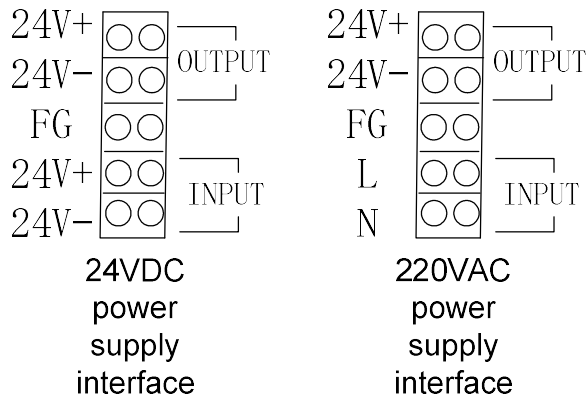


Figure 2-2-1 external hardware interface diagram of NA2000-PLC CPU module

#### 1 Power terminal

There are two power supply modes for the NA2000-CPU, one is 24VDC and the other is 220VAC; as shown in the following example:



INPUT indicates power input, in which CPU2001-2401, CPU2001-2402, and CPU2001-2411 are 24VDC power supplies, CPU2001-2403 and CPU2001-2404 are

220VAC power supplies. OUTPUT indicates that the CPU module supplies power to the external devices. The output voltage is 24VDC (unregulated 20VDC to 28VDC) and the power is 18W (750mA).

## **2 BD board interface**

Install different optional modules of BD signal board and define different terminals for different BD boards. Refer to Chapter 5 “BD Signal Board Module” for details.

## **3 Operating mode selector switch**

There is a 3-position switch in the CPU module. When the switch is turned to the [Debug] position, the CPU enters the default running state. At this time, the CPU's IP address is 192.168.1.66. Then the user program can be downloaded manually by the NPro.

When the switch is turned to the [Run] position, the CPU enters the normal running state. After that, the software can detect the switch position and set the status of the module. The definitions are as follows:

[Stop]: When turning the switch to “Stop” position, the CPU module is in a stopped state. The software will stop scanning the program.

[Debug]: When turning the switch to “Debug” position, the CPU module is in a debug state, and the Watchdog of the module will be disabled. Debug the user program at this point.

[RUN]: When turning the switch to “Run” position, the CPU module is in a normal state. Watchdog will be enabled when the CPU module appears to be running chaos or crash due to some kinds of interference or hardware failure, the module can be reset automatically.

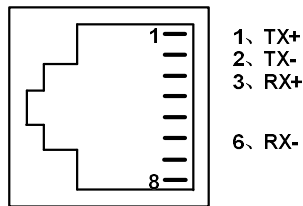
## **4 SD card**

Install SD card optional accessories, upgrade programs and store data through SD card.

## **5 Dual Ethernet interface**

For the dual network port NA2000 module, there are two Ethernet interfaces for debugging and downloading user programs.

The Ethernet port is defined as follows:



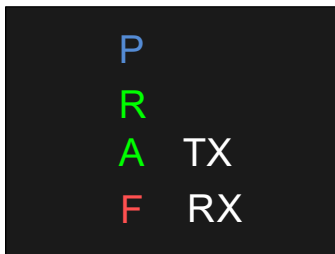
## 6 IO interface and RS485 interface

Refer to 2.4 in this chapter for detailed definitions.

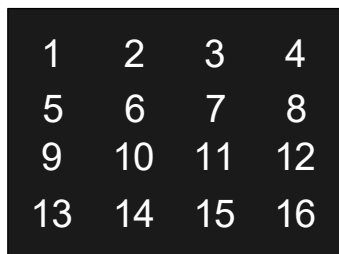
### 2.2.2 Indicator LEDs

The LED indicators of the NA2000-PLC CPU module are divided into the following types:

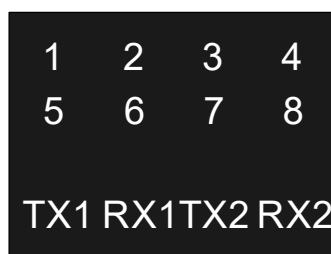
- Status indicator LED: It is mainly used to indicate the power indication and working status of the CPU module.
- Channel indicator LED: It is used to indicate the working status of each channel provided by the PLC, including the switch input channel (DI), the switch signal output status channel and the serial port transceiver indicator.
- Network indicator LED: used to indicate link status and rate status.



CPU indicator LED



DI indicator LED



DO indicator LED/serial port indicator

**Description of indicator LEDs**

LED	Color	State	Meaning
P	Blue	Constant Lighting	Power on
		off	Power off
R	Green	Flicker	Run normally, the user program is running.
A	Green	Constant Lighting	Module is running
		off	The module is in a stopped state or has a fatal fault
F	Red	Light	Module is faulty (including network cable not plugged, internal bus fault, etc.)
		off	Module is fault free
TX、RX	Green	Flicker	Wireless communication has data transmission and reception instructions
		off	Wireless communication has no data
1、 2、 3、 4、 5、 6、 7、 8、 9、 10、 11、 12、 13、 14、 15、 16	Green	Constant Lighting	Signal loading or external output
		off	No signal loading or no external output
TX1、 RX1 、 TX2、 RX2、	Green	Flicker	Serial port 1 and 2 send and receive data indications
		off	Serial port does not work

**LED combination indicator definition**

R	A	F	State representation meaning
Flicker	Constant Lighting		Running normally
Flashing		Flashing	Running in the default state

RJ45 network port indicator as shown in Figure 2-2-2.

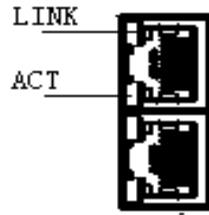


Figure 2-2-2 RJ45 network port comes with an indicator

RJ45 network ports have their own indicators, which are LINK and ACT LEDs. The module LINK light is green and can be judged if the network connection is detected. The ACT light is yellow and can represent the link status. The specific indications are as follows:

Name	Color	Status	Indicator status meaning
LINK	Green	Light	Network connection detected
		off	No network connection detected
ACT	Yellow	Flicker	Data on the Ethernet link
		off	No data on the Ethernet link

## 2.3 The definition of Special IO

### 2.3.1 The definition of IO wiring

#### 1 Special use of DI

##### Frequency measurement and high-speed counting

The basic PLCs of NA2000 are equipped with 2-way single-phase/dual-phase high-speed counters.

Pin	Frequency measurement	Single phase high-speed counting	Pulse + direction high-speed counting	AB phase high-speed counting
I01	pulse	pulse	pulse	pulse A
I02	common DI	common DI	direction	pulse B
I03	pulse	pulse	pulse	pulse A
I04	common DI	common DI	direction	pulse B

Note: 1) I01, I02 is the 1st high-speed counter signal input; and I03, I04 is the 2nd high-speed counter signal input.

2)The upper limit of the input frequency is 100KHz.

##### External hardware interrupt

The basic PLCs of NA2000 support 4 channels DI interrupts, and the DI pins are I13, I14, I15, and I16. At the same time, each DI interrupt supports rising edge and falling edge interrupt. The interrupt number is shown in the chapter 2.3.2 which describes the definition of interrupt number.

##### Function of origin search

When using function of the origin search, its DI will be used as a special function, as shown in the following table:

Pin	Function
I05	The negative polarity switch input of first axis
I06	The positive polarity switch input of first axis
I07	The origin switch input of first axis
I08	The negative polarity switch input of second axis
I09	The positive polarity switch input of second axis
I10	The origin switch input of second axis
I11	The negative polarity switch input of third axis
I12	The positive polarity switch input of third axis
I13	The origin switch input of third axis

I14	The negative polarity switch input of fourth axis
I15	The positive polarity switch input of fourth axis
I16	The origin switch input of fourth axis

Note: The basic CPU uses the hardware interface of I05 to I10, and the motion CPU uses the hardware interface of I05 to I16.

## 2 The special use of DO

CPU2001-2401 and CPU2001-2403 are the NA2000 series basic PLC, and they are transistor output modules. They have 2-way high-speed pulse outputs. The ports are defined as shown in the following table:

Pin	Function
Q01	The pulse of first axis
Q02	The pulse of second axis
Q03	The direction of first axis
Q04	The direction of second axis

CPU2001-2411 is the NA2000 series basic PLC, and it is also transistor output module. It has 4-way high-speed pulse outputs. The ports are defined as shown in the following table:

Pin	Function
Q01	The pulse of first axis
Q02	The pulse of second axis
Q03	The pulse of third axis
Q04	The pulse of fourth axis
Q05	The direction of first axis
Q06	The direction of second axis
Q07	The direction of third axis
Q08	The direction of fourth axis

### 2.3.2 The definition of interrupt number

Interrupt Number	Interrupt Type	Notes
1	Timer	Timer 1
2		Timer 2
3		Timer 3
4		Timer 4
5	External Input	DI13 rising edge interrupt
6		DI13 falling edge interrupt
7		DI14 rising edge interrupt
8		DI14 falling edge interrupt
9		DI15 rising edge interrupt
10		DI15 falling edge interrupt

11		DI16 rising edge interrupt
12		DI16 falling edge interrupt
21	High-speed Counting	High-speed counting 1
22		High-speed counting 2

## 2.4 Terminal definition and wiring instructions

### 2.4.1 DI terminal definition of CPU module

For the CPU module of NA2000-PLC, all of them have 16 DI inputs, which are divided into two isolated parts. I01~I08 share 1M common terminal, and I09~I16 share 2M common terminal. Supporting source and sink access modes. The internal circuit is shown in Figure 2-4-1, and the external wiring is shown in Figure 2-4-2.

#### Interface circuit schematic of DI channel

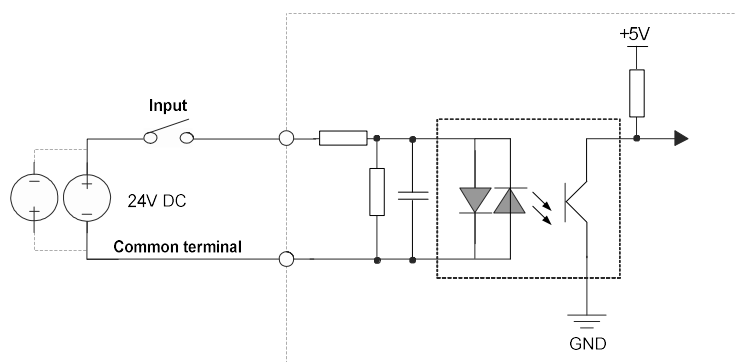


Figure 2-4-1 DI single channel interface circuit schematic of CPU module

#### Terminal wiring diagram

The digital input of the CPU module is connected to the external device through the terminal blocks on the front of the module. Correspondence of each channel is described in the following figure, and please pay attention to the following:

- A group of 8 channels, with two common terminals, and 16 channels are divided into two groups;
- I01~I08 share 1M common terminal, and I09~I16 share 2M common terminal, supporting source type and sink type access mode;
- Please don't connect more than 2 cables to the same pin of the terminal. It is better to realize multipoint cable access by busbar or transfer terminal.

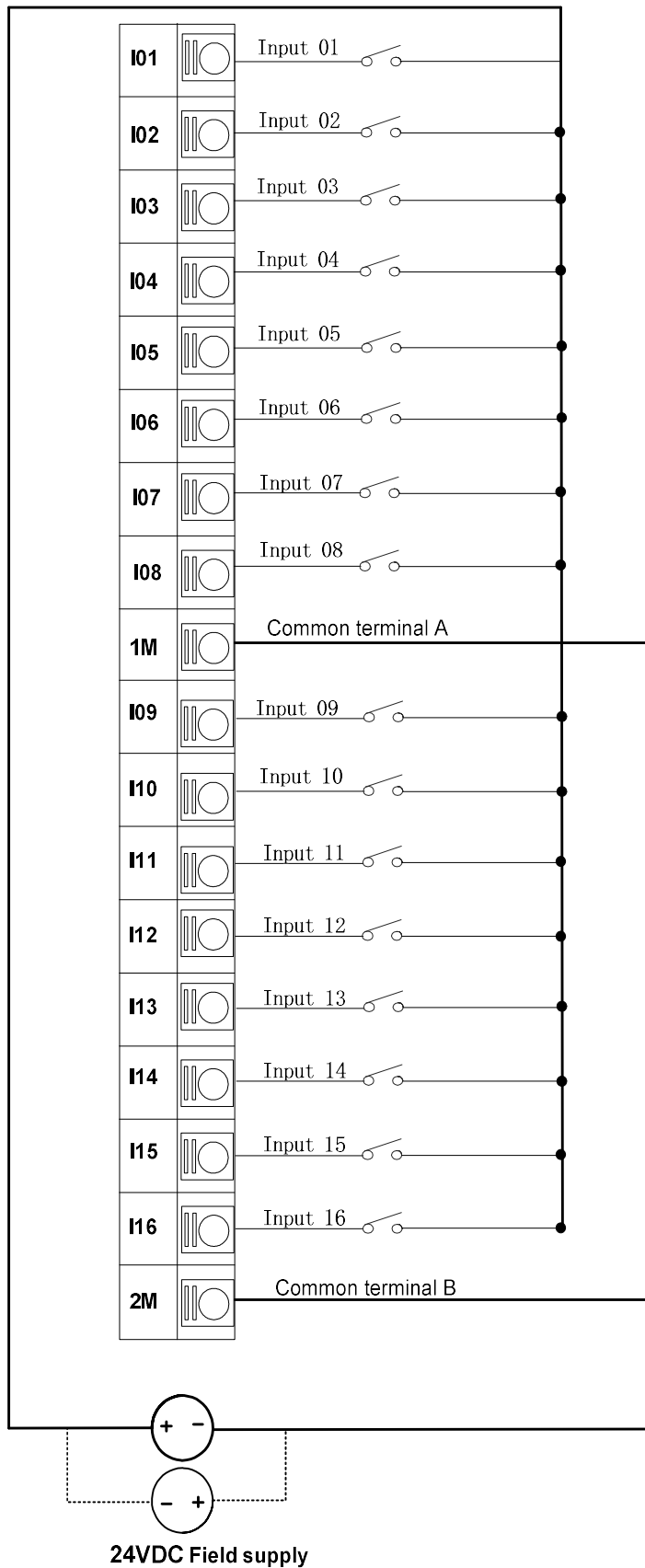


Figure 2-4-2 DI terminal wiring diagram of CPU module

## 2.4.2 DO terminal definition of CPU module

### 1 transistor output type

For the CPU module of the NA2000-PLC, the CPU2001-2401, CPU2001-2403, and CPU2001-2411 CPU modules have 8 channels transistor outputs. They are drain output types. The internal circuit is shown in Figure 2-4-3, and the external wiring is shown in Figure 2-4-4.

### Interface circuit schematic of DO channel

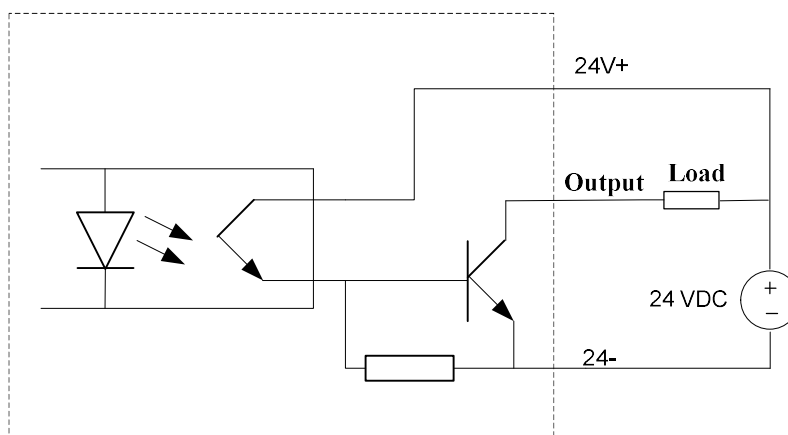


Figure 2-4-3 DO single channel interface circuit schematic of CPU module

### Terminal wiring diagram

The digital output of the CPU module connects to the external device by the terminal blocks on the front of the module. Correspondence of each channel is described in the following figure. And please pay attention to the following:

- Digital output module needs to use user-supplied power supply 24VDC separately.
- All the 8 points in one group use the same 24VDC supply.
- "1L+,1M" terminal is an 8-channel power terminal, in which terminal "1L+" is connected to 24VDC power supply positive, "1M" is connected to negative pole, and "Q1~Q8" terminals are respectively 1st to 8th digital output terminals;
- Providing 2-way RS485 terminal blocks. A1 and B1 are COM1, A2 and B2 are COM2;
- "NC" means that this channel is not wired or has no physical connection;
- Please don't connect more than 2 cables to the same pin of the terminal. It is

better to realize multipoint cable access by busbar or transfer terminal.

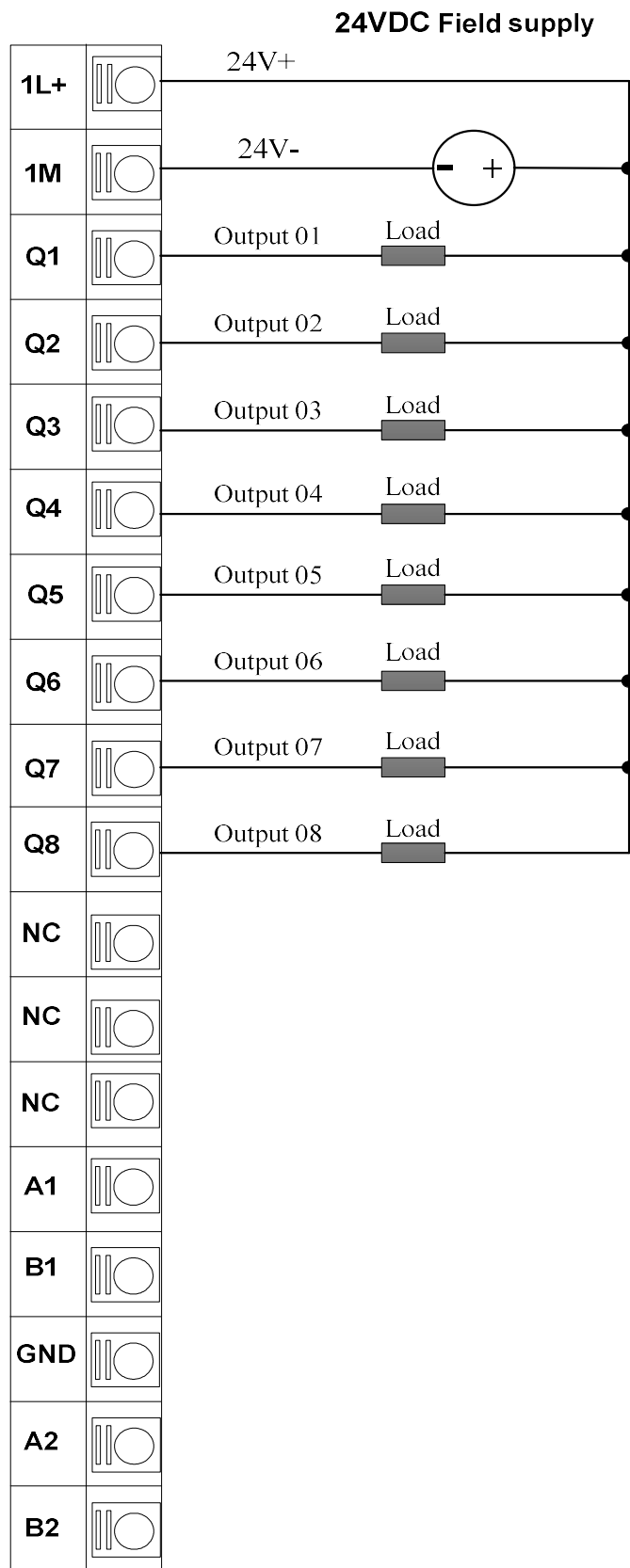


Figure 2-4-4 DO terminal wiring diagram of CPU module



## 2 Relay output type

For the CPU module of the NA2000-PLC, the CPU2001-2402 and the CPU2001-2404 modules have eight relay outputs. Providing 2-way RS485 terminal blocks. A1 and B1 are COM1, and A2 and B2 are COM2. The internal circuit is shown in Figure 2-4-5, and the external wiring is as shown in Figure 2-4-6.

### Interface circuit schematic of DO channel

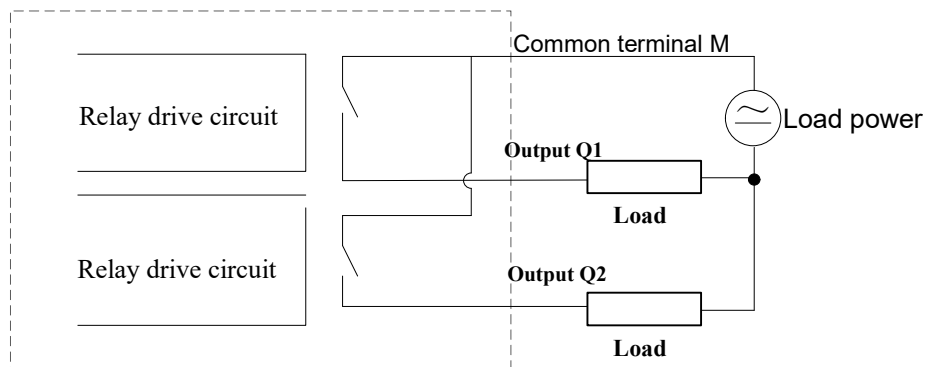


Figure 2-4-5 DO single channel interface circuit schematic of CPU module

### Terminal wiring diagram

The digital output of the CPU module is connected to the external device through the terminal blocks on the front of the module, the corresponding relationship of each channel is shown in the figure below, and please note the following: the 2 channels share a load power supply and there are 4 groups of common terminals.

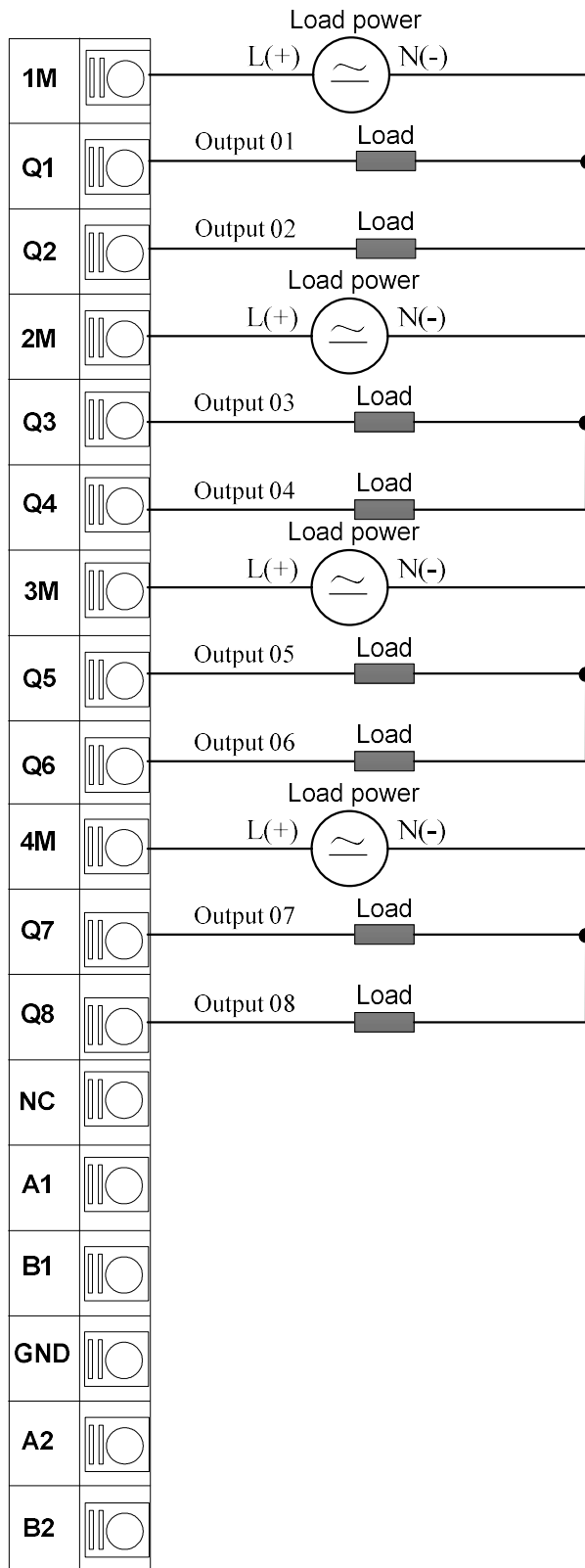


Figure 2-4-6 DO terminal wiring diagram of CPU module

## 2.5 Technical specifications

CPU Type		Basic Type				
CPU Model		CPU200 1-2401	CPU2001- 2403	CPU2001- 2402	CPU2002- 2404	CPU2002- 2411
Module Points	Digital Input	16*24VDC	16*24VDC	16*24VDC	16*24VDC	16*24VDC
	Digital Output	8* Transistor	8* Transistor	8*Relay	8*Relay	8* Transistor
Storage Capacity	Program Area	512K bytes	512K bytes	512K bytes	512K bytes	512K bytes
	Power Down Holding Area	4K bytes	4Kbytes	4K bytes	4K bytes	4K bytes
Operating Voltage		24VDC	220VAC	24VDC	220VAC	24VDC
DC24VTransmitting Output		DC24V 800mA				
Number of Expansion modules		14				
General Characteristics						
Pulse Input		2-way single phase	2-way single phase	2-way single phase	2-way single phase	2-way single phase
Interrupt Input		4	4	4	4	4
High-speed Counting		2, 100kHz	2, 100kHz	2, 100kHz	2, 100kHz	2, 100kHz
High-speed Output		2, 100kHz	2, 100kHz	---	---	4, 200kHz
Timer(T)		256		256	256	256

Counter(C)	256	256	256	256	
Password Protection	Yes	Yes	Yes	Yes	
Real-time Clock	Yes	Yes	Yes	Yes	
<b>Integrated Communication Function</b>					
RS485	Number	2			
	Mode	Half duplex			
	Isolation	Isolation			
	Support Baud Rate	1200-38400bpsOptional			
	Communication Protocol	Modbus RTU Master、 Modbus RTU Slaver、 Free port agreement			
Ethernet	Interface	2(share one IP address)			
	Physical Layer	10BASE-T/100BASE-TX			
	Topology	Star type、 Daisy chain			
	Communication Protocol	Modbus TCP Master、 Modbus TCP Slaver、 Free port agreement			
<b>Digital Input Characteristics</b>					
Input Type	Sink /Source				
Voltage Input	24VDC				
Allowable Range	12VDC-30VDC				
Isolation Method	Optical isolation				
Isolation Group	2				
Isolation Withstand Voltage	2500/5000 Vr.m.s				
<b>Digital Output Characteristics</b>					
Output Type	Transistor(sink)	Transistor(sink)	Relay	Relay	Transistor(sink)
Rated Voltage	24VDC	220VAC	24VDC	220VAC	24VDC
Maximum Current of Single Point	500mA	500mA	2A	2A	500mA

Common Rated Current	4A	4A	4A	4A	4A
Isolation Group	2	2	4	4	2
Isolation Withstand Voltage	2500/5000Vr.m.s	2500/5000 Vr.m.s	3000Vr.m.s	2500/5000 Vr.m.s	2500/5000 Vr.m.s
Physical characteristics					
Installing Size(mm)	125(L)*90(W)*75(H)				
Weight(g)	460	460	460	460	460
Power Consumption(max)	2.8W	2.8W	2.8W	2.8W	2.8W
Operating Temperature	-10□~+55□		-10□~+55□		-10□~+55□
Storage Temperature	-40□~+70□		-40□~+70□		-40□~+70□
Storage Humidity	5%~ 95%(non-condensation)		5%~ 95%(non-condensation)		5%~ 95%(non-condensation)

### 3 Digital I/O Module

#### 3.1 Digital input module

##### 3.1.1 Overview

The NA2000-PLC digital input expansion module can be connected to standard switch input and 2-wire proximity switch input. The main technical performance indicators are as follows:

- Can be connected to input signals of source or sink type
- Rated input voltage is 24VDC
- Suitable for switches and 2-wire proximity switches
- The hardware doesn't need to be set, and the CPU module automatically loads the parameters after start up.
- Each channel has separate electrical isolation to ensure that the signal will not affect the normal operation of the entire module under the strong electrical interference.

##### 3.1.2 Indicator LED description:

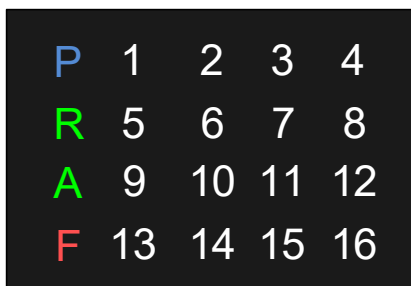


Figure 3-1-1 Indicator LEDs

##### Description of indicator LEDs:

LED	Color	State	Meaning
P	Blue	Constant lighting / off	Supply power for the module/No power
R	Green	Flicker /Constant lighting	Run normally/The program is running but the parameters are not loaded

A	Green	Constant lighting / off	Indicates Normal communication with the CPU / abnormal communication with the CPU
F	Red	Light / off	Fault/ Running normally
1-16 LEDs	Green	Light / off	The input state of the channel is currently 1/The input state is currently 0.

The specific meanings of the indicators on the module panel corresponding to their operating status are as follows:

**P:** Power indicator. When the light is on, the module is powered on. When the power is off, the light is off.

**R:** Running indicator. The module flashes green when the module is running normally. If the green light is constant lighting, it indicates that the program is running but the parameters are not loaded.

**A:** Communication indicator. When the light is on, it indicates that the high-speed bus network communication between the module and the CPU is normal.

**F:** Fault indicator. When the light is on, the module is faulty, and the light is off during normal operation.

**1-16 channels:** Channel indicator. Each green indicator indicates the status of a signal. For the digital input module, the input state of the channel is currently 1 when the light is on, otherwise it is 0.

### 3.1.3 Terminal definition and wiring instructions

#### Diagram of Interface

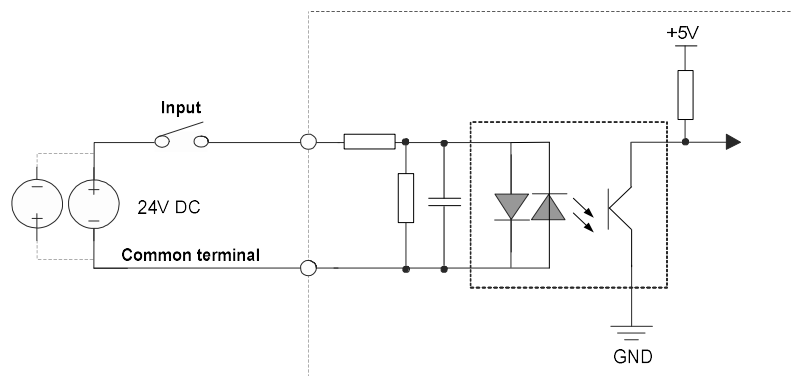


Figure 3-1-2 Diagram of DIM2001-0801 and DIM2001-1601 Single Channel Interface Circuit

**Terminal wiring diagram of DIM2001-0801**

DIM2001-0801 Digital input module connects with external devices by terminal blocks in front of the module. Correspondence of each channel is described in the following figure. And please pay attention to the following:

- Every 8 channels form a group and share a common terminal. There is all one common terminal.
- I01~I08 share 1M common terminal. Supporting source and sink access modes;
- "NC" means that this channel is not wired or has no physical connection;
- Please don't connect more than 2 cables to the same pin of the terminal. It is better to realize multipoint cable access by busbar or transfer terminal.

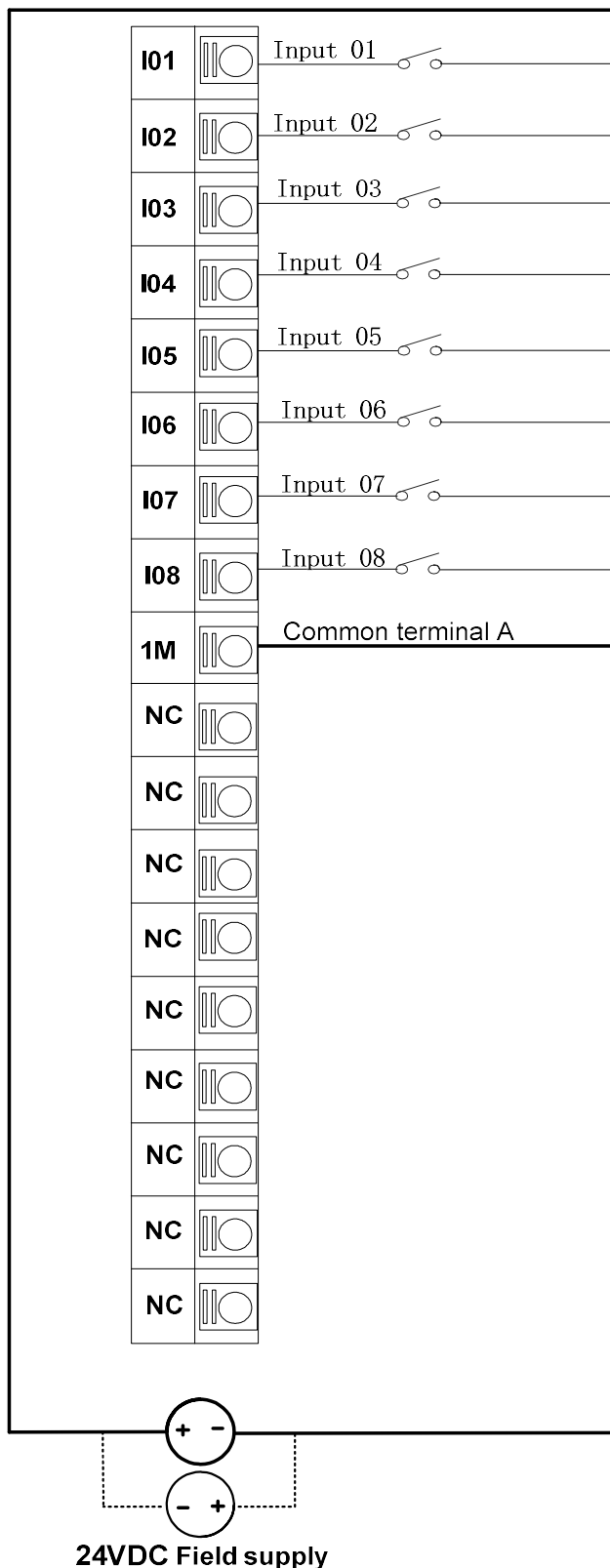


Figure 3-1-3 DIM2001-0801 Terminal wiring diagram

**Terminal wiring diagram of DIM2001-1601**

DIM2001-1601 Digital input module connect with external devices by terminal blocks in front of the module. Correspondence of each channel is described in the following

figure. And please pay attention to the following:

- DIM2001-1601 digital input module requires a separate 24VDC field power supply.
- Every 8 channels form a group and share a common terminal. There are all two common terminals. 16 channels can be divided into 2 groups, each of which requires a separate 24VDC filed power supply.
- I01~I08 share 1M common terminal, and I09~I16 share 1M common terminal. Supporting source and sink access modes;
- Please don't connect more than 2 cables to the same pin of the terminal. It is better to realize multipoint cable access by busbar or transfer terminal.

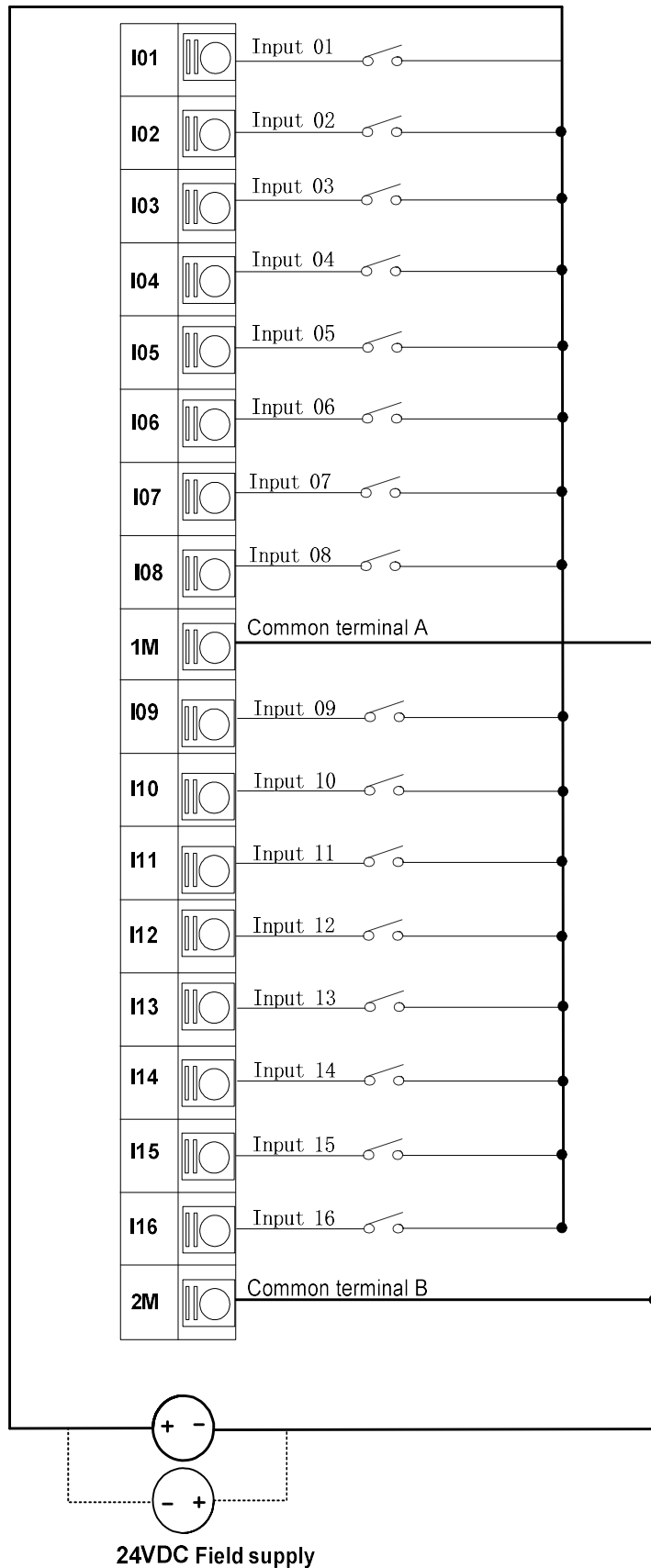


Figure 3-1-4 DIM2001-1601 Terminal wiring diagram

### 3.1.4 Technical Specification

Product Model		DIM2001-0801	DIM2001-1601
Input Characteristics			
Input Channel		8 Points	16Points
Input Type		Sink or source	Sink or source
Input Voltage	Rating	24VDC	24VDC
	"1"Signal	15~24VDC	15~24VDC
	"0"Signal	0~5VDC	0~5VDC
Input Delay		4ms	4ms
Isolation Method		Optical isolation	Optical isolation
Isolation Group		1	2
Isolation Withstand Voltage		5000Vr.m.s	5000Vr.m.s
Physical Characteristics			
Installing Size(mm )		25mm×90mm×75mm	25mm×90mm×75mm
Weight(g)		100	100
Power Consumption(max)		0.50W	0.60W
Operating Temperature		-10□~+55□	-10□~+55□
Storage Temperature		-40□~+70□	-40□~+70□
Storage Humidity		5%~ 95%(non-condensation)	5%~ 95%(non-condensation)

## 3.2 Digital output module

### 3.2.1 Overview

The NA2000 digital output expansion module can be used to connect solenoid valves, contactors, small power motors, lamps, motor starters, etc. The main technical performance are as follows:

- Up to 16 output channels.
- The output mode is transistor or relay, and the transistor output is a sink output.
- Every group of output has a fuse which can protect the module automatically if it is over loaded.
- No need for hardware setting. The CPU module can load parameters on it automatically after starting up.

### 3.2.2 Indicator LED description:

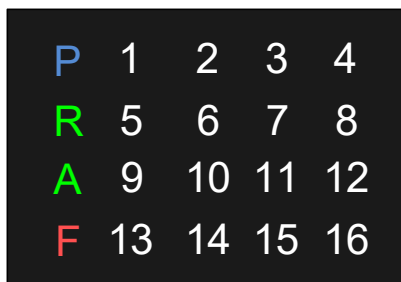


Figure 3-2-1 Indicator LEDs

#### Description of indicator LEDs:

LED	Color	State	Meaning
P	Blue	Constant lighting / off	Supply power for the module/No power
R	Green	Flicker /Constant lighting	Run normally/The program is running but the parameters are not loaded
A	Green	Constant lighting / off	Indicates Normal communication with the CPU / abnormal communication with the CPU
F	Red	Light / off	Fault/ Running normally
1-16LEDs	Green	Light / off	The input state of the channel is currently 1/The input state is currently 0.

The specific meanings of the indicators on the module panel corresponding to their operating status are as follows:

**P:** Power indicator. When the light is on, the module is powered on. When the power is off, the light is off.

**R:** Running indicator. The module flashes green when the module is running normally. If the green light is constant lighting, it indicates that the program is running but the parameters are not loaded.

**A:** Communication indicator. When the light is on, it indicates that the high-speed bus network communication between the module and the CPU is normal.

**F:** Fault indicator. When the light is on, the module is faulty, and the light is off during normal operation.

1-16 channels: Channel indicator. Each green indicator indicates the status of a signal. For the digital input module, the input state of the channel is currently 1 when the light is on, otherwise it is 0.

### 3.2.3 Terminal definition and wiring instructions

#### 1 Digital output module of DOM2001-0801 and DOM2001-1601

For digital output modules, DOM2001-0801 and DOM2001-1601 are transistor outputs and drain output types.

#### Diagram of Interface

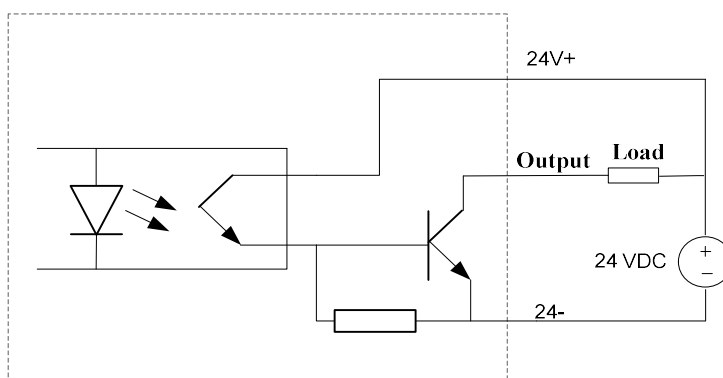


Figure 3-2-2 Diagram of DOM2001-0801 and DOM2001-1601

#### Single Channel Interface Circuit

#### Terminal wiring diagram of DOM2001-0801

DOM2001-0801 Digital output module connects with external devices by terminal blocks in front of the module. Correspondence of each channel is described in the following figure. And please pay attention to the following:

- Digital output module needs to use user-supplied power supply 24VDC separately.
- All the 8 points in one group use the same 24VDC supply.
- "1L+,1M" terminal is an 8-channel power terminal, in which terminal "1L+" is connected to 24VDC power supply positive, "1M" is connected to negative pole, and "Q1~Q8" terminals are respectively 1st to 8th digital output terminals;
- "NC" means that this channel is not wired or has no physical connection;
- Please don't connect more than 2 cables to the same pin of the terminal. It is better to realize multipoint cable access by busbar or transfer terminal.

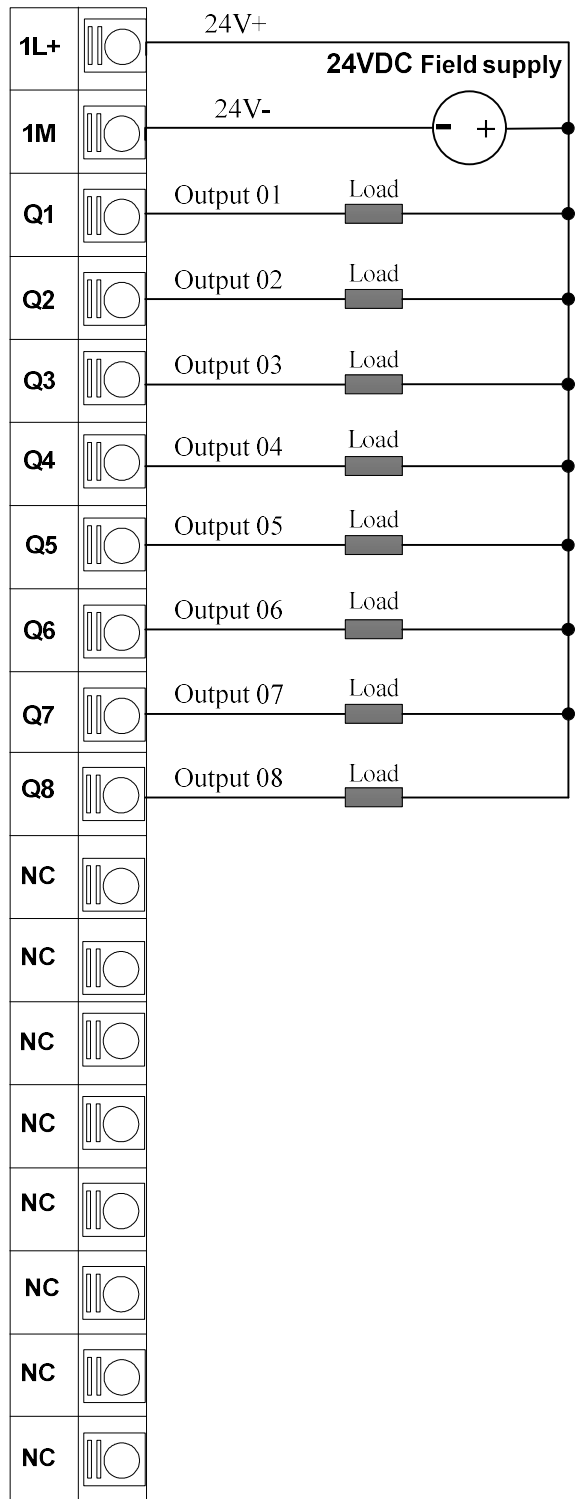


Figure 3-2-3 DOM2001-0801 Terminal wiring diagram

**Terminal wiring diagram of DOM2001-1601**

DOM2001-1601 Digital output module connect switch external devices by terminal blocks in front of the module. Correspondence of each channel is described in the following figure. And please pay attention to the following:

- Digital output module needs to use user-supplied power supply 24VDC separately.
- All the 16 points in one group use the same 24VDC supply.
- "1L+,1M" terminal is an 8-channel power terminal, in which terminal "1L+" is connected to 24VDC power supply positive, "1M" is connected to negative pole, and "Q1~Q16" terminals are respectively 1st to 16th digital output terminals;
- Please don't connect more than 2 cables to the same pin of the terminal. It is better to realize multipoint cable access by busbar or transfer terminal.

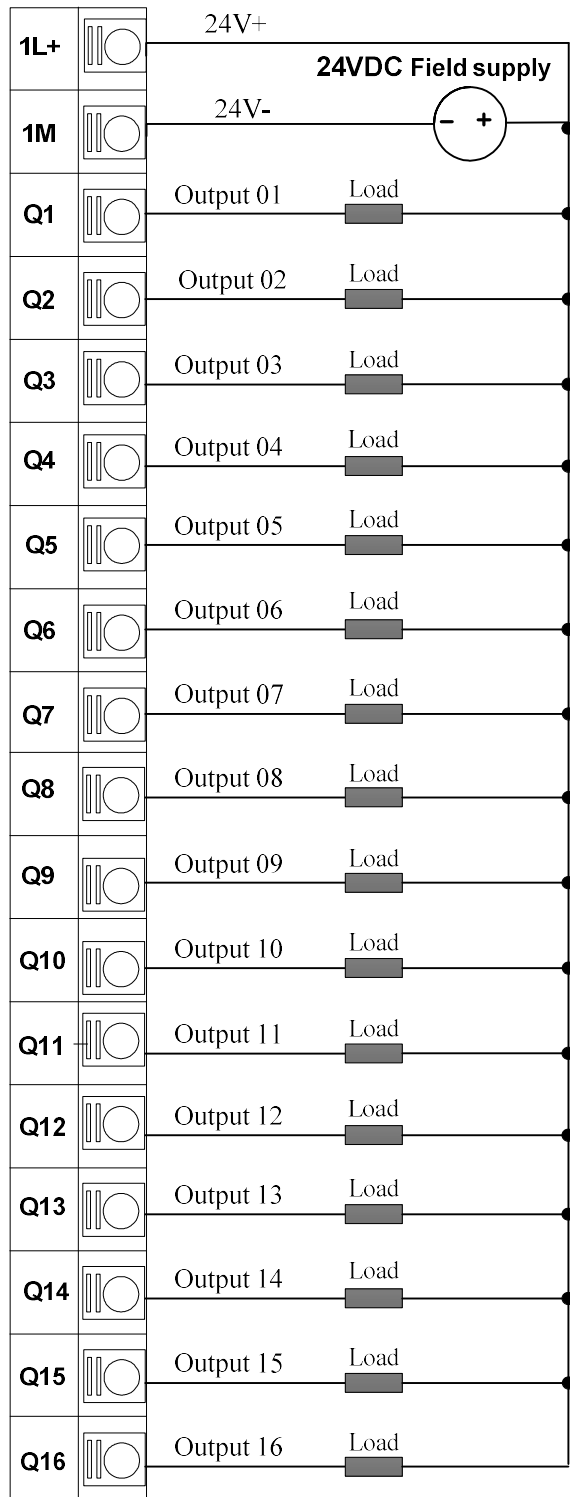
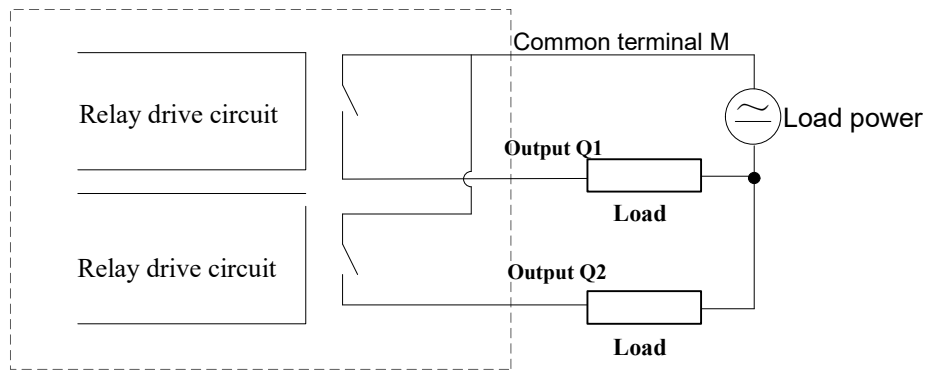


Figure 3-2-4 DOM2001-1601 Terminal wiring diagram

**2 Digital output module of DOM2001-0802**

For the digital output module, DOM2001-0802 is relay type output module which provides 8 relay outputs.

**Interface circuit schematic of DO channel**



DOM2001-0802 single channel interface circuit schematic of CPU module

### Terminal wiring diagram of DOM2001-0802

The digital output of DOM2001-0802 connects to the external device by the terminal blocks on the front of the module. Correspondence of each channel is described in the following figure. And please pay attention to the following: the 2 channels share a load power supply and there are 4 groups of common terminals.

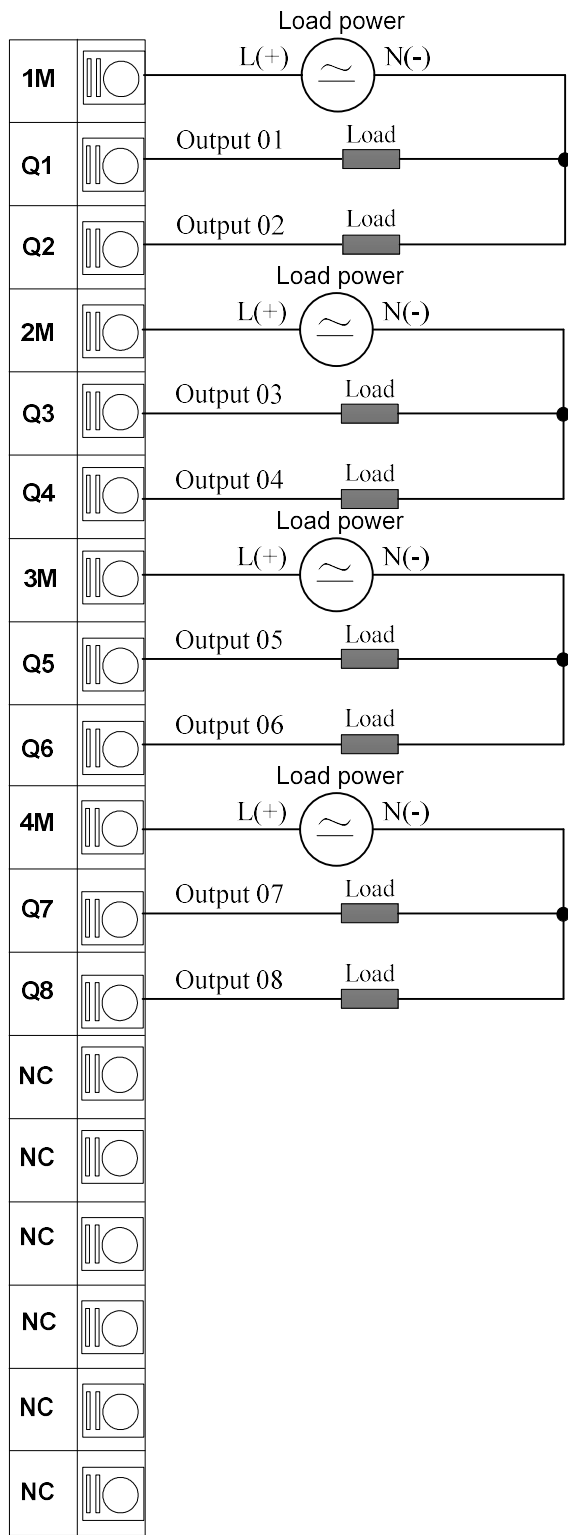


Figure 3-2-5 DOM2001-0802 Terminal wiring diagram

### 3.2.4 Technical Specification

Product model	DOM2001-0801	DOM2001-1601	DOM2001-0802
Output Characteristics			
Output Channel	8 points	16 points	8 points
Output Type	Transistor	Transistor	Relay

The Current Sum of Common Terminal Output	4A	4A	4A
Maximum Current of Single Point	500mA	500mA	3A
Isolation Method	Optical isolation	Optical isolation	
Isolation Group	1	2	4
<b>Physical Characteristics</b>			
Installing Size(mm)	25mm×90mm×75mm		
Weight(g)	100	100	120
Power Consumption(max)	0.65W	0.8W	0.65W
Operating Temperature	-10□~+55□	-10□~+55□	-10□~+55□
Storage Temperature	-40□~+70□	-40□~+70□	-40□~+70□
Storage Humidity	5%~95% (non-condensation)	5%~95% (non-condensation)	5%~95% (non-condensation)

## 4 Analog Expansion Module

### 4.1 Analog Input module

#### 4.1.1 Overview

NA2000 series analog input expansion module is used to connect with voltage/current sensors, its main specifications as follows:

- Up to 8 analog input channels.
- Signal type: voltage/current.
- 12-bit A/D conversion chip.
- Signal input form: single-ended input.
- Intelligent module with self-diagnosis function can be reset and reboot automatically when fault.
- No need for hardware setting. The CPU module can load parameters on it automatically after start up.

#### 4.1.2 LED indicators instructions

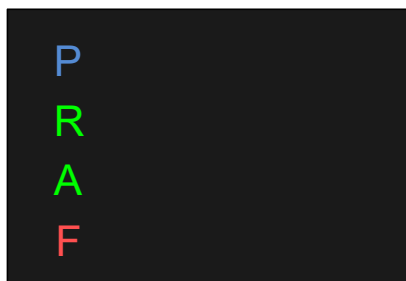


Figure 4-1-1 LED indicators

##### Definition of indicators

LED	color	state	Meaning
P	Blue	Constant Lighting/ off	Power on/ Power off
R	Green	Flicker/Constant Lighting	Run normally/Program has been running but parameter is unloaded
A	Green	Constant Lighting/ off	HIN work normally/ abnormally
F	Red	Light / off	Fault/ Running normally

The working state corresponding to the indicator LED is as follows:

P: Power LED indicator. When module power on, the LED is on; When module power off ,the LED is off.

R: Run LED indicator. When the module is running normally, the green LED flickers. If the green LED is always on, that means program has been running but parameter is unloaded

A: Communication LED indicator. When CPU module can communicate normally with other modules through HIN, the LED is on.

F: Fault LED indicator. The LED is on when the module has fault. The LED will go off when everything is normal.

### 4.1.3 Terminal definition and Wiring instructions

#### Diagram of Interface

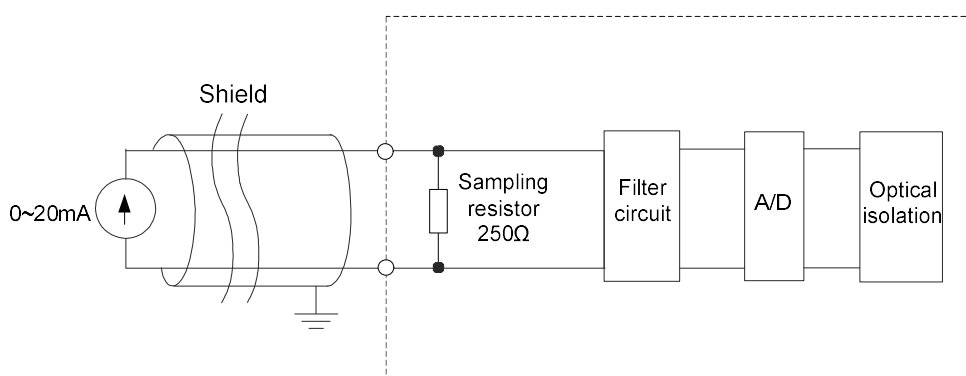


Figure 4-1-2 Diagram of AIM2001-0401/AIM2001-0802 Single Channel Interface Circuit

The current signal is converted into digital signal by current-voltage conversion, filtering and A/D. After photoelectric isolation, it will be read by the microprocessor of the module and then uploaded to the main station of the controller through the high-speed internal bus.

#### Terminal wiring diagram

AIM2001-0401 AI module connects with external devices by terminal blocks in front of module. Correspondence of each channel is described in the following figure. And please pay attention to the following:

- Each field AI signal is connected to terminals by two wires (shielded cable).
- When the Nth channel is connected to the current type signal, you need to short the RNA and RNB terminals. If connecting voltage mode signals, there is no

need to be shorted, and please refer to the following wiring diagram.

- Do not supply power to transmitter with input channel. A separate 24V DC power supply must be used when a two-wired transmitter is connected.
- "NC" indicates that this channel is not wired or has no physical connection. "FG" is connected to earth;
- Please don't connect more than 2 cables to the same pin of the terminal.

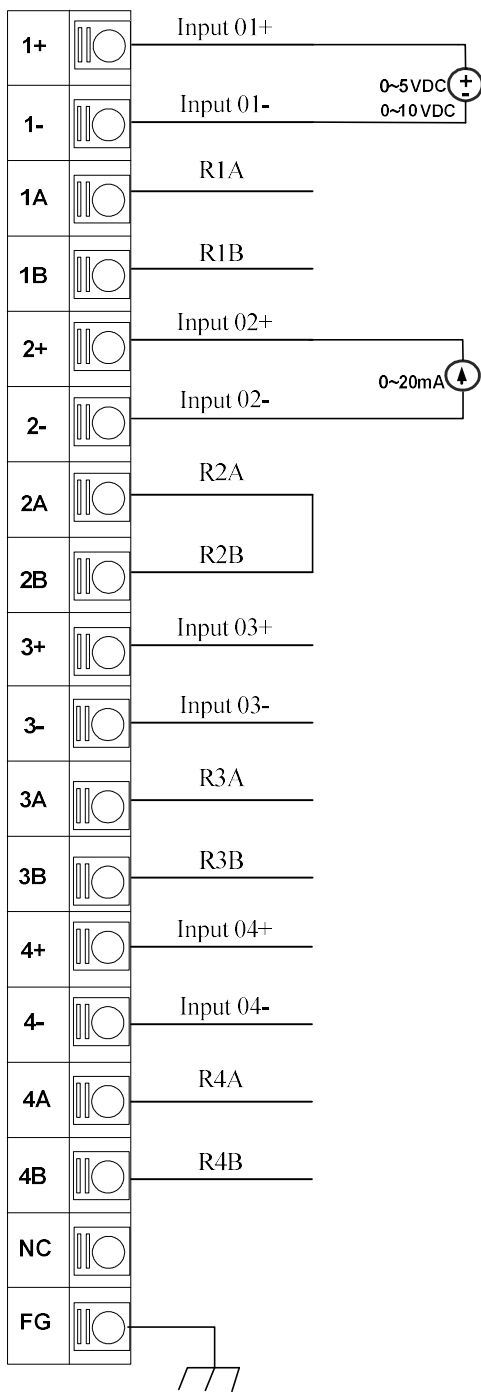


Figure 4-1-3 AIM2001-0401 Terminal wiring diagram

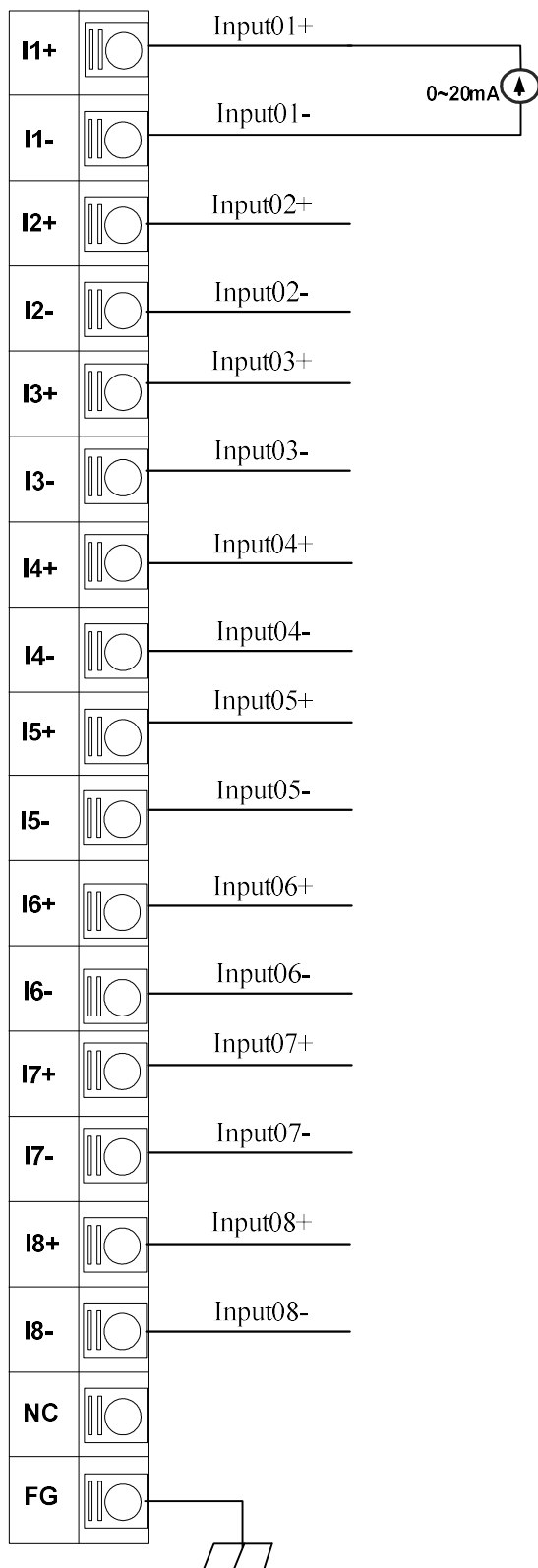


Figure 4-1-4 AIM2001-0802 Terminal wiring diagram

#### 4.1.4 Technical specification

Product Model	AIM2001-0401	AIM2001-0802
Input Characteristics		

Input channels	4		8	
Input type	Single-ended input (current/voltage)		Single-ended input (current)	
A/D Resolution	12-bit		12-bit	
Conversion time	<100us		<100us	
Signal type	-10V~+10V,0V~+10V, -5V~ +5V, 0V~+5V,0~20 mA,4~20 mA		0~20 mA,4~20 mA	
Data code value	-10V~+10V,0V~+10V, -5V~+5V, 0V~+5V, 0~20mA,	0~ 20000	0~20 mA	0~20000
	4~20mA	4000 ~ 20000	4~20 mA	4000~ 20000
Input step response	5ms		5ms	
CMRR	120dB		120dB	
Temperature drift	±100ppm/°C		±100ppm/°C	
<b>Physical Characteristics</b>				
Dimension W×H×D	25mm×90mm×75mm			
Weight(g)	100		100	
Power consumption (max)	1.2W		1.65W	
Operating Temperature	-10°C~+55°C		-10°C~+55°C	
Storage Temperature	-40°C~+70°C		-40°C~+70°C	
Relative humidity	5%~95%(No condensation)		5%~95%(No condensation)	

## 4.2 Temperature Input module

### 4.2.1 Overview

NA2000 series temperature input expansion module is used to connect with thermal resistance /thermocouple sensors, its main specifications as follows:

- Up to 4 temperature probe input channels.
- The type of thermistor for each channel can be set optionally.
- Measurement mode of each channel: RTD/Thermocouple.
- RTD Wiring mode: Two-wire/Three-wire.

- Intelligent module with self-diagnosis function can be reset and reboot automatically when fault.
- No need for hardware setting. The CPU Module can load parameters on it automatically after start up.

### 4.2.2 LED indicators instructions

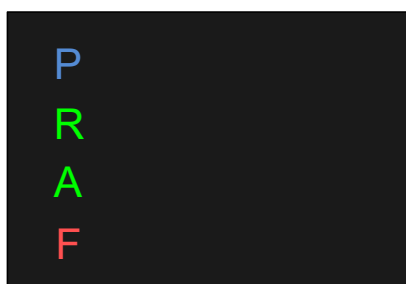


Figure 4-2-1 Diagram of LED indicators

#### Definition of indicators

LED	color	state	Meaning
P	Blue	Constant Lighting/ off	Power on/ Power off
R	Green	Flicker/Constant Lighting	Run normally/Program has been running but parameter is unloaded
A	Green	Constant Lighting/ off	HIN work normally/ abnormally
F	Red	Light / off	Fault/ Running normally

The working state corresponding to the indicator LED is as follows:

P: Power LED indicator. When module power on ,the LED is on; When module power off, the LED is off.

R: Run LED indicator. When the module is running normally, the green LED flickers. If the green LED is always on, that means program has been running but parameter is unloaded

A: Communication LED indicator. When CPU module can communicate normally with other modules through HIN, the LED is on.

F: Fault LED indicator. The LED is on when the module has fault. The LED will go off when everything is normal.

### 4.2.3 Terminal definition and Wiring instructions

#### 1 RTD temperature input module

## Diagram of Interface

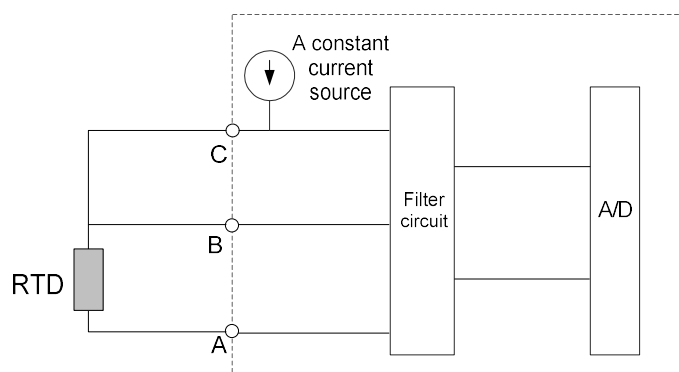


Figure 4-2-2 Diagram of AIM2001-0203/AIM2001-0403 Single Channel Interface Circuit

Compared with the traditional bridge measurement method, using the constant current source excitation measurement method can eliminate the effect of the line resistance of the RTD long wire on the measurement accuracy more effectively when the bridge is unbalanced. Of course, both the constant current source measurement method and the bridge measurement method require that the line resistance of the three wires of the RTD be equal, otherwise the deviation of the wire resistance will affect the measurement accuracy.

### Terminal wiring diagram of AIM2001-0203

AIM2001-0203 AI module connects with external devices by terminal blocks in front of module. Correspondence of each channel is described in the following figure. And please pay attention to the following:

- Each field RTD is connected to terminals A、B、C by three wires (shielded cable).
- "1A, 1B, 1C ,1B" and "2A, 2B, 2C ,2B " are the input terminals of the 1st and 2nd temperature signals respectively.
- If the resistance which is provided by user is of two-wire, B、C terminals of input channels need to be shorted.
- "NC" indicates that this channel is not wired or has no physical connection. "FG" is connected to earth.
- Please don't connect more than 2 cables to the same pin of the terminal.

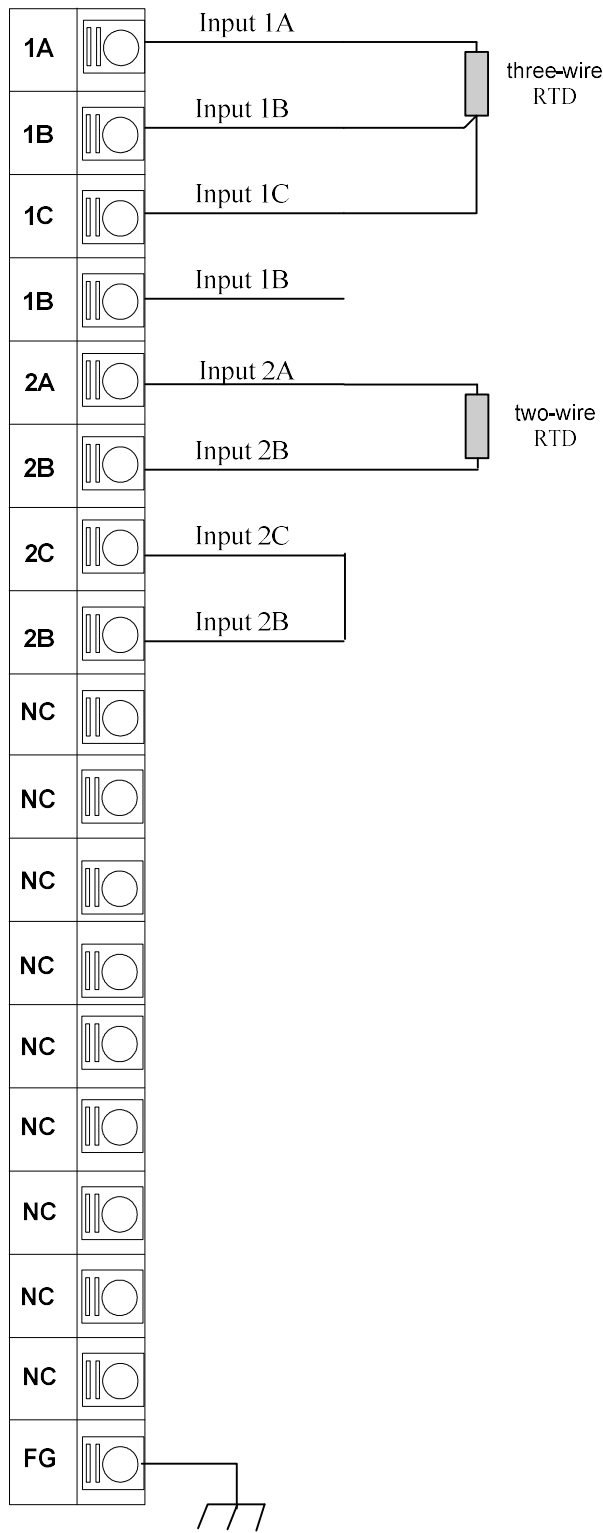


Figure 4-2-3 AIM2001-0203 Terminal wiring diagram

**Terminal wiring diagram of AIM2001-0403**

AIM2001-0403 AI module connects with external devices by terminal blocks in front of module. Correspondence of each channel is described in the following figure. And please pay attention to the following:

- Each field RTD is connected to terminals A、B、C by three wires (shielded cable).
- "1A, 1B, 1C ,1B" and "2A, 2B, 2C ,2B " are the input terminals of the 1st and 2nd temperature signals respectively.
- If the resistance which is provided by user is of two-wire, B、C terminals of input channels need to be shorted.
- "NC" indicates that this channel is not wired or has no physical connection. "FG" is connected to earth.
- Please don't connect more than 2 cables to the same pin of the terminal.

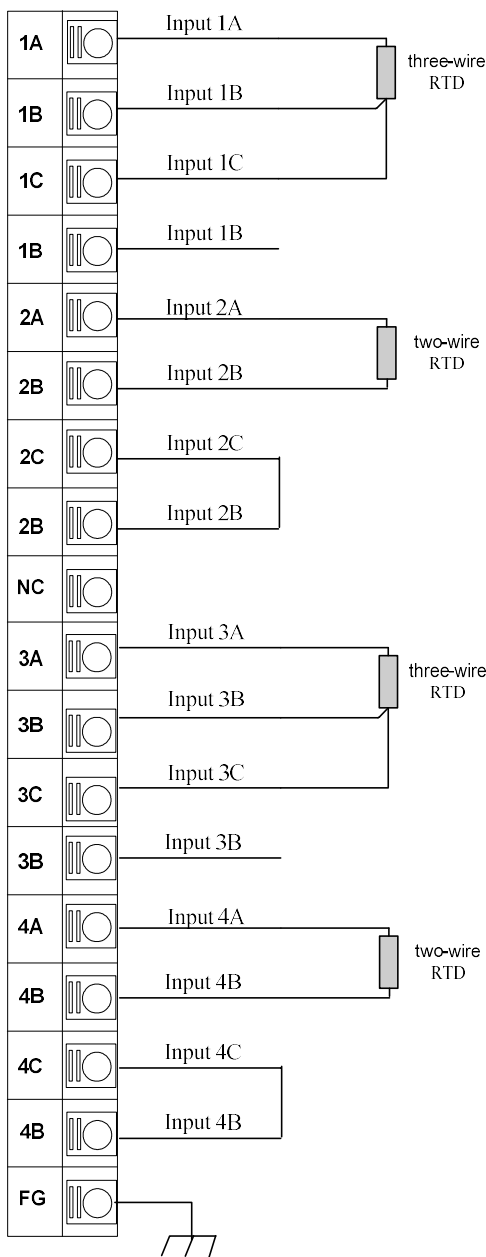


Figure 4-2-4 AIM2001-0403 Terminal wiring diagram

## 2 Thermocouple temperature input module

### Diagram of Interface

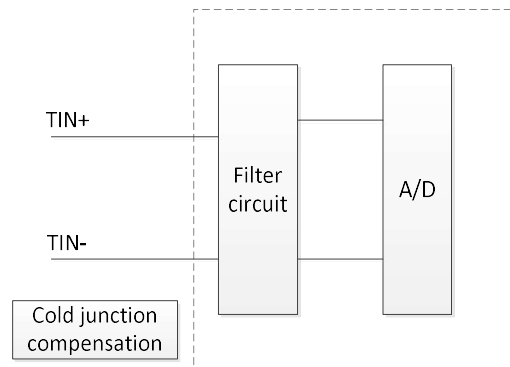


Figure 4-2-5 Diagram of AIM2001-0204/AIM2001-0404 Single Channel Interface Circuit

The measurement method using the thermocouple differential input can effectively suppress the interference of the common mode signal input and improve the measurement accuracy. Cold junction compensation is available in two ways for the user to select: in-board compensation and PT100 thermal resistance compensation. High-precision differential ADC reduces the effects of interference on the input channel and improves the accuracy.

### Terminal wiring diagram of AIM2001-0204

AIM2001-0204 AI module connects with external devices by terminal blocks in front of module. Correspondence of each channel is described in the following drawing. And please pay attention to the following:

- Each field thermocouple is connected to terminals Tx+ and Tx- by two wires (shielded cable).
- "T1+, T1-" and "T2+, T2-" are the input terminals of the 1st and 2nd temperature signals respectively, other signal terminals see the wiring diagram for details.
- "NC" indicates that this channel is not wired or has no physical connection. "FG" is connected to earth.
- Please don't connect more than 2 cables to the same pin of the terminal.

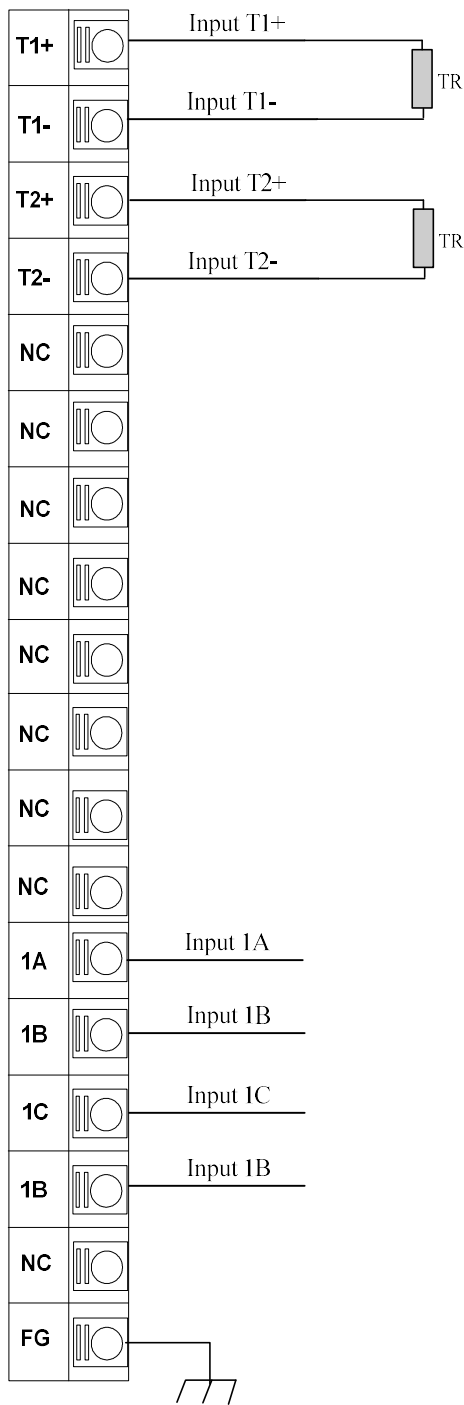


Figure 4-2-6 AIM2001-0204 Terminal wiring diagram

**Terminal wiring diagram of AIM2001-0404**

AIM2001-0404 AI module connects with external devices by terminal blocks in front of module. Correspondence of each channel is described in the following drawing. And please pay attention to the following:

- Each field thermocouple is connected to terminals Tx+ and Tx- by two wires (shielded cable).

- "T1+, T1-" and "T2+,T2-" are the input terminals of the 1st and 2nd temperature signals respectively, other signal terminals see the wiring diagram for details.
- "NC" indicates that this channel is not wired or has no physical connection. "FG" is connected to earth.
- Please don't connect more than 2 cables to the same pin of the terminal.

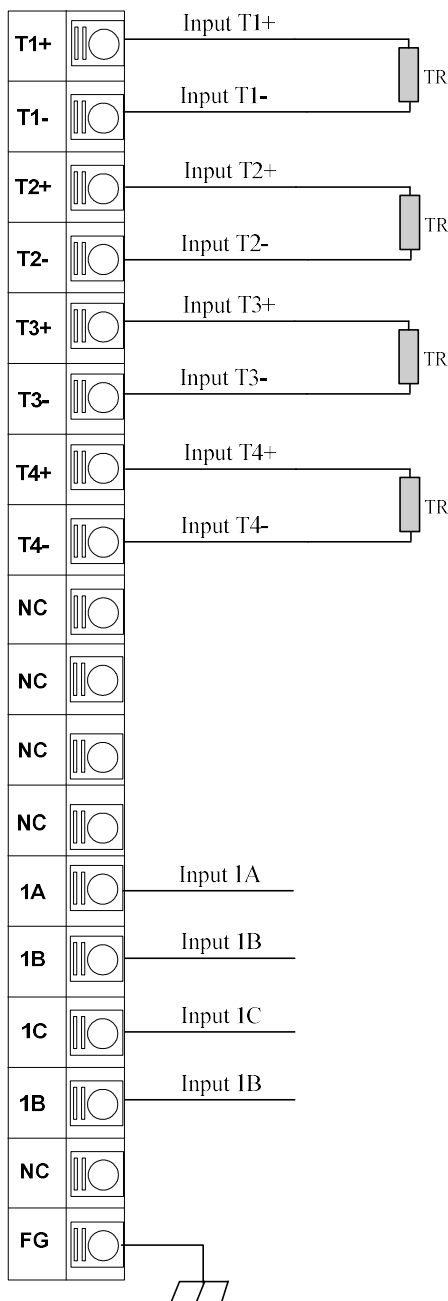


Figure 4-2-7 AIM2001-0404 Terminal wiring diagram

1A, 1B, 1C, and 1B are input terminals for measuring the thermal resistance of the cold junction temperature. The thermal resistance measurement can be performed using

the two-wire or three-wire. The wiring method is as follows:

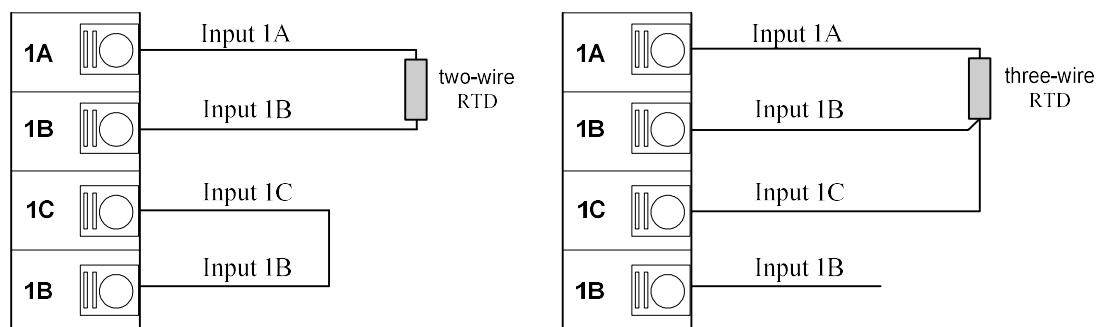


Figure 4-2-8 AIM2001-0404 thermal resistance cold junction compensation wiring diagram

Note: In the case where the cold end is close to the module, the 2-wire mode can be used, and in the case of a long distance, the 3-wire mode can be used.

### 4.2.4 Technical specification

Product Model	AIM2001-0203	AIM2001-0403	AIM2001-0204	AIM2001-0404
<b>Input Characteristics</b>				
Input channels	2	4	2	4
Signal type	Pt100, Pt1000,Ni1000,Cu50,Cu53,Cu100		S,T,R,E,N,K,J	
Data format	actual value × 10		actual value × 10	
sensor	2-wire	Yes	Yes	Yes
	3-wire	Yes	Yes	---
Module refresh cycle	200ms	300ms	200ms	300ms
CMRR	120dB	120dB	120dB	120dB
Temperature drift	±100ppm/°C	±100ppm/°C	±100ppm/°C	±100ppm/°C
<b>Physical Characteristics</b>				
Dimension W×H×D	25mm×90mm×75mm			
Weight(g)	100	100	100	100
Power consumption (max)	1W	1W	1.5W	1.5W
Operating Temperature	-10°C~+55°C	-10°C~+55°C	-10°C~+55°C	-10°C~+55°C
Storage Temperature	-40°C~+70°C	-40°C~+70°C	-40°C~+70°C	-40°C~+70°C
Relative humidity	5%~95%( No condensation)	5%~95%( No condensation)	5%~95%( No condensation)	5%~95%( No condensation)

## 4.3 Analog output module

### 4.3.1 Overview

NA2000 series analog output expansion module is used to connect with analog actuator, its main specifications are as follows:

- Up to 4 analog output channels.
- Output range of each channel: 4~20mA/-10V~+10V.
- 12-bit D/A conversion chip.
- Accuracy: 0.2%
- Intelligent module with self-diagnosis function can be reset and reboot automatically when fault.
- No need for hardware setting. The CPU module can load parameters on it automatically after start up.

### 4.3.2 LED indicators

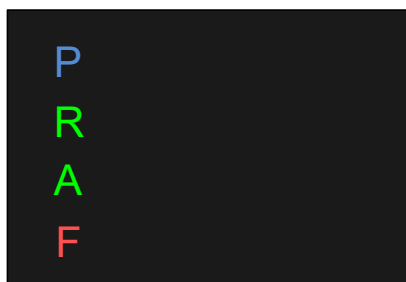


Figure 4-3-1 Diagram of LED indicators

#### Definition of indicators

LED	Color	State	Meaning
P	Blue	Constant Lighting/ off	Power on/ Power off
R	Green	Flicker/Constant Lighting	Run normally/Program has been running but parameter is unloaded
A	Green	Constant Lighting/ off	HIN work normally/ abnormally
F	Red	Light / off	Fault/ Running normally

The working state corresponding to the indicator LED is as follows:

P: Power LED indicator. When module power on ,the LED is on; When module power off , the LED is off.

R: Run LED indicator. When the module is running normally, the green LED flickers. If the green LED is always on, that means program has been running but parameter is unloaded

A: Communication LED indicator. When CPU module can communicate normally with other modules through HIN, the LED is on.

F: Fault LED indicator. The LED is on when the modules has fault. The LED will go off when everything is normal.

### 4.3.3 Terminal definition and Wiring instructions

#### Diagram of Interface

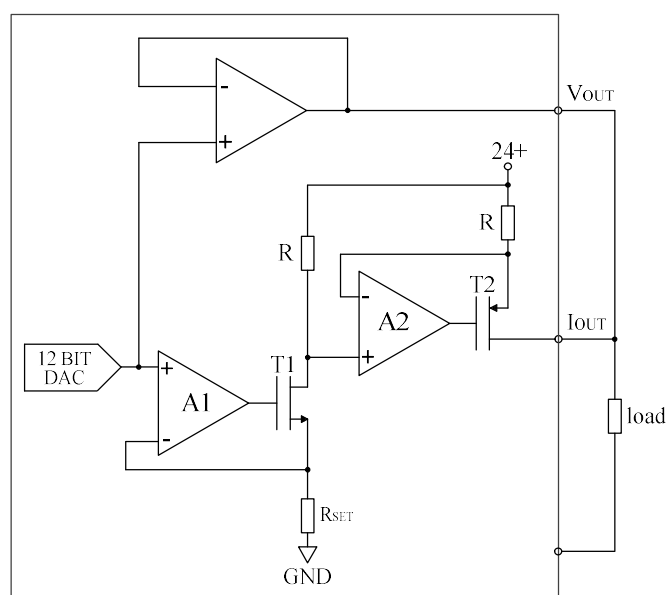


Figure 4-3-2 Diagram of AOM2001-0201/AOM2001-0401

#### Single Channel Interface Circuit

#### Terminal wiring diagram

AOM2001-0201 and AOM2001-0401 AI output module connects with external devices by terminal blocks in front of module. Correspondence of each channel is described in the following drawing. And please pay attention to the following:

- Each field AO signal is connected to load by two wires (shielded cable).
- "NC" indicates that this channel is not wired or has no physical connection. "FG" is connected to earth.
- Please don't connect more than 2 cables to the same pin of the terminal.

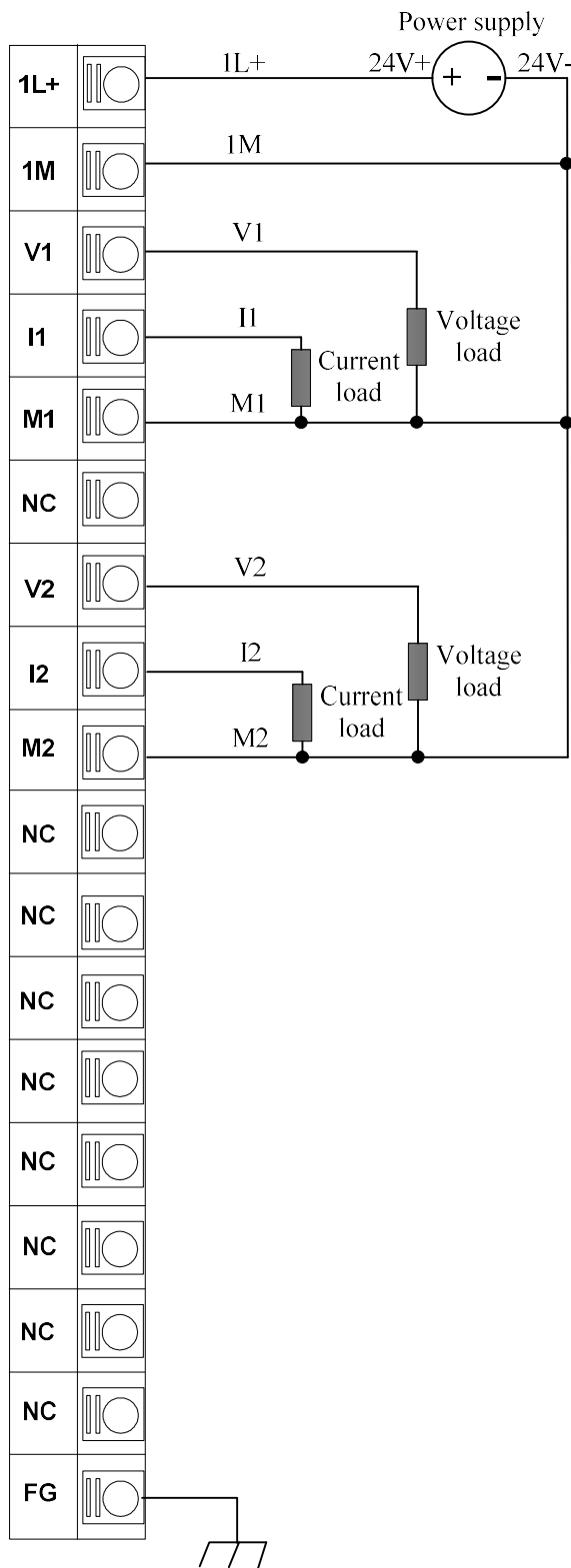


Figure 4-3-3 AOM2001-0201 Terminal wiring diagram

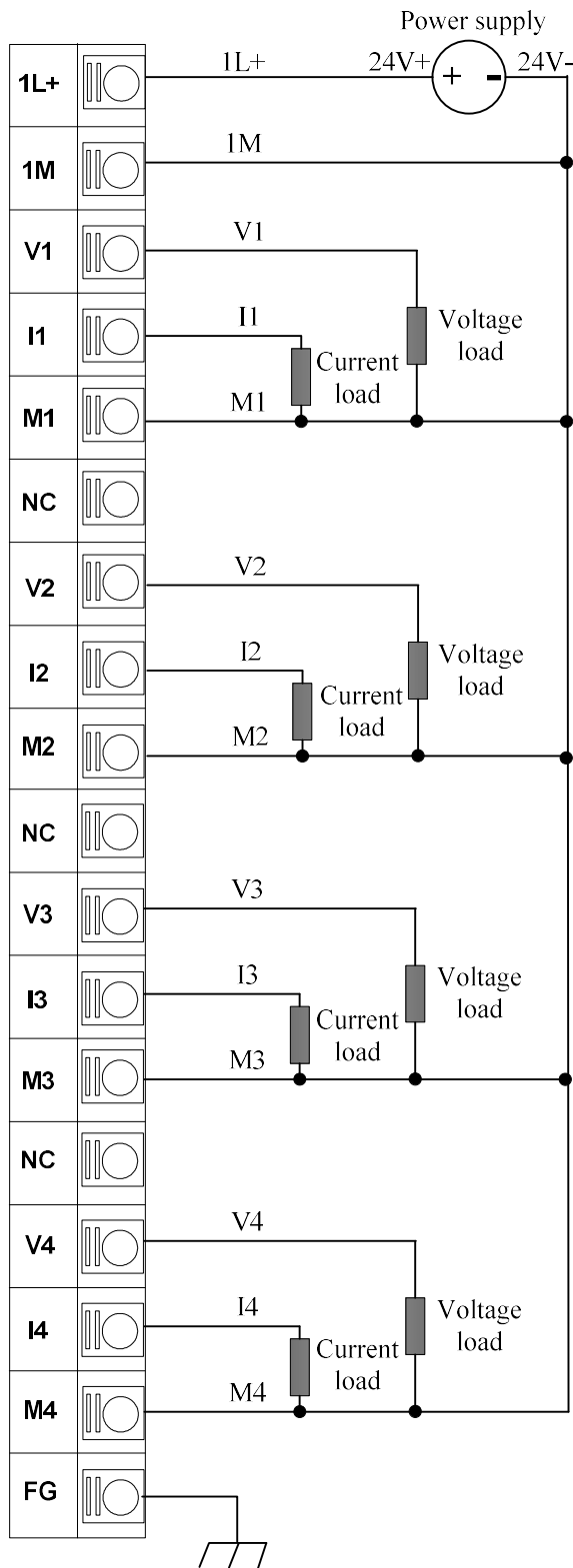


Figure 4-3-4 AOM2001-0401 Terminal wiring diagram

## 4.3.4 Technical specification

Product Model	AOM2001-0201	AOM2001-0401
<b>Output Characteristics</b>		
Output channels	2	4
Output range	-10V~+10V,0V~+10V,-5V~+5V, 0V~+5V,0~20 mA,4~20 mA	-10V~+10V,0V~+10V,-5V~+5V, 0V~+5V,0~20 mA, 4~20 mA
Output format	-10000~10000	-10000~10000
D/A Resolution	12-bit	12-bit
Isolation	Isolation	Isolation
Setup time	100us	100us
Drive capability (max)	500Ω	500Ω
Accuracy (relative range)	0.2%	0.2%
<b>Physical Characteristics</b>		
Dimension W×H×D	25mm×90mm×75mm	
Weight(g)	100	100
Power consumption (max)	0.8W	0.8W
Operating Temperature	-10℃~+55℃	-10℃~+55℃
Storage Temperature	-40℃~+70℃	-40℃~+70℃
Relative humidity	5%~95%( No condensation)	5%~95%( No condensation)

## 5 Module of BD signal board

### 5.1 Analog input signal board

#### 5.1.1 Overview

The NA2000 analog input signal board is used to connect the sensors of voltage or current. It is the best choice for users when the input points of CPU cannot meet the project requirements and maximum extent consider economic situation.

The NA2000 analog input signal board is used to connect the sensors of voltage or current. Its main technical performance indexes are as follows:

- Maximum analog input :4 points.
- Signal type: voltage or current.
- The accuracy of measurement: 12 bits.
- Form of signal input: single-end input.
- No need for hardware setting, The CPU Module can load parameters on it automatically after start up.

#### 5.1.2 Terminal definition and wiring instruction

##### Terminal wiring diagram of CAI2001-0201

CAI2001-0201 analog input BD signal board is connected to external equipment through the wiring terminal in front of the module. The corresponding relationship of each channel is shown in the following figure, and please pay attention to the following points:

- Each field AI signal is connected to terminals by two wires (shielded cable).
- When the Nth channel is connected to the current type signals, you need to short the N- and NR terminals. If connecting voltage mode signals, there is no need to be shorted, and please refer to the following wiring diagram.
- Do not supply power to transmitter with input channel. A separate 24V DC power supply must be used when a two-wired transmitter is connected.
- Terminal of 1R、 2R are effective when the input signal is current type.
- "NC" means that this channel is not connected or has no physical connection.  
"FG" means that this channel is connected to the earth.

- Please don't connect more than 2 cables to the same pin of the terminal.

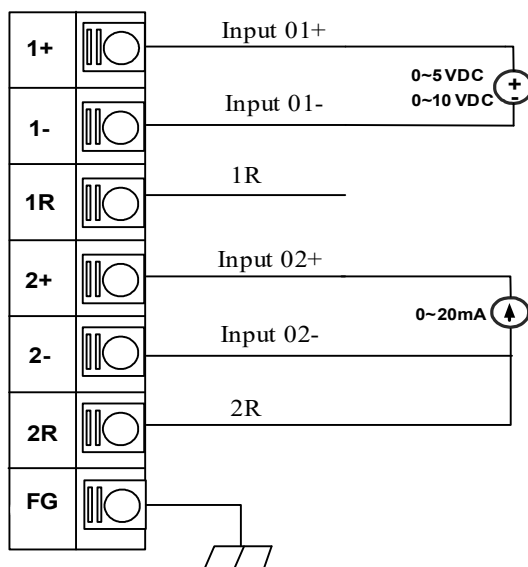


Figure 5-1-1 Terminal wiring diagram of CAI2001-0201

#### Terminal wiring diagram of CAI2001-0402

CAI2001-0402 analog input BD signal board is connected to external equipment through the wiring terminal in front of the module. The corresponding relationship of each channel is shown in the following figure, and please pay attention to the following points:

- Each field AI signal is connected to terminals by two wires (shielded cable).
- Do not supply power to transmitter with input channel. A separate 24V DC power supply must be used when a two-wired transmitter is connected.
- "NC" means that this channel is not connected or has no physical connection.  
"FG" means that this channel is connected to the earth.
- Please don't connect more than 2 cables to the same pin of the terminal.

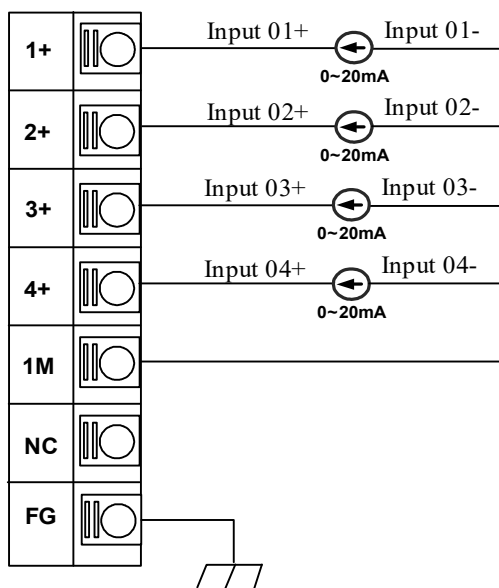


Figure 5-1-2 Terminal wiring diagram of CAI2001-0402

### 5.1.3 Technical Specification

Product Model	CAI2001-0201		CAI2001-0402	
Input Characteristics				
Input Channel	2		4	
Input Type	Single-ended Input (Current/Voltage)		Single-ended Input (Current)	
A/D Resolution	12 bit		12 bit	
Conversion Time	<100us		<100us	
Signal Types	0V~+5V, 0~20 mA,4~20 mA		0~20 mA,4~20 mA	
Data Code Value	0V~+5V, 0~20mA	0~20000	0~20 mA	0~20000
	4~20mA	4000~ 20000	4~20 mA	4000~ 20000
Input Step Response	5ms		5ms	
CMRR	120dB		120dB	
Temperature Drift	±100ppm/°C		±100ppm/°C	

## 5.2 Temperature input signal board

### 5.2.1 Overview

The NA2000 temperature input signal board is used to connect the sensor of thermal resistance. It is the best choice for users when the input points of CPU cannot meet the project requirements and maximum extent consider economic situation.

NA2000 series temperature signal input board is used to connect the thermal resistance sensor. Its main technical performance indexes are as follows:

- Maximum 2 channel temperature probe input.
- The type of thermistor for each channel can be set optionally.
- Measurement of each channel: RTD.
- Wiring mode: Two-wire、Three-wire.
- No need for hardware setting. The CPU Module can load parameters on it automatically after start up.

### 5.2.2 Terminal definition and wiring instructions

CAI2001-0203 temperature signal input board is connected to external equipment through the wiring terminal in front of the module. The corresponding relationship of each channel is shown in the following figure, and please pay attention to the following points:

- Each field RTD resistance connects to the terminals A, B, C with three separate wires (shielded cable).
- "1A,1B,1C", "2A,2B,2C" are the input terminals for the first and the second channel of temperature signal.
- If the resistance which is provided by user is of two-wire, B, C terminals of input channels need to be shorted.
- "NC" means that this channel is not connected or has no physical connection"FG" means that this channel is connected to the earth.
- Please don't connect more than 2 cables to the same pin of the terminal.

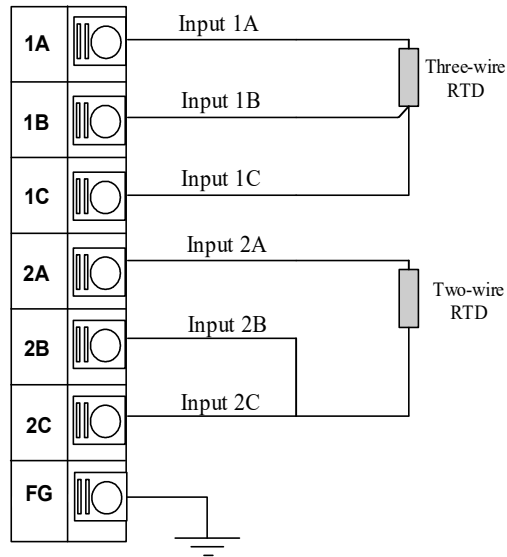


Figure 5-2-1 Terminal wiring diagram of CAI2001-0203

### 5.2.3 Technical Specification

Product Model	CAI2001-0203
Input Channel	2
Signal Type	Pt100
Data Type	Actual Value×10
Module Refresh Period	200ms
CMRR	120dB
Temperature Drift	±100ppm/°C

## 6 Module of Wireless signal

### 6.1 GRPS communication expansion board

#### 6.1.1 Overview

As a wireless data transmission communication module, CCM2001-0101 combines Modbus-TCP protocol with GPRS. It can be applied to automated systems with NA2000 series PLC, which realizes the wireless connection between automated system and GPRS network, GSM network. It can implement the function of CPU program downloading and uploading through debugging tool software NAWLTool. CCM2001-0101 is especially suitable for remote monitoring of distributed systems and other applications.

#### 6.1.2 Features of product

- Open and transparent data transmission
- Supporting persistent online mode, with the function of disconnect redial and heartbeat
- Supporting 4 center data transmission simultaneously
- Supporting IP or domain name access to data center
- Supporting local configuration

#### 6.1.3 Technical Specification

Product model	CCM2001-0101
MCU chip	Industrial chip
Frequency Band	Quad Band: GSM850, EGSM900,DCS1800,PCS1900 Module can automatically search frequency Conform to the GSM Phase 2/2+
Data characteristics of GPRS	GPRS data downlink transmission: Maximum 85.6kbps GPRS data uplink transmission: Maximum 85.6kbps Coding format: CS-1/CS-2/CS-3/CS-4 Support PAP (Password Authentication Protocol)

	<p>protocols that are normally connected using Point to Point Protocol</p> <p>Support for embedded protocols commonly used for CHAP(query holding authentication protocol) : TCP/UDP/FTP/PPP/HTTP/NTP/MMS/SMTP/PING etc.</p> <p>Support unstructured supplementary Service Data (USSD)</p>
Type of antenna interface	Characteristic impedance 50 ohm
The power supply mode	CPU main power supply
The environment temperature	<p>Working temperature:-35℃~+70℃</p> <p>Storage temperature:-40℃~80℃</p>

## 6.2 ZigBee communication expansion board

### 6.2.1 Overview

As a wireless data transmission communication module, CMB2001-0501 is an embedded wireless data transmission module based on IEEE802.15.4/ZigBee technology. It adopts ZigBee network conforming to 2.4GHz IEEE802.15.4 standard RF transceiver to provide users with wireless data transmission function.

This module adopts high-performance industrial-grade ZigBee scheme to realize transparent data transmission. It is designed with low power consumption and the minimum power consumption is less than 1uA. This product can realize the self-organizing network between CPU and CPU of NA2000 product, which is convenient for users to use in the scheme of wireless data transmission.

CMB2001-0501 communication expansion board is directly installed in the CPU module, and ZigBee parameter configuration is completed through the host programming software NAPRO.

## 6.2.2 Features of Product

- Adopt high performance industrial ZigBee chip
- Watchdog design, guarantee the system stability
- Adopt complete anti-dropping mechanism to ensure the data terminal is always online
- Support ZigBee wireless short-range data transmission function
- Support point to point, point to multi-point
- Great network capacity: up to 65000 nodes
- Large communication distance. Point-to-point barrier-free visual distance 200 meters, cascade 15 levels

## 6.2.3 Technical Specification

Product model	CCM2001-0201
MCU chip	Industrial ZigBee chip
Communication Standards and Frequency Band	IEEE802.15.4 ISM2.4~2.5GHz
Indoor/urban communication distance	90m
Outdoor/horizon communication distance	200m
Transmission power	+20dBm
Theoretical bandwidth of communication	250Kbps
Receiving sensitivity	-103dBm
Network topology	point to point, point to multi-point
Channel	0 to 15
Maximum network capacity	65000 (The maximum number of nodes is 32 and the maximum number of nodes cascading is 15)

Type of antenna interface	Characteristic impedance 50 ohm
The power supply mode	CPU main power supply
The environment temperature	Working temperature:-35℃~+70℃ Storage temperature:-40℃~80℃

## 6.3 LORA communication expansion board

### 6.3.1 Overview

As a wireless data transmission communication module, CCM2001-0301 is an embedded wireless data transmission module based on LoRa spread spectrum technology, which adopts LoRa network to provide users with wireless data transmission functions.

This module adopts high-performance industrial-grade chip to realize transparent data transmission. It is designed with low power consumption and the minimum power consumption is less than 2uA. This product can realize the self-organizing network between CPU and CPU of NA2000 product, which is convenient for users to use in the scheme of wireless data transmission.

CMB2001-0301 communication extension board is directly installed in the CPU module, and LoRa parameter configuration is completed through the host programming software NAPRO.

### 6.3.2 Features of Product

- Adopt high performance industrial LoRa chip
- Watchdog design, guarantee the system stability
- Built-in LDO ensures the stable power supply of the module
- Intelligent data module, power on to enter the data transmission state
- Easy and flexible to use, multiple working modes are available

### 6.3.3 Technical Specification

Product model	CCM2001-0301
MCU chip	Industrial chip
Communication	The product series supports various frequency

Standards and Frequency Band	bands all over the world (433/470/780/868/915MHz)
Indoor/urban communication distance	1km
Outdoor/horizon communication distance	3.5km
Transmission power	+20dBm
Receiving sensitivity	-140dBm
Network topology	Point to point, point to multi-point
Maximum number of communication points	32
The power supply mode	CPU main power supply
The environment temperature	Working temperature:-35℃~+70℃ Storage temperature:-40℃~80℃

## 7 System Configuration and installation

The establishment of NA2000-PLC control system mainly includes the selection of controller CPU and I/O module, which will be introduced in the following chapters.

### 7.1 Selection of CPU module

There are six kinds of CPU in NA2000 series PLC, include four basic models, two motion control models. Their communication port, memory capacity and amount of standard input and output are same. Therefore, it mainly considers whether the power supply type of the control system is DC24V or AC220V and whether there is a need for motion control, and whether the standard digital output is transistor or relay type to determine the specific CPU type.

### 7.2 Selection of I/O modules

Before system configuration, you may calculate the number of I/O points according to the practical application at first. Final number of I/O points is the number you calculated multiplied by 1.1-1.2. This may facilitate expansion. The NA2000-PLC series supports up to 256 channels of digital quantity and 128 channels of analog quantity. If the number of digital quantity or analog quantity of the control system exceeds the upper limit, you should consider using our company's PLC of NA300 or NA400 series, and NA2000 can expand up to 14 expansion modules. Besides maximum number of channels, the power of the whole control system should also be considered. Power supply module of NA2000 that our company have two kinds of specifications, one is 15W and the other is 25W. It is recommended that the total power of the whole control system should not exceed 70% of the power of the power supply in the actual use. The following table is the models and consumed power of various modules of NA2000 series PLC. Please refer to the following table for the configuration of the control system.

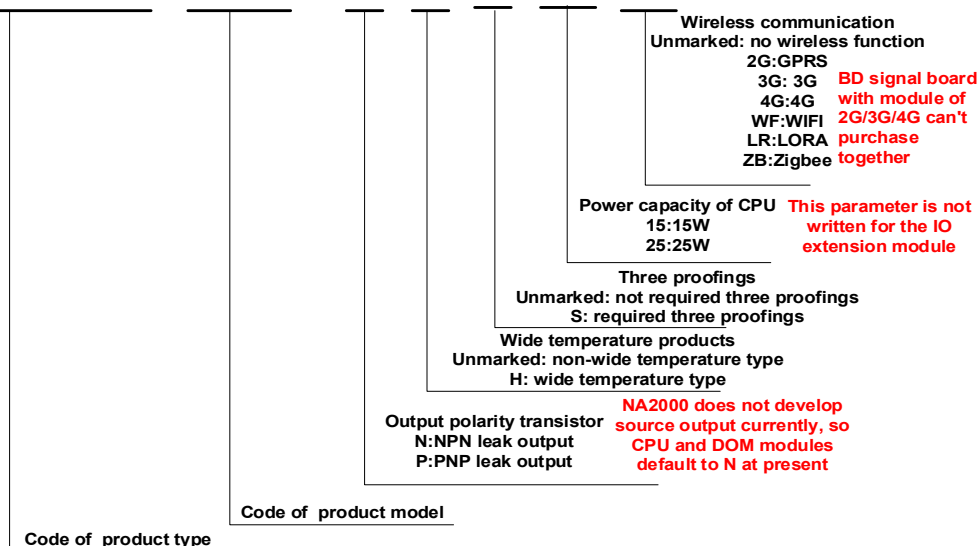
Module Type	Model	Instruction	Power (W)
-------------	-------	-------------	-----------

Basic Model CPU	CPU2001-2401	DI16, DO8×Transistor (Sink type NPN), DC24V power supply, 2-channel high-speed output, 2- channel high-speed counting	2.8
	CPU2001-2402	DI16, DO8×Relay, DC24V power supply, 2- channel high-speed counting	2.8
	CPU2001-2403	DI16, DO8×Transistor (Sink type NPN), AC220V power supply, 2-channel high-speed output, 2- channel high-speed counting	2.8
	CPU2001-2404	DI16, DO8×Relay, AC220V power supply, 2- channel high-speed counting	2.8
	CPU2001-2411	DI16, DO8×Transistor (Leakage type), DC24V power supply, 4-channel high-speed output, 2- channel high-speed counting, Interpolation is not supported	2.8
Digital Input Module	DIM2001-0801	Digital DC input module,DI8×24VDC (Two-way input)	0.55
	DIM2001-1601	Digital DC input module, DI16×24VDC (bidirectional input)	0.55
Digital Output Module	DOM2001-0801	Digital DC output module, DO8×24VDC×Transistor (Leakage type NPN)	0.65
	DOM2001-1601	Digital DC output module,DO16×24VDC×Transistor (Leakage type NPN)	0.65
	DOM2001-0802	Digital DC output module, DO8×relay	0.65
Analog Input Module	AIM2001-0401	AI4×voltage/ current	1.2
	AIM2001-0802	AI8×current 4-20mA	1.2
	AIM2001-0203	AI2×RTD	1.2
	AIM2001-0403	AI4×RTD	1.2
	AIM2001-0204	AI2×TC	1.2
	AIM2001-0404	AI4×TC	1.2
Analog Output Module	AOM2001-0201	AO2×current/voltage	0.8
	AOM2001-0401	AO4×current/voltage	0.8
BD Signal	CAI2001-0201	AI2 (BD board) ×current/voltage	0.5

Board	CAI2001-0402	AI4 (BD board) ×current	0.5
	CAI2001-0203	AI2 (BD board) ×RTD	0.5
Selectio n	CCM2001-0101	GRPS Communication Board (2.5G)	0.1
	CCM2001-0201	ZIGBEE Communication Board	0.1
	CCM2001-0301	LoRa Communication Board	0.1

### 7.3 Ordering instructions

## CPU2001-2401- N-H-S-15-2G



Note:

- 1) BD signal board with module of 2G/3G/4G can't purchase together;
- 2) The source output module of NA2000 has not been developed at present. Therefore the CPU module that transistor output should choose NPNmodel that sink output.

### 7.4 Hardware installation

#### 7.4.1 Guideline

In order to use high-performance intelligent integrated NA2000-PLC more effectively and safely, the following are some installation guidelines. These principles will guide you how to reasonably install high-performance intelligent integration of NA2000-PLC's system components, and ensure that the installation of the system meets the requirements of EMC.

### 1 Ventilation and heat dissipation

Since all electrical equipment works continuously under maximum load, extreme ambient temperature or extremely harsh working conditions, the service life of the equipment will be shortened. Therefore, the heat dissipation of electrical equipment must be seriously considered.

The high performance intelligent integration PLC of NA2000 adopts natural convection heat dissipation mode, so there are certain requirements for the placing mode and space of NA2000 series high performance intelligent integration PLC module. No matter how PLC module is installed, in order to have a good effect of ventilation and heat dissipation, please install PLC follow the way shown in figure 7-4-1.

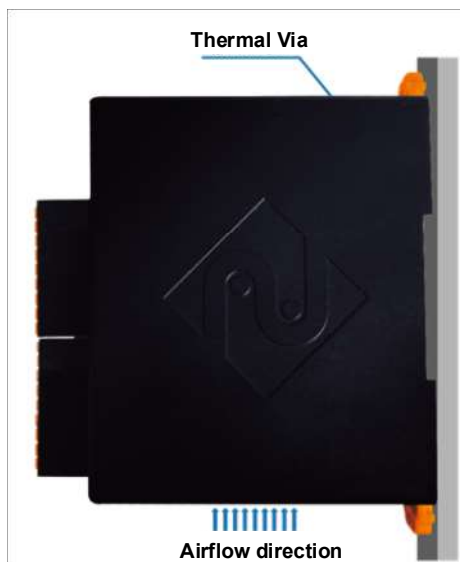


Figure7-4-1 Correct way of dissipate heat

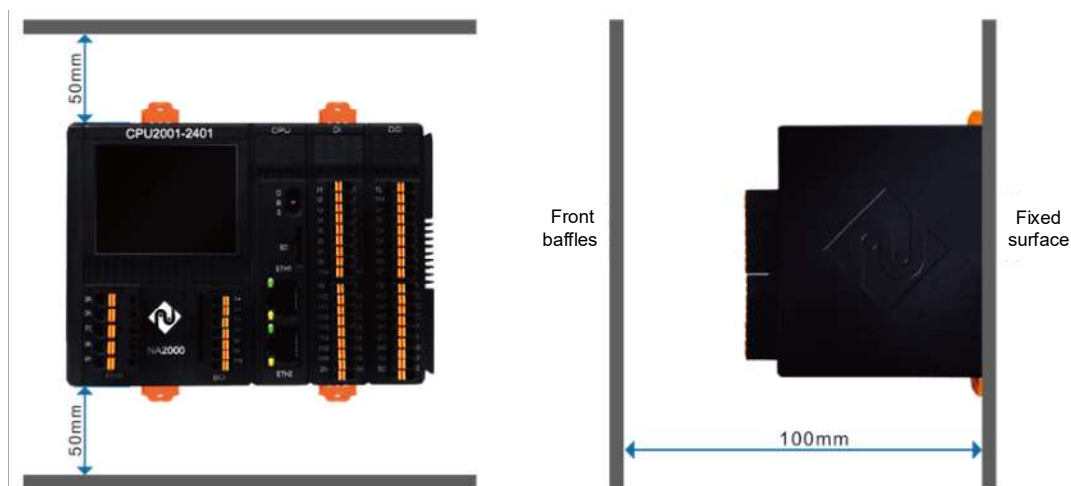
Likewise, in order to avoid operational failure caused by poor ventilation environment, please do not install PLC in the way shown in figure 7-4-2.



Figure7-4-2 Installation methods that should be avoided

At the same time, at least 50mm of space should be left above and below each module to facilitate normal heat dissipation. In the case of there are front baffles, the depth

between plates must be kept at 100mm, as shown in figure 7-4-3.



7-4-3 Space requirements of PLC

Finally, it is important to note that there should be enough space to accommodate extension and communication cables.

## 2. Power consumption

CPU modules of NA2000PLC integrates internal power, which not only supplies CPU module with local power, but also provides power for expansion module and field sensors or actuators. All CPU modules of NA2000 series can provide 24VDC output.

Due to the increase in the number of expansion modules, the overall power demand of the system will exceed the power quota of CPU modules, so the number of modules should be taken into account when selecting CPU modules. For specific information, please refer to the selection of IO module in this chapter.

## 3. Arrange cables reasonably

The following items are only general principles of cable installation and field wiring. Detailed wiring requirements correspond to different wiring schemes according to the specific module, please refer to the corresponding section.

- Minimize the distance between PLC and field equipment to shorten cable length;
- Use as much as possible equal length cable;
- According to the different functions and effectiveness, the cables should be divided into different types and numbered;
- Avoid installing the input cable and output cable in the same cable slot;
- Data and signal lines must be shielded;

- Separate AC and high-energy DC lines from low-energy signal lines;
- Avoid installing high-current cables and signal or data cables in the same cable slot;
- Do not use the external power in parallel with the DC output point for the output load, in order to avoid causing the reverse current to impact the output.

### 7.4.2 Installation of rail

- Standard DIN rail and DIN rail clip

NA2000PLC can be installed on the standard 35mm DIN rail. PLC module can slide horizontally along the rail. Figure 7-4-4 shows the sizes of the two DIN rail in common use, and figure 7-4-5 shows the diagram of DIN rail clip.

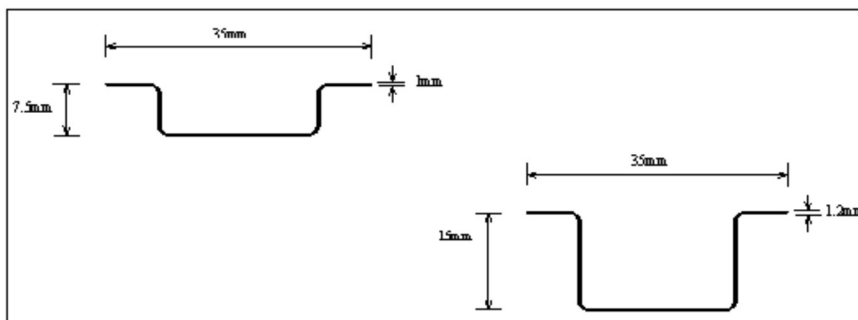


Figure 7-4-4 Diagram of standard 35mm DIN

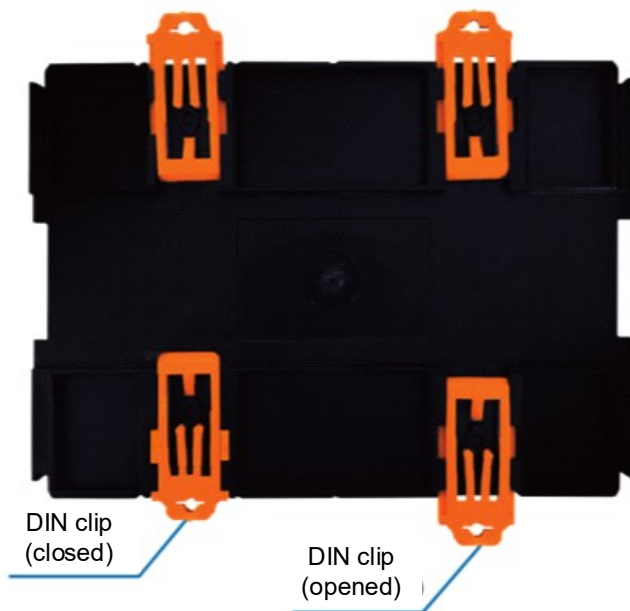


Figure 7-4-5 Diagram of railclip

- Installation
  1. Release the DIN clip at the bottom of the CPU module and place the module on

the DIN rail

2. Close DIN clip and confirm CPU module is fixed tightly with rail;
3. If there is an expansion module, the required expansion module should be fixed to the rail close to the adjacent module;
4. Insert the cable of the expansion module into the connector to the right of the adjacent module, and ensure the correct direction of cable;
5. Connect the cable.

The process of installation is shown in figure 7-4-6.



Figure 7-4-6 Install the module on the rail

■ Disassembly

1. Remove all cables;
2. Release the DIN clip and remove the module in order.

The process of disassembly is shown in figure 7-4-7.



Figure 7-4-7 Disassemble the module from the rail

### 7.4.3 Size of product

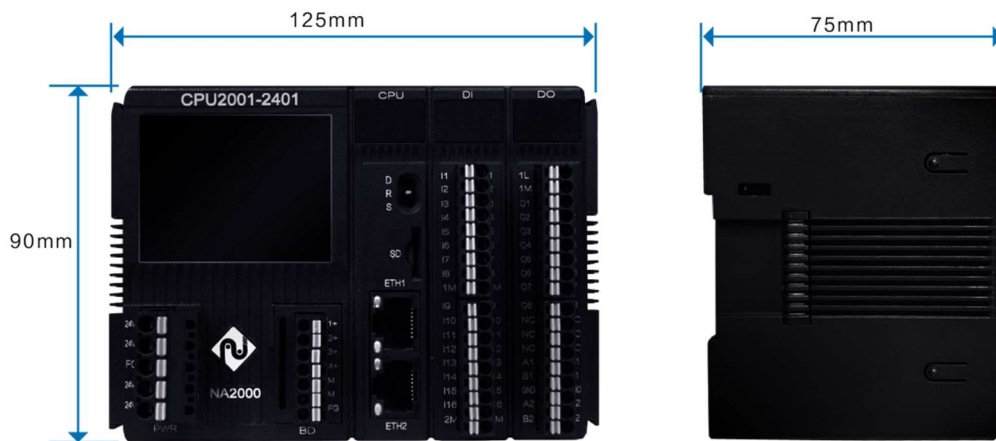


Figure 7-4-8 Diagram of CPU module size

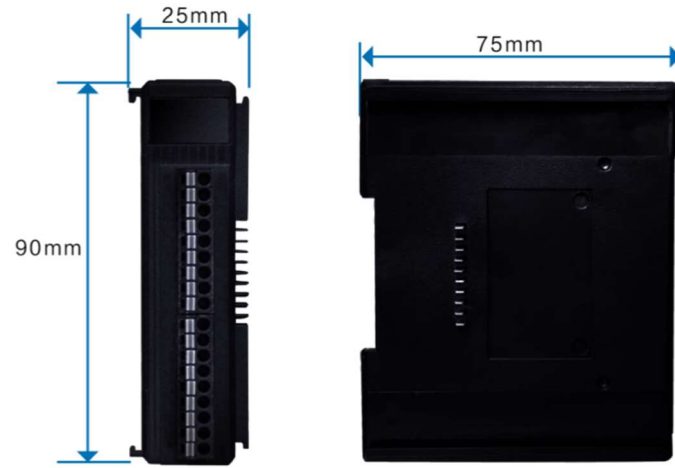


Figure 7-4-9 Diagram of extension module size

## 8 Guide of quick application

If you have experience in using PLC, so the following guidance will help you quickly establish a set of simple control system based on NA2000PLC.

### 8.1 Inventory of products

Please confirm whether the parts of your products are consistent with your order number, and check whether the packaging is complete. If the packaging is damaged or the product is defected, please contact your supplier as soon as possible.

### 8.2 Installation and wiring of Equipment

Firstly, choosing the appropriate CPU module and extension module according to the actual project needs. Then according to the field situation to determine the installation mode of module, and preliminary determine the working mode of PLC. Finally, planning and making a reasonable wiring plan and connect the field sensor or actuator to the wiring terminal of PLC module. (Detailed installation instructions and wiring principles, please refer to hardware installation and wiring principles in chapter 7).

### 8.3 Connection of power line

Connecting the power line according to the model and type of CPU module (please refer to hardware installation and wiring principles in chapter 7 for detailed wiring rules), as shown in figure 7-3-1.

Note: different models correspond to different voltage levels. At present, NA2000CPU controller has two modes of power supply, 24VDC and 220VAC. Please pay attention to the voltage level and positive and negative polarity. When selecting the 220VAC power supply module, pay more attention to the safety of power supply, so as not to cause unnecessary personal injury or equipment damage!



Figure 8-3-1 Connect the power line

Don't switch on the power supply after the power line is connected. After checking that all cables are connected correctly, connect the power supply of the system, and confirm that the power indicator light of "P" on the CPU module panel is on and displayed normally, so as to ensure the reliable operation of PLC.

### 8.4 Establishment of PC communication

Connecting the CPU module to the personal computer (PC) through a common Ethernet network cable to establish a transfer channel of data, as shown in Figure 8-4-1 CPU comes with dual Ethernet port, either of the two can be connected to the PC.

Note: please set the three-position switch to "D" before downloading the program. Default IP address of PLC is "192.168.1.66".

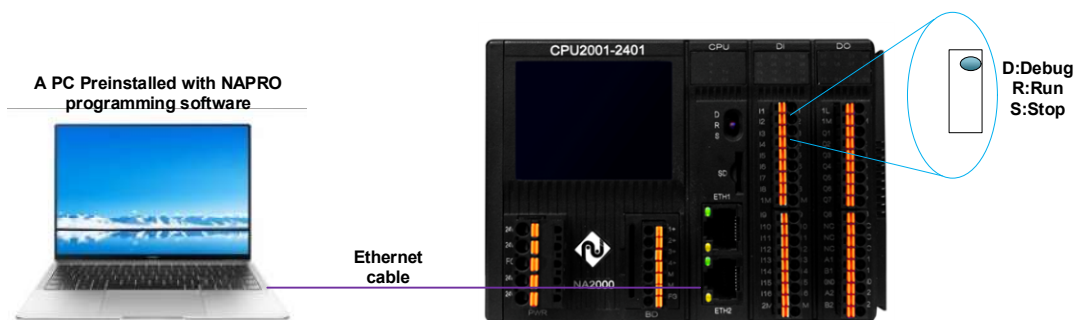


Figure 8-4-1 Connect the programming cable

### 8.5 Download the program for the first time

When downloading the program for the first time, 3-position switch should be set to

the position of "D" to make PLC run in DEBUG mode for manual download. When the manual download is completed, the 3-position switch of PLC can be set to the "R" position of the operation mode. The following is a brief description of manual download.

Manual download is often used to change the CPU network IP address if the project file is downloaded to the CPU for the first time or the Ethernet IP address of CPU is forgotten. Manual download will automatically download the entire project files and program files into the CPU. First, switch 3-position switch of PLC to the "DEBUG", and then repower the CPU. After successful start up, the indicator R/F on the CPU panel will flash at the same time, about 1 second later, indicating that the CPU is running in the state of DEBUG. At this time, the IP address of the CPU is 192.168.1.66. Changing the IP address of PC network connection and the default IP address of CPU in the same network segment (the first three sections of number are the same, the last section of number is different). As shown in figure 8-5-1.

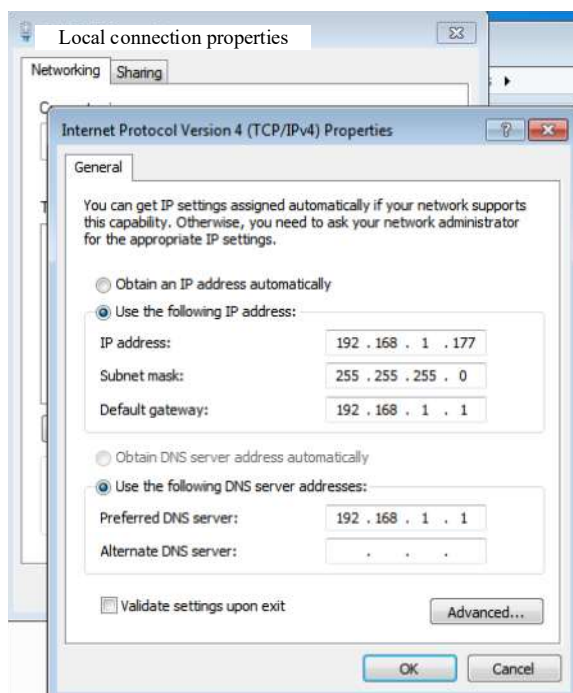


Figure 8-5-1 Diagram of network IP setting

Select the load of menu of NAPro and click manual download, and the following window pops up, as shown in figure 8-5-2:

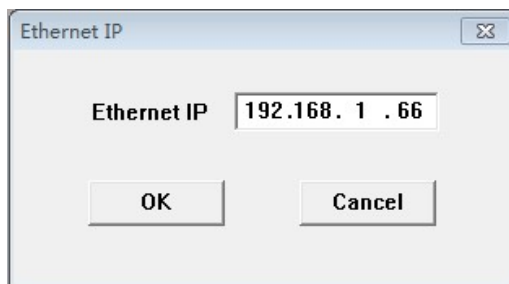


Figure 8-5-2 Diagram of manually download

Click the button of "OK" to download the project file, and the following process box will pop up in the system, as shown in figure 8-5-3:



Figure 8-5-3 Diagram of project download

If the network hardware is not available or the address is not correct, the system will pop up a prompt box of connection failure. At this time, please check the setting of network. By ping 192.168.1.66-t, you can check whether the network status is normal. When "ping" is executed and time feedback is normal, but the program cannot be downloaded, please check the firewall setting of computer, whether the file transfer is blocked or NAPro is blacklisted. For Win7, Win8 and Win10 system, please must modify the firewall setting or close the firewall, otherwise you can't download.

When the prompt of successful download appears, turn 3-position switch of PLC to the "RUN", and the CPU will be re-powered again. After successful start-up, the R light flashes once a second, and the light of "A" constant lighting, indicating that the CPU is running normally.

After the program is downloaded to the PLC, the CPU module must be reset and restarted once, only in this way the downloaded program is executed, otherwise, the system is executing the program downloaded previously. "Reset" can be accomplished through the reset command of programming software.

## 8.6 Compile control program

Installing programming software NAPro into personal computer (PC) and make it communicate with CPU module. Meanwhile setting the relevant hardware parameters, and then design and develop the corresponding engineering applications according to the

engineering needs to achieve and meet your control requirements. (For more detailed information about NPro programming software, please refer to NA2000 programmable controller <NPro programming software user manual> and <NA2000 system PLC application manual>)

## 8.7 Put equipment into operation

After checking and confirming that all processes are correct, load the debugged control program into PLC. Now, a set of control system based on NA2000PLC can be put into production and operation.