

# **M2000 series remote I/O module**

# **User 's Manual**

Rev: H



**Smacq Technologies. Co., Ltd**

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## Contact us

If you have any questions or need assistance while using this product or this document, please contact us via:

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# Safety requirements



Warning: Only connect voltage within the specified range. If the voltage exceeds the specified range, it may cause equipment damage and even affect personal safety. The voltage range that can be connected to each port is detailed in the product specification section.



Warning: Do not attempt to operate the device in any other way not mentioned in this document. Incorrect operation of equipment may pose a danger. When the equipment is damaged, the internal security protection mechanism will also be affected.



Warning: Do not attempt to replace device components or modify the device using other methods not mentioned in this document. Do not repair the product yourself when it malfunctions.



Warning: Do not use the equipment in environments where explosions may occur or in the presence of flammable smoke. If necessary for such environments, please place the device in a suitable enclosure.



Warning: During the operation of the warning device, all chassis covers and filling panels must be closed.



Warning: For equipment with exhaust vents, do not insert foreign objects into the vents or block the air flow through the vents.

# Measurement category



Warning: This device can only be used in measurement category I (CAT I).  
Do not use this device to connect signals or perform measurements in measurement categories II/III/IV.

## Measurement category description

Measurement Category I (CAT I) refers to measurements taken on circuits that are not directly connected to the main power supply. For example, measuring circuits that are not derived from the main power source, especially circuits derived from protected (internal) main power sources. In the latter case, the instantaneous stress will change. Therefore, users should understand the instantaneous tolerance of the device.

Measurement Category II (CAT II) refers to measurements taken on circuits directly connected to low-voltage equipment. For example, measuring household appliances, portable tools, and similar devices.

Measurement Category III (CAT III) refers to measurements conducted in building equipment. For example, measurements are taken on distribution boards, circuit breakers, circuits (including cables, busbars, junction boxes, switches, sockets) in fixed equipment, as well as industrial equipment and certain other devices (such as fixed motors permanently connected to fixed installations).

Measurement category IV (CAT IV) refers to measurements taken at the source of low-voltage equipment. For example, measurements taken on electricity meters, primary over Current protection equipment, and pulse control units.

# Environment

Temperature	
Operation	0°C~55°C
Storage	-40°C~85°C
Humidity	
Operation	5% RH~95% RH, non-condensing
Storage	5% RH~95% RH, non-condensing
Pollution level	2
Highest altitude	2000m

## Pollution level description

Pollution level 1: No pollution, or only dry non-conductive pollution occurs. This pollution level has no impact. For example, a clean room or an air-conditioned office environment.

Pollution level 2: Generally only dry non-conductive pollution occurs. Sometimes temporary conduction may occur due to condensation. For example: general indoor environment.

Pollution level 3: Conductive pollution occurs, or dry non-conductive pollution becomes conductive due to condensation. For example, an outdoor environment with a canopy.

Pollution Level 4: Permanent conductive pollution caused by conductive dust, rainwater, or snow. For example: outdoor places.

## Recycling precautions



Warning: Some substances contained in this product may be harmful to the environment or human health. To avoid releasing harmful substances into the environment or endangering human health, it is recommended to recycle this product using appropriate methods to ensure that most materials can be reused or recycled correctly. For information on handling or recycling, please contact local professional organizations.



### **Feature point**

- 8-channel analog input
- M2001, M2002, 16 bit resolution
- M2003, M2004, M2013, M2014, 12 bit resolution (16 bit in high-resolution mode)
- Using standard Modbus TCP protocol
- Multi-range setting
- Multi-sampling rates to choose from (M2001, M2002)
- Built-in Watchdog Timer will automatically reset the module in case of system failure
- 9-24V power supply voltage range
- DIN-Rail Mounting and Piggyback Stack

### **Applications**

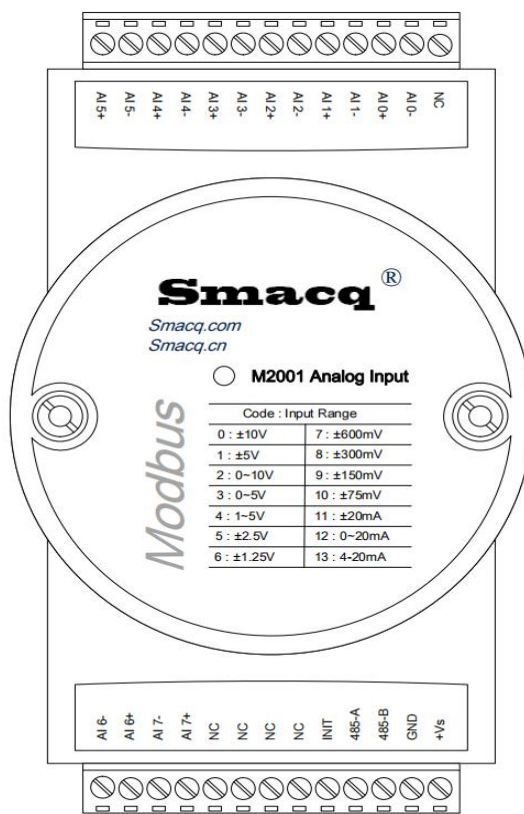
- Remote data acquisition
- Process monitoring
- Industrial process control
- Energy management
- Monitor
- Safety system
- Laboratory automation
- Building automation
- Product testing

## 1.2. Product specifications

### Common Specifications

Connection	
Interface	RS-485 (2-Wire)
Baud rate (bps)	1200,2400,4800,9600(Default),19200,38400,57600,115200
Checksum	NONE, ODD, EVEN(Default)
Stop bits	1(Default), 2
Protocol	Modbus RTU
Watchdog Timer	0.1seconds to 40 seconds
Power Supply	
Input Voltage	9-30 VDC
Electric Current	M2001: 150mA(Max) @ 12V M2002: 60mA(Max) @ 12V M2003: 60mA(Max) @ 12V M2013: 60mA(Max) @ 12V M2004: 50mA(Max) @ 12V M2014: 50mA(Max) @ 12V

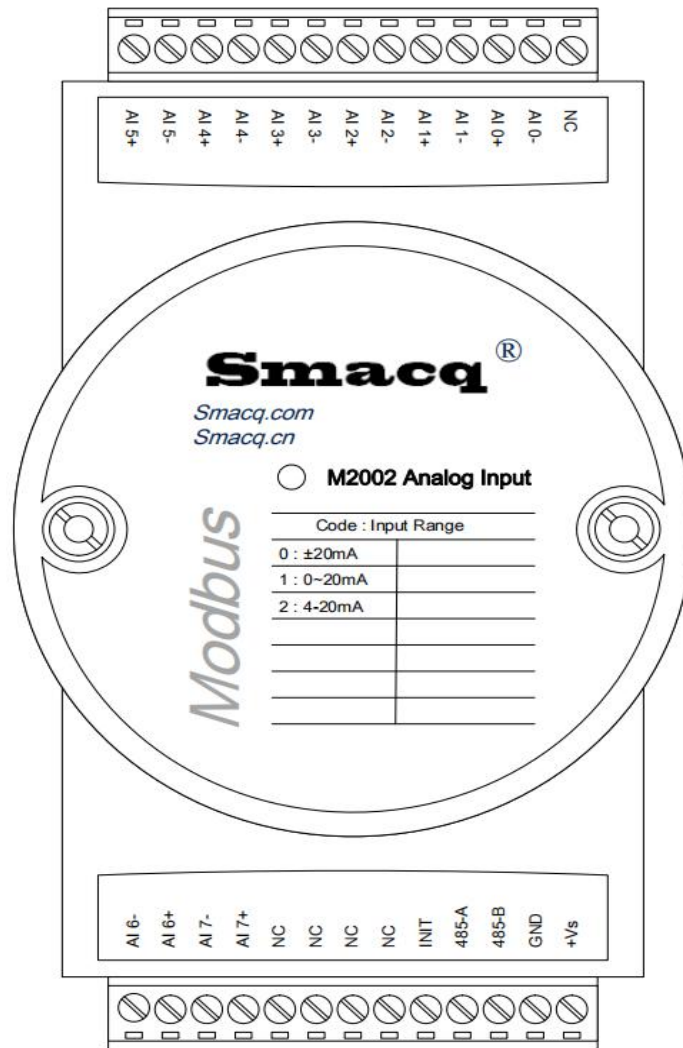




M2001 Wiring Definition

### M2001 Product Specification

Analog input	
Channels	8
Channel mode	Differential
Input Type	Voltage, Current (Switch through Jumper setting)
Resolution	16-bit
Voltage range	$\pm 10V$ (Default), $\pm 5V$ , $\pm 2.5V$ , $\pm 1.25V$ , 0-10V, 0-5V, 1-5V $\pm 600mV$ , $\pm 300mV$ , $\pm 150mV$ , $\pm 75mV$
Current range	$\pm 20mA$ , 0-20mA, 4-20mA
Integral time	Maximum speed: 5ms High speed: 20ms Medium speed: 60ms (Default) Low speed: 100ms Minimum speed: 300ms
Input coupling mode	DC
Voltage input impedance	30M $\Omega$ (Typical values)
Current input impedance	120 $\Omega$
Accuracy	$\pm$ (% of reading+% of range) $\pm 10V$ , $\pm 5V$ , 0-10V, 0-5V, 1-5V, $\pm 2.5V$ , $\pm 1.25V$ : 0.018 + 0.008 $\pm 600mV$ , $\pm 300mV$ : 0.05 + 0.01 $\pm 150mV$ , $\pm 75mV$ : 0.1 + 0.05 $\pm 20mA$ , 0-20mA, 4-20mA: 0.05 + 0.015
Temperature coefficient	25ppm/ $^{\circ}C$
Isolation voltage	1500V



M2002 Wiring Definition

### M2002 Product Specification

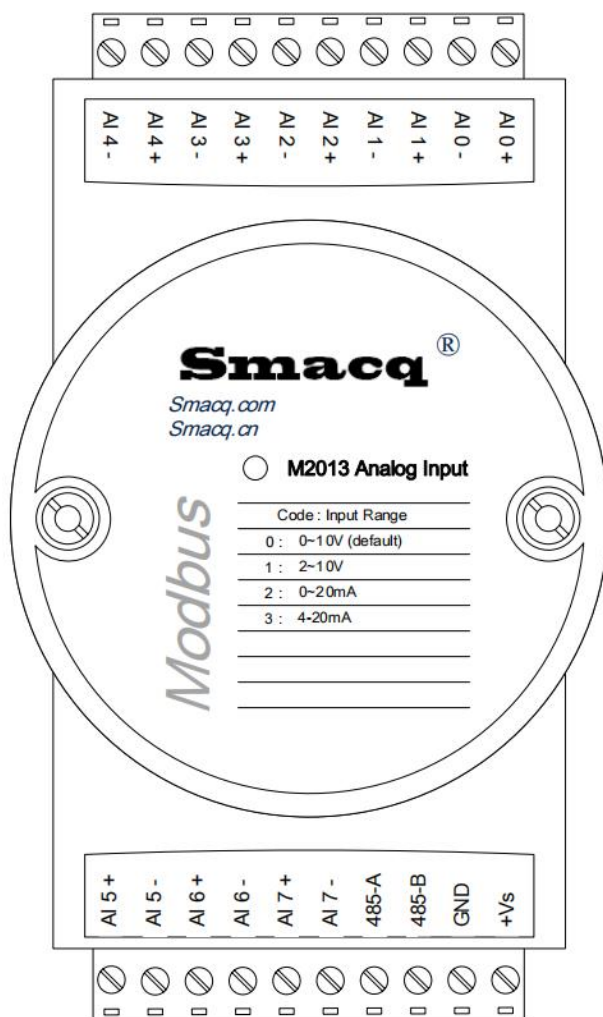
Analog input	
Channels	8
Channel mode	Differential
Input Type	Current
Resolution	16-bit
Current range	±20mA(Default), 0-20mA, 4-20mA
Integral time	Maximum speed: 5ms High speed: 20ms Medium speed: 60ms (Default) Low speed: 100ms Minimum speed: 300ms
Input coupling mode	DC
Current input impedance	120Ω
Accuracy	±(% of reading+% of range) 0.05 + 0.015
Temperature coefficient	25ppm/°C
Isolation voltage	1500V



M2003 Wiring Definition

### M2003 Product Specification

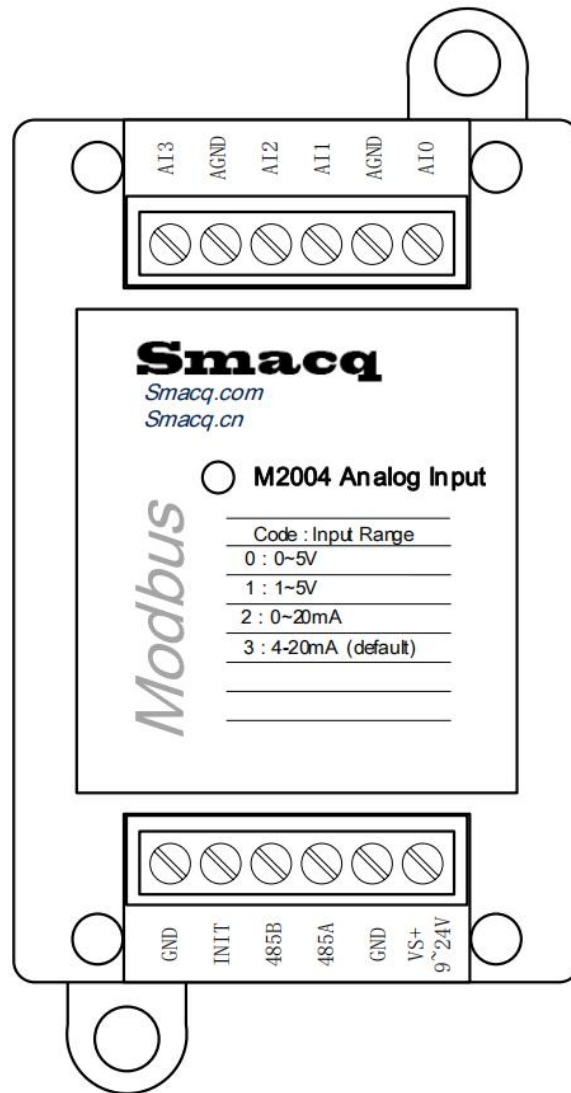
Analog input	
Channels	8
Channel mode	Referenced Single Ended
Input Type	Voltage, Current (Switch through Jumper setting)
Resolution	12-bit 16-bit (High-resolution mode)
Voltage range	0-5V, 1-5V
Current range	0-20mA, 4-20mA (Default)
Integral time	20ms
Input coupling mode	DC
Voltage input impedance	10M $\Omega$ (Typical values)
Current input impedance	249 $\Omega$
Accuracy	Voltage range: $\pm$ (% of reading + % of range) 0.05+0.1 Current range: $\pm$ (% of reading + % of range) 0.1+0.2
Temperature coefficient	25ppm/ $^{\circ}$ C
Isolation voltage	1500V



M2013 Wiring Definition

### M2013 Product Specification

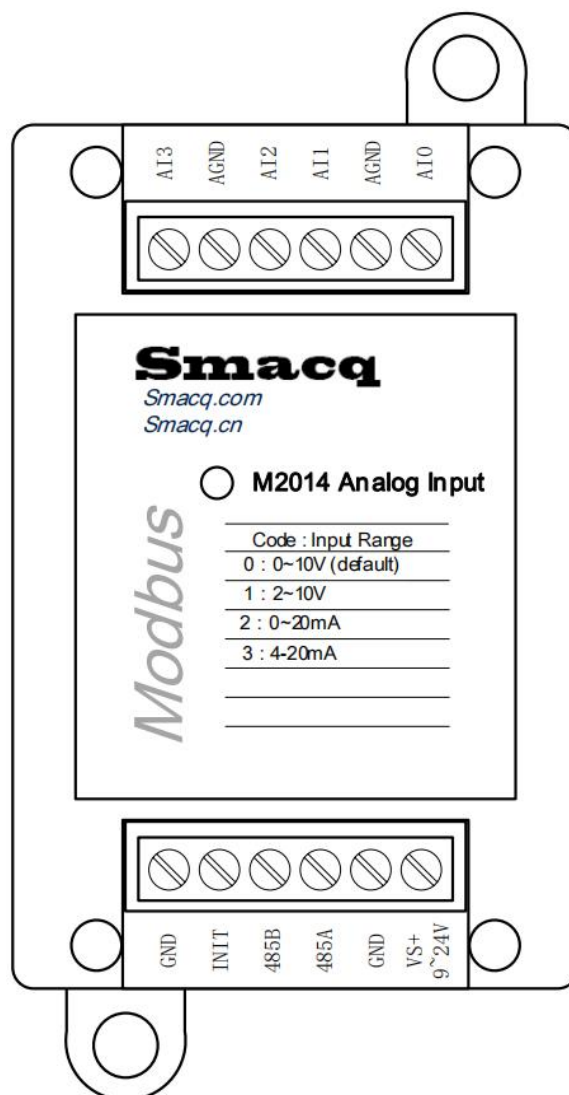
Analog input	
Channels	8
Channel mode	Referenced Single Ended
Input Type	Voltage, Current (Switch through Jumper setting)
Resolution	12-bit 16-bit (High-resolution mode)
Voltage range	0-10V (Default), 2-10V
Current range	0-20mA, 4-20mA
Integral time	20ms
Input coupling mode	DC
Voltage input impedance	10M $\Omega$ (Typical values)
Current input impedance	249 $\Omega$
Accuracy	Voltage range: $\pm$ (% of reading+% of range) 0.05+0.1 Current range: $\pm$ (% of reading+% of range) 0.1+0.2
Temperature coefficient	25ppm/ $^{\circ}$ C
Isolation voltage	1500V



M2004 Wiring Definition

### M2004 Product Specification

Analog input	
Channels	4
Channel mode	Referenced Single Ended
Input Type	Voltage, Current (Switch through Jumper setting)
Resolution	12-bit 16-bit (High-resolution mode)
Voltage range	0-5V, 1-5V
Current range	0-20mA, 4-20mA (Default)
Integral time	20ms
Input coupling mode	DC
Voltage input impedance	10M $\Omega$ (Typical values)
Current input impedance	249 $\Omega$
Accuracy	$\pm$ (% of reading+% of range) 0.05+0.1
Temperature coefficient	25ppm/ $^{\circ}$ C
Isolation voltage	1500V



M2014 Wiring Definition

### M2014 Product Specification

Analog input	
Channels	4
Channel mode	Referenced Single Ended
Input Type	Voltage, Current (Switch through Jumper setting)
Resolution	12-bit 16-bit (High-resolution mode)
Voltage range	0-10V, 2-10V
Current range	0-20mA, 4-20mA (Default)
Integral time	20ms
Input coupling mode	DC
Voltage input impedance	10M $\Omega$ (Typical values)
Current input impedance	249 $\Omega$
Accuracy	Voltage range: $\pm$ (% of reading+% of range) 0.05+0.1 Current range : $\pm$ (% of reading+% of range) 0.1+0.2
Temperature coefficient	25ppm/ $^{\circ}$ C
Isolation voltage	1500V

## 2. Product unpacking and packing list

### 2.1. Product unboxing

To prevent equipment damage from electrostatic discharge (ESD), please note the following:

- Please wear a grounded wristband or touch a grounded object first to ensure that the human body is grounded.
- Before removing the equipment from the packaging, please first place the anti-static packaging in contact with a grounded object.
- Do not touch the exposed pins of the connector.
- Please place the device inside an anti-static rod when not in use.

If the product is damaged after unpacking, please contact us promptly.

### 2.2. Packing list

Name	Specification Description	Quantity
M2000	M2000 Remote I/O Module	1
<b>Include Attachments</b>		
Wiring terminals	13 Pin/Green/3.81	2

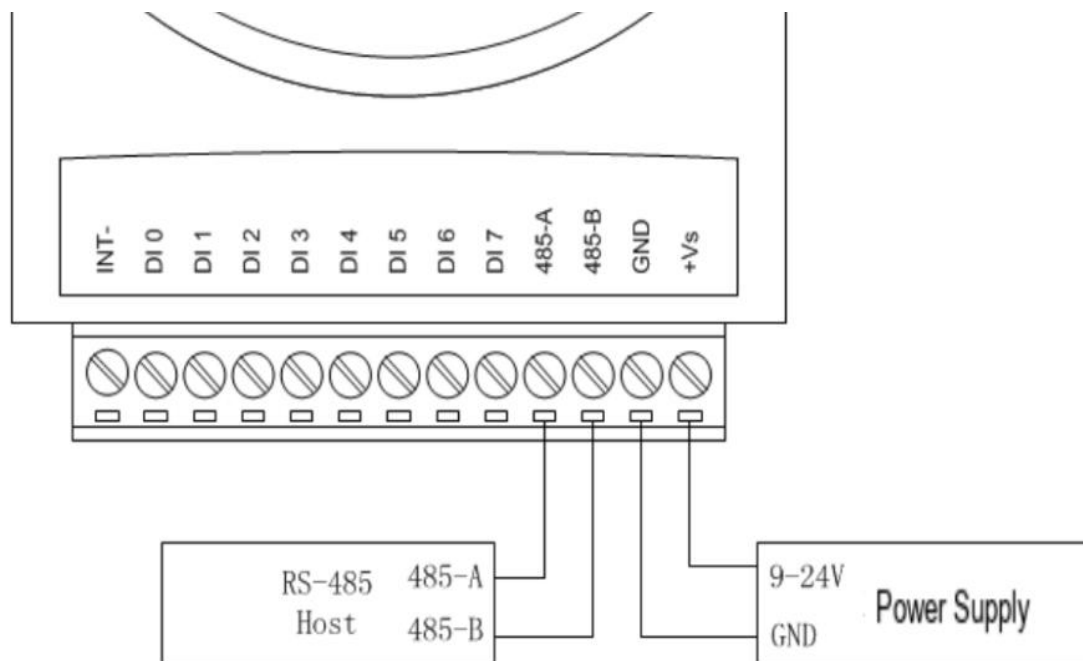
## 3. Installation and simple testing

### 3.1. Hardware install

Before installation and debugging, the following equipment needs to be prepared:

- M2000 Remote I/O Module
- A Windows series computer with RS-485 interface
- A DC Power Supply (9-24V)
- A USB to RS-485 converter, such as SDS1001(if the computer does not have an RS-485 interface)

Connect the power supply and RS-485 cable according to the instruction in the following diagram. When selecting power cables, due to the limitation of DC voltage drop, using thicker wires would be more suitable. In addition, long wires can also cause interference to communication lines. It is best to use shielded twisted pair cables that comply with EIA RS-485 when selecting RS-485 cables to reduce interference.

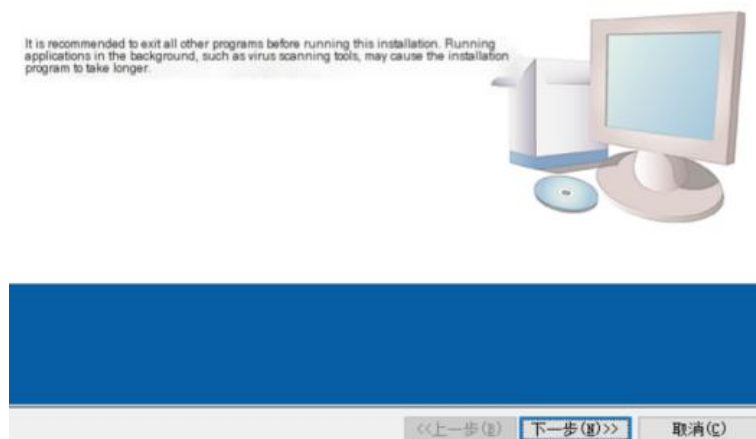


Power Connection Diagram

### 3.2. Software installation

We provide an application for configuring, detecting, and easy-to-use M2000 series remote I/O modules, which can only be installed on the Windows desktop operating system. Double click to run setup. exe for installation.





Software installation diagram

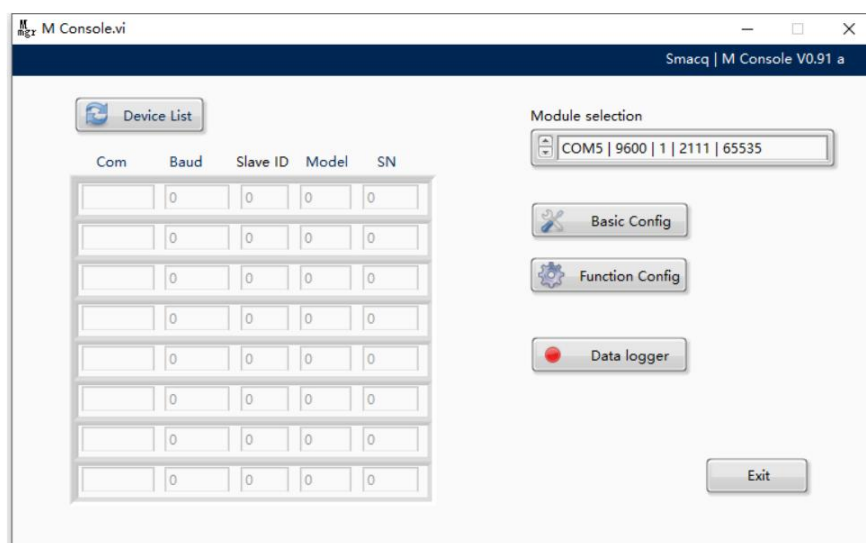
### 3.3. Simple testing

The M2000 series remote I/O module is set to its initial value before leaving the factory, as shown in the table below. If the settings of the M2000 series remote I/O module have been modified and the settings have been forgotten, a wire can be used to connect the Initiate and GND terminals, and then the power of the M2000 can be turned on. The LED indicator of the M2000 will flash three times at a frequency of 1Hz, and then disconnect the connection between the Initiate and GND. At this time, the M2000 remote I/O module will be restored to its factory default values.

Table 1 Default Value List

Parameter	Default value
485 Address	0x01
Baud rate	9600
Checksum	EVEN
Stop bit	1

Run the M Console configuration software, in the figure below. Please refer to the “M Console Quick Use Guide” for software operations.

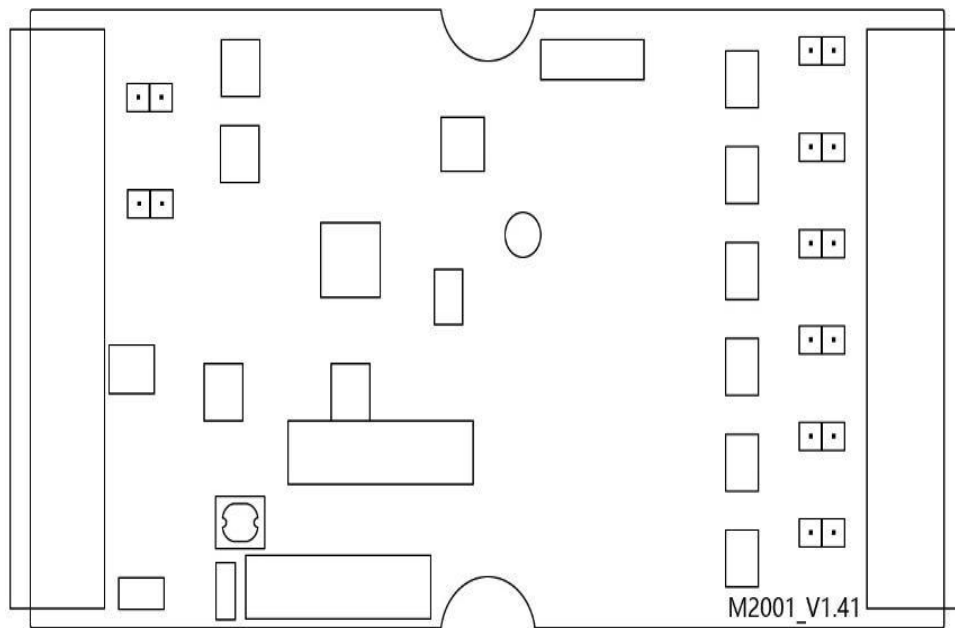


M series DAQ setting software

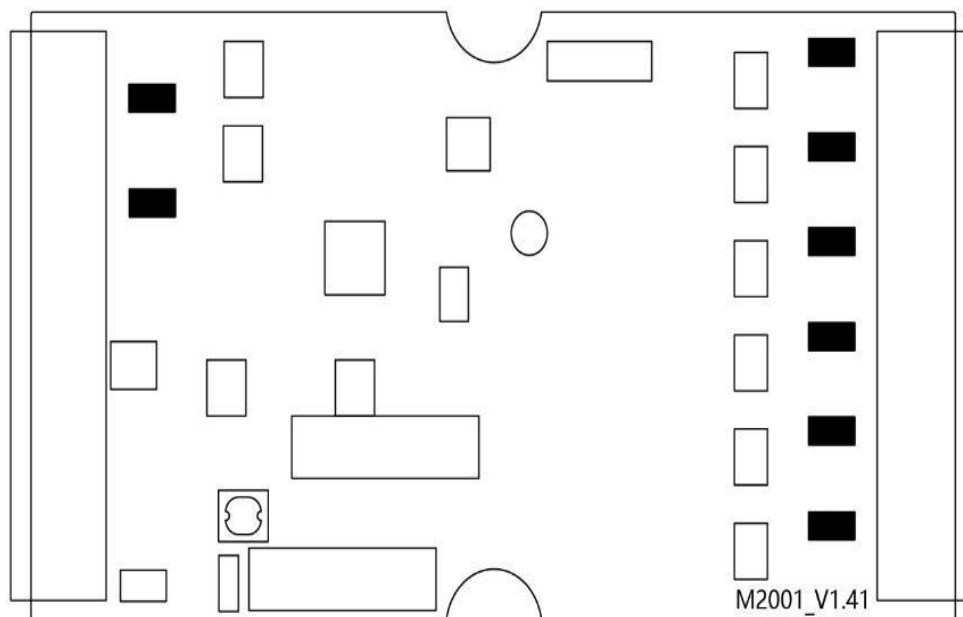
## 4. Analog input

In the M2000 series remote I/O module, except M2002 cannot switched input type, the other module voltage/Current switchable.

Each channel has a Jumper bit to set the input type for that channel. When the Jumper is not connected, this channel is a voltage input channel; When the Jumper is connected, this channel is the Current input channel.



The picture shows that the Jumper cap is not connected.  
At this time, it is voltage acquisition type



The picture shows that the Jumper cap is connected.  
At this time, it is Current acquisition type

At the leave factory, these Jumper positions will be set according to the default input range. The default range is marked on the front panel of the module, as shown in the figure below. The default range is 0~10V, so there is no Jumper wire connected inside. If you need to measure a 20mA Current signal, you need to open the housing and plug in the Jumper cap on the corresponding channel.

Modbus

○ **M2013 Analog Input**

Code	Input Range
0	0~10V (default)
1	2~10V
2	0~20mA
3	4~20mA

Default voltage range in the diagram

As shown in the figure below, the default range is 4~20mA, and a Jumper is already connected inside. If you need to measure a 5V voltage signal, you need to open the casing and remove the corresponding channel Jumper cap.

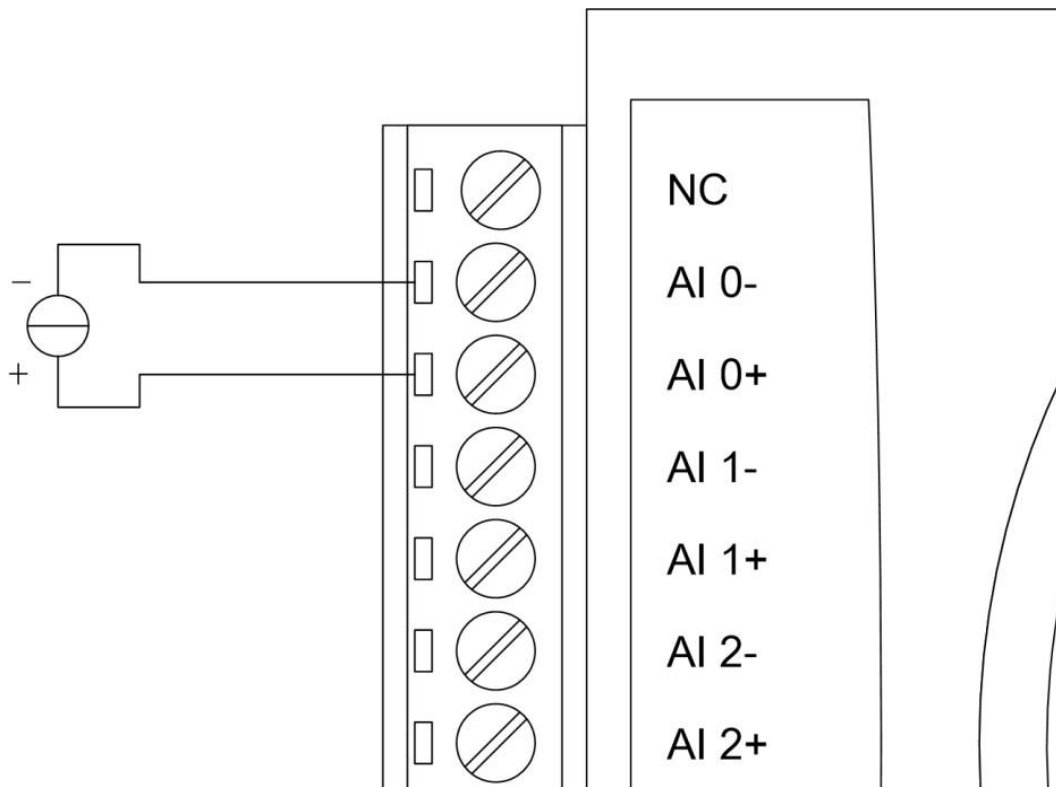
Modbus

○ **M2003 Analog Input**

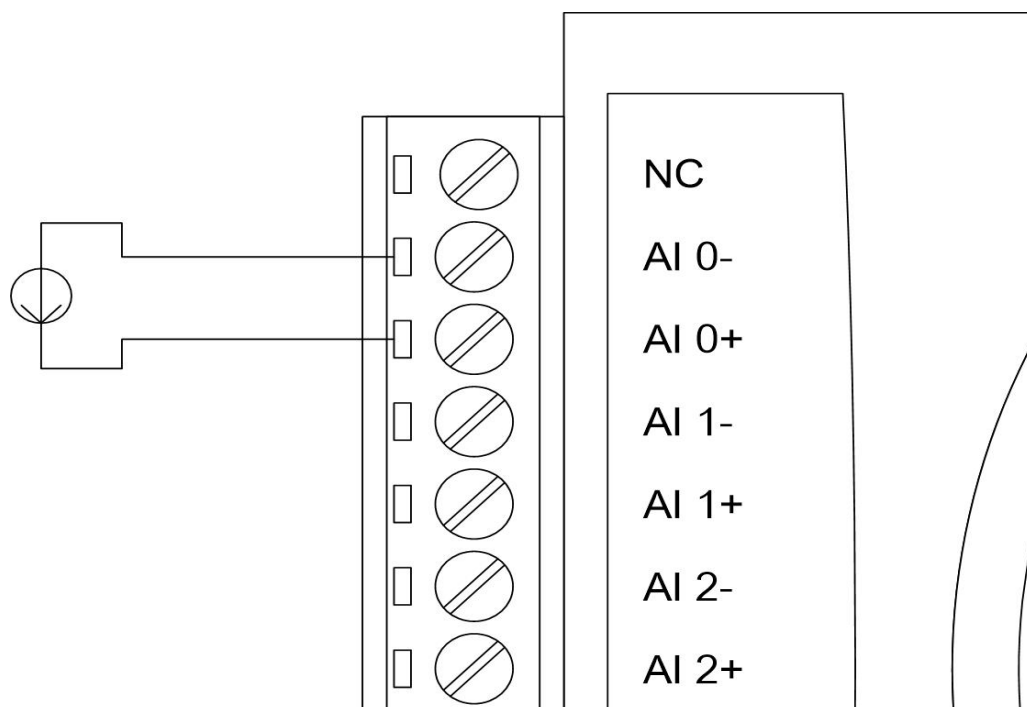
Code	Input Range
0	0~5V
1	1~5V
2	0~20mA
3	4~20mA (default)

Default Current range in the diagram

In addition, after switching the jumper, we also need to set the corresponding channel range in the software and save the default settings. After completing these operations, you can connect the signals as shown in the following diagram.



Schematic diagram of voltage signal analog input connection



Schematic diagram of Current signal analog input connection

## 5. Programming instructions

The M2000 series remote I/O module is a set of computer interface modules based on Modbus RTU, and its programming rules follow The relevant conventions of Modbus RTU protocol.

For the convenience of different application scenarios, the M2000 series remote IO module is equipped with two versions of MODBUS address schemes, namely V1.0 and V2.0. The V1.0 version is a non offset address scheme, while V2.0 is an offset address scheme. Since the release of this manual, V2.0 is the default setting. If necessary, the version can be switched through the M Console software.

Comparison table between coil/register address and Modbus message address.

Coil/Register Address	V1.0 Modbus Message Address	V2.0 Modbus Message Address
1~9999	1~9999, 0x000~0x270F	0~9998, 0x0000~0x270E
10001~19999	10001~19999, 0x2711~0x4E1F	0~9998, 0x0000~0x270E
30001~39999	30001~39999, 0x7531~0x9C3F	0~9998, 0x0000~0x270E
40001~49999	40001~49999, 0x9C41~0xC34F	0~9998, 0x0000~0x270E

### MODBUS RTU Command Message Description

For the convenience of users who are using the Modbus RTU protocol for the first time, here are several commonly used Modbus command messages as examples. If you are already familiar with the Modbus RTU protocol, you can directly view the following mapping table.

#### 01 Function code

Used to read the status of the coil (DO)

To read the status of 8 coils starting from address 1 of a module, the host **sends** the following command:

Module address	Function code	Coil address	Read the number of coils	CRC verification
0x01	0x01	0x0000	0x0008	2-byte CRC check

The module **returns** the following data:

Module address	Function code	Byte count	data	CRC verification
0x01	0x01	0x01	0x05	2-byte CRC check

The state of each coil corresponds to one bit of data, and 8 coils correspond exactly to one byte of data. If 9-16 coils of data are read at a time, the byte count is 2, and so on. The binary representation of data 0x05 is 0000 0101, indicating that DO0 and DO2 states are 1, and the remaining DO states are 0.

#### 02 Function code

Used to read discrete quantity (DI) states

To read the 8 discrete states of a module starting from address 10001, the host **sends** the following command:

Module address	Function code	Coil address	Read the quantity of discrete quantities	CRC verification
0x01	0x02	0x0000	0x0008	2-byte CRC check

The module **returns** the following data:

Module address	Function code	Byte count	data	CRC verification
0x01	0x02	0x01	0x05	2-byte CRC check

Each discrete state corresponds to one bit of data, and 8 coils correspond to exactly 1 byte of data. If 9-16 coils of data are read at a time, the number of bytes is 2, and so on. The binary representation of data 0x05 is 0000 0101, indicating that DI0 and DI2 are in the 1 state, and the remaining DO states are in the 0 state.

### 03 Function code

Used for reading and holding registers

To read the status of three registers starting from address 40201 in a module, the host **sends** the following command:

Module address	Function code	Register address	Read the number of registers	CRC verification
0x01	0x03	0x00C8	0x0003	2-byte CRC check

The module **returns** the following data:

Module address	Function code	Byte count	data	CRC verification
0x01	0x03	0x06	0x0001 0023 0005	2-byte CRC check

0x0001 represents the data of register 40201, 0x0023 represents the data of register 40202, and 0x0005 represents the data of register 40203 For the specific meaning of the data, please refer to the Modbus mapping table.

### 04 Function code

Used for reading input registers

To read the status of the three registers starting from address 30101 in a module, the host **sends** the following command:

Module address	Function code	Register address	Read the number of registers	CRC verification
0x01	0x04	0x0064	0x0003	2-byte CRC check

The module **returns** the following data:

Module address	Function code	Byte count	data	CRC verification
0x01	0x04	0x06	0x0001 0023 0005	2-byte CRC check

0x0001 is the data of register 30101, 0x0023 is the data of register 30102, and 0x0005 is the data of register 30103 For the specific meaning of the data, please refer to the Modbus mapping table.

### 05 Function code

Used for writing a single coil (DO)

To control the coil status of address 1 in a module, the host **sends** the following command:

Module address	Function code	Coil address	Coil status	CRC verification
0x01	0x05	0x0000	0xFF00 (set to 1) 0x0000 (set to 0)	2-byte CRC check

The module **returns** the same data as the **sent** content.

### 06 Function code

Used for writing and holding registers

If it is necessary to write register data with address 40201 to a module, the host sends the following command:

Module address	Function code	Register address	data	CRC verification
0x01	0x06	0x00C8	0x001C	2-byte CRC check

The module **returns** the same data as the **sent** content.

### 15 (0x0F) Function code

Used for writing multiple coils (DO)

To read the status of the 8 coils starting from address 1 of a module, the host **sends** the following command:

Module address	Function code	Coil address	Number of coils	Byte count	data	CRC verification
0x01	0x0F	0x0000	0x0008	0x01	0x05	2-byte CRC check

The state of each coil corresponds to one bit of data, and 8 coils correspond exactly to one byte of data. If 9-16 are written in a single time. The number of bytes for each coil's data is 2, and so on. The binary representation of data 0x05 is 0000 0101, which represents DO0 and DO2 has a state of 1, while the remaining DO states are 0.

The module **returns** the following data:

Module address	Function code	Coil address	Number of coils	CRC verification
0x01	0x0F	0x0000	0x0008	2-byte CRC check

### 16 (0x10) Function code

Used to write multiple hold registers

If you need to read the data from two registers of a module starting from address 40201, the host **sends** the following command:

Module address	Function code	Register address	Number of registers	Byte count	data	CRC verification
0x01	0x10	0x00C8	0x0002	0x04	0x0001 0023	2-byte CRC check

The data of each register corresponds to 2 bytes of data, and the data of 2 registers is 4 bytes, and so on. 0x0001 is the data of register 4101, and 0x0023 is the data of register 4102.

The module **returns** the following data:

Module address	Function code	Register address	Number of registers	CRC verification
0x01	0x10	0x00C8	0x0002	2-byte CRC check

**M2000 Series Remote I/O Module Universal Function Modbus Mapping Table**

Address 4X	Function	Explain	Attribute	Command
40201	485 Address	1-255	Read/Write	0x03,0x06,0x10
40202	Serial port settings	0-3 bits: Baud rate <sup>[1]</sup> 4-5 bits: Checksum <sup>[2]</sup> 6-7 bits: Stop bit <sup>[3]</sup>	Read/Write	0x03,0x06,0x10
40203	Watchdog	0-255 0: Turn off the Watchdog 1-255: Set Watchdog Time (Units 100ms)	Read/Write	0x03,0x06,0x10
40204	Model		Read	0x03
40205	Version number		Read	0x03
40206	Serial number		Read	0x03

[1]Baud rate comparison table

Set value	Baud rate
0	1200
1	2400
2	4800
3 (Default)	9600
4	19200
5	38400
6	57600
7	115200

[2]Checksum type comparison table

Set value	Parity
0	NONE
1	ODD
2 (Default)	EVEN

[3]Stop bit comparison table

Set value	Stop bit
0 (Default)	1
1	2

Taking a baud rate of 9600, a stop bit of 2, and even parity as an example, the serial port setting value is 0x0063 (01100011).



## M2000 Series Remote I/O Module Modbus Mapping Table

Analog input register list (The 4-channel module cannot use 30005-30008 register)

Address 3X	Channel	Function	Attribute	Command
30001	AI 0	Analog input register	Read	0x04
30002	AI 1	Analog input register	Read	0x04
30003	AI 2	Analog input register	Read	0x04
30004	AI 3	Analog input register	Read	0x04
30005	AI 4	Analog input register	Read	0x04
30006	AI 5	Analog input register	Read	0x04
30007	AI 6	Analog input register	Read	0x04
30008	AI 7	Analog input register	Read	0x04

Comparison Table of Analog Input Register Data and Voltage/Current Values

Analog input range	Simulate input register data values (Decimal)
±10V	0-65535, 0 corresponds to -10V, 65535 corresponds to 10V
±5V	0-65535, 0 corresponds to -5V, 65535 corresponds to 5V
0-10V	0-65535, 0 corresponds to 0V, 65535 corresponds to 10V
0-5V	0-65535, 0 corresponds to 0V, 65535 corresponds to 5V
1-5V	0-65535, 0 corresponds to 1V, 65535 corresponds to 5V
±2.5V	0-65535, 0 corresponds to -2.5V, 65535 corresponds to 2.5V
±1.25V	0-65535, 0 corresponds to -1.25V, 65535 corresponds to 1.25V
±600mV	0-65535, 0 corresponds to -600mV, 65535 corresponds to 600mV
±300mV	0-65535, 0 corresponds to -300mV, 65535 corresponds to 300mV
±150mV	0-65535, 0 corresponds to -150mV, 65535 corresponds to 150mV
±75mV	0-65535, 0 corresponds to -75mV, 65535 corresponds to 75mV
±20mA	0-65535, 0 corresponds to -20mA, 65535 corresponds to 20mA
0-20mA	0-65535, 0 corresponds to 0mA, 65535 corresponds to 20mA
4-20mA	0-65535, 0 corresponds to 4mA, 65535 corresponds to 20mA

M2003,M2004 High Resolution Mode (Default) Register Data and Analog Values list

Analog input range	Analog input register data values (Decimal)
0-5V	0-65535, 0 corresponds to 0V, 65535 corresponds to 5V
1-5V	0-65535, 0 corresponds to 1V, 65535 corresponds to 5V
0-20mA	0-65535, 0 corresponds to 0mA, 65535 corresponds to 20mA
4-20mA	0-65535, 0 corresponds to 4mA, 65535 corresponds to 20mA

M2003,M2004 12-bit Analog Input Register Data and Analog Values list

Analog input range	Analog input register data values (Decimal)
0-5V	0-4095, 0 corresponds to 0V, 4095 corresponds to 5V
1-5V	0-4095, 0 corresponds to 1V, 4095 corresponds to 5V
0-20mA	0-4095, 0 corresponds to 0mA, 4095 corresponds to 20mA
4-20mA	0-4095, 0 corresponds to 4mA, 4095 corresponds to 20mA

M2013,MT2014 High Resolution Mode (Default) Register Data and Analog Values list

Analog input range	Analog input register data values (Decimal)
0-10V	0-65535, 0 corresponds to 0V, 65535 corresponds to 10V
2-10V	0-65535, 0 corresponds to 2V, 65535 corresponds to 10V
0-20mA	0-65535, 0 corresponds to 0mA, 65535 corresponds to 20mA
4-20mA	0-65535, 0 corresponds to 4mA, 65535 corresponds to 20mA

M2013, MT2014 12-bit Analog Input Register Data and Voltage/Current Values

Analog input range	Analog input register data values (Decimal)
0-10V	0-4095, 0 corresponds to 0V, 4095 corresponds to 10V
2-10V	0-4095, 0 corresponds to 2V, 4095 corresponds to 10V
0-20mA	0-4095, 0 corresponds to 0mA, 4095 corresponds to 20mA
4-20mA	0-4095, 0 corresponds to 4mA, 4095 corresponds to 20mA

List of analog input range registers

Address 4X	Channel	Function	Attribute	Command
40101	AI 0	Range register	Write/Read	0x03,0x06,0x10
40102	AI 1	Range register	Write/Read	0x03,0x06,0x10
40103	AI 2	Range register	Write/Read	0x03,0x06,0x10
40104	AI 3	Range register	Write/Read	0x03,0x06,0x10
40105	AI 4	Range register	Write/Read	0x03,0x06,0x10
40106	AI 5	Range register	Write/Read	0x03,0x06,0x10
40107	AI 6	Range register	Write/Read	0x03,0x06,0x10
40108	AI 7	Range register	Write/Read	0x03,0x06,0x10

M2001 Analog Input Range Register Range and Set Value Comparison Table

Analog input range	Analog input range register setting value (Decimal)
±10V	0
±5V	1
0-10V	2
0-5V	3
1-5V	4
±2.5V	5
±1.25V	6
±600mV	7
±300mV	8
±150mV	9
±75mV	10
±20mA	11 (Jumper wires need set too)
0-20mA	12 (Jumper wires need set too)
4-20mA	13 (Jumper wires need set too)

M2002 Analog Input Range Register Range and Set Value Comparison Table

Analog input range	Analog input range register setting value (Decimal)
±20mA	0
0-20mA	1
4-20mA	2

Comparison Table of Range and Setting Values of M2003 and M2004 Analog Input Range Register

Analog input range	Analog input register data values (Decimal)
0-5V	0
1-5V	1
0-20mA	2
4-20mA	3 (Default)

Comparison Table of Range and Setting Values of M2013 and M2014 Analog Input Range Register

Analog input range	Analog input register data values (Decimal)
0-10V	0
2-10V	1
0-20mA	2
4-20mA	3 (Default)

List of analog input sampling rate registers (M2001, M2002 available)

Address 4X	Channel	Function	Attribute	Command
40121	AI 0	Sampling rate register	Write/Read	0x03,0x06,0x10
40122	AI 1	Sampling rate register	Write/Read	0x03,0x06,0x10
40123	AI 2	Sampling rate register	Write/Read	0x03,0x06,0x10
40124	AI 3	Sampling rate register	Write/Read	0x03,0x06,0x10
40125	AI 4	Sampling rate register	Write/Read	0x03,0x06,0x10
40126	AI 5	Sampling rate register	Write/Read	0x03,0x06,0x10
40127	AI 6	Sampling rate register	Write/Read	0x03,0x06,0x10
40128	AI 7	Sampling rate register	Write/Read	0x03,0x06,0x10

Comparison Table of Analog Input Sampling Rate Register Range and Setting Values

Sampling rate	Analog input sampling rate register setting value (decimal)
Minimum	0
Low	1
Medium	2 (Default)
High	3
Highest	4

Restore Analog Input Channel Defaults Values Registers List

Address 4X	Channel	Function	Attribute	Command
40181	AI 0-7	Write data <b>1</b> to this address, all analog input channel configure to default values (Sampling rate and Input range)	Write	0x06,0x10

## 6. After sales service and warranty

Smacq Technologies. Co., Ltd. promises that its products are under warranty. If the product malfunctions during normal use, we will provide free repair or replacement of parts for the user. For detailed warranty instructions, please refer to the warranty instructions inside the packaging box.

Except for the warranties mentioned in this manual and warranty instructions, our company does not provide any other express or implied warranties, including but not limited to any implied warranties regarding the merchant ability and fitness for a particular purpose of the product.

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Website: <http://www.smacq.com>  
<http://www.smacq.cn>

## 7. Ordering information

### Main Equipment

Model	Description
M2001	8-channel Voltage/Current analog input
M2002	8-channel Current analog input
M2003	8-channel Voltage/Current analog input
M2013	8-channel Voltage/Current analog input
M2004	8-channel Voltage/Current analog input (10V Range)
M2014	8-channel Voltage/Current analog input (10V Range)

### Standard Accessories

Model	Description
TB13-3.81	Bolt terminal connector, 13 positions, 3.81mm
SDIN	DIN-Rail mounting bracket

## 8. Document Revision History

Date	Edition	Remarks
2019.03.28	Rev: A	First release.
2019.11.06	Rev: B	Revise important programming content.
2021.12.20	Rev: C	Add some content to M2003
2022.06.22	Rev: D	Modify some content of M2003 data comparison table
2022.07.25	Rev: E	Add relevant content on Modbus protocol explanation
2023.04.06	Rev: F	Add some content for M2004, M2013, and M2014
2024.01.12	Rev: G	Add jumper instructions.
2024.07.03	Rev: H	Modify some commands with incorrect instructions.