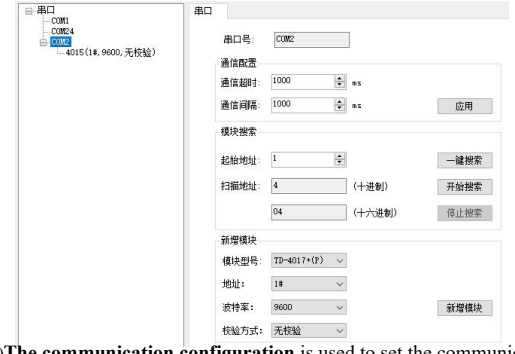
■ Software operation instructions

1、Open the TD-4000 configuration software through the start menu shortcut or desktop shortcut. Right-click the serial port on the left side of the software and select Refresh. The software will automatically search for the serial port on the computer and display the serial port number on the interface;

2、Click the serial port number connected to the module with the left mouse button. There are multiple function areas in the pop-up interface. If the software pops up the prompt box that the serial port cannot be connected, please check whether the serial port is normal or occupied by other software;



(1)**The communication configuration** is used to set the communication timeout and communication interval of the upper computer. The communication timeout refers to the maximum time for the software to wait for the module to return data after sending the command. If the software fails to receive the returned data within this time, it will be deemed that the communication failed. The communication interval refers to the time for the software to send the next command after the software completes sending the command. After entering the value to be set, click Apply;

(2)**The module search** is used to search the module information (device model, communication address, baud rate, and verification method). The one-key search is the software sending the universal search command to the module (the module firmware version must be B0.01 or above, and only one module can be connected on the same serial port). This function can directly obtain the module information, Start search is to poll the search module information from the start address (all firmware versions are supported, and multiple modules with different communication addresses can be connected on the same serial port), and automatically stop when the search address is 255. Stop search is to stop the search in advance during the polling search process. The searched module information will be displayed below the serial port number, as shown in the figure above. The information contents are: device model, communication address, baud rate Verification method.

(3)**The new module** is used to manually add module information. If the information of the module has been learned in advance, select the known module model in the module model, select the known module address in the address, select the known module baud rate in the baud rate, select the known module verification method in the verification method, click the new module, and the new information will be displayed under the serial port number;

3、After the software obtains the module information, directly click the module information software with the left mouse button to automatically connect the module and display the communication parameter page and module function page;

(1)**The communication parameter page** is used to view the current address, baud rate, verification method and firmware version of the module. At the same time, you can also set the address, baud rate and verification method of the module. In the communication parameter setting area, select the address to be modified, baud rate and verification method, and then click the setting button. If the setting is successful, the software will pop up a prompt box. At this time, you need to search the module again, If the modification failure prompt box pops up, check whether there is a fault.

(2)Page TD-4024P is used to view the measured values and configuration parameters of the module and modify the configuration parameters.

1) **Range configuration**, Select the channel you want to configure in the channel drop-down box, select the range you want to configure in the range drop-down box, and then click Set Range.

2) **Output power-on value and output safety value.** Select the channel you want to configure in the channel drop-down box, output the power-on value and the expected parameters in the output safety value input box, and then set the output parameter button for the motor. The output power-on value is the value output when the module starts, and the output safety value is the value output when the module is in the timeout state.

3) **Communication timeout value.** Click the Read Timeout Value button to obtain the timeout value of the current module. After entering the expected communication timeout value, click the Set Timeout Value. When the communication timeout value is not 0, when no communication command is received within the module timeout value range, the module is recognized as in the timeout state. At this time, the output channel will output the safe value. When the communication timeout value is 0, the function will fail.

4) **Set the output value.**select the channel you want to configure in the channel drop-down box, then slide the slider in the figure below to the desired output value, and click Set Output Value to set the output value of the channel to the desired value.

TD-4024+
Eight-Channel Analog Quantity Acquisition Module Instrations(Usage

NOTICE

- Please check the product packaging, product label model, specifications are consistent with the order contract;
- Please read this manual carefully before installation and use. If you have any questions, please contact our technical support hotline;
- The product need to installed in a safe place;
- 24V DC power supply for instrument, 220V AC power supply is strictly prohibited;
- It is strictly prohibited to disassemble and assemble the instrument without permission to prevent instrument failure or failure.
- The Company reserves the right to change the product without prior notice to the user. In case of any discrepancy between the contents of the instructions and the website, samples and other materials, the instructions shall prevail.
- Please scan the code for more product information and configuration software.

Micro cloud

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■ Profile

TD-4024 support 0~20mA, 4~20mA， -10V~+10V， -20mV~+20mA,0~10V ranges,4-channel differential input. The AD acquisition part is photoelectric isolated, and the application layer adopts the standard MODBUS-RTU protocol, which is applicable to a variety of industrial occasions and automation systems. It is convenient to communicate with the host computer, and can realize rapid networking and build monitoring system.

■ Main Technical Parameters

Output

Number of Channels: 4

Output range:0~20mA, 4~20mA，-10V~+10V，-20mV~+20mA,0~10V

Output method:4-channel current or voltage input

Sampling frequency:≤100Hz

Accuracy class：≤0.1%

Input load:current≤350Ω，voltage≥2KΩ

Note:After the module is powered on, it will output the negative value. After the device is started, it will return to normal.

Input

Signal type： RS-485 digital signal

Baud rate： 1200、2400、4800、9600、19200、38400、57600、115200bps

Verification method: no verification, odd verification or even verification

Data bits： 8bit Stop bit：1bit

Communication output protocol:MODBUS-RTU

Communication distance:1200m

General Technical Parameters

Power Supply: DC24V, Voltage Range: DC 9~30V

Current Consumption: <1.5W @DC 24V

Dielectric Strength:1500V DC/1min （between input and output）

Insulation Resistance: ≥ 100MΩ (between input and output)

Electromagnetic Compatibility: In accord with GB/T182681(IEC6132-1)

Suit for Field Equipment: Configuration software, PLC, touch screen, computer and other equipment supporting MODBUS - RTU protocol

Indicator status

1、The indicator light is always on after power-on. If it is not on, it indicates power failure or poor contact；

2、The indicator flashes during normal communication；

3、When there is no communication, the indicator lamp flashes, indicating that the module is faulty.

Default factory parameters

Device address：1 Baud rate：9600bps Verification method: no verification

Data bits： 8bit Stop bit：1bit

Channel range: all are set to 4-40mA range；

Use environment

(1) The surrounding environment shall be free of strong vibration, impact, large current, spark and other electromagnetic induction effects. The air shall be free of corrosive media for chromium, nickel and silver coatings, and shall not contain flammable and explosive substances;

(2) Continuous operating temperature：-40℃~ +85℃；

(3) Relative humidity ： 10 % ~ 90 % R H(No condensation)；

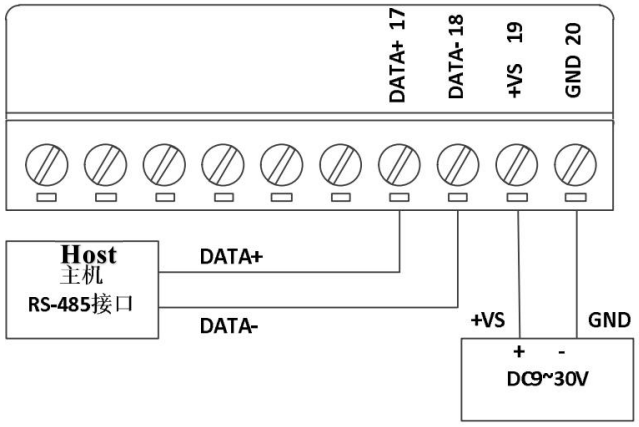
■Range configuration description

TD-4024 supports four-channel current or voltage output. When switching current or voltage output, the wiring mode needs to be modified. For example, when channel 0 outputs current, the terminal is I0+and I0 -, and the output voltage is, the terminal is U0+and U0-.

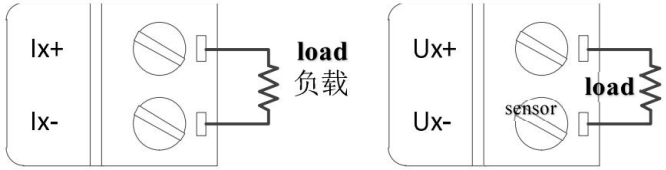
■ Wiring instructions

Communication and power wiring diagram：

The RS485 communication line is connected by hand. If star connection is required, please add a splitter. The terminal resistance Rt is added at both ends of the communication line as required.



Input signal wiring diagram：



Current output wiring　　Voltage output wiring

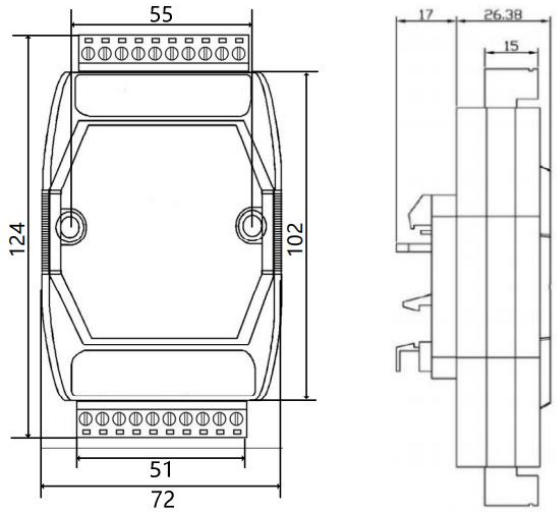
■ Connecting terminal description

Terminal number	Terminal name	Text description
1	I2+	Channel 2 Current output positive terminal
2	I2-	Channel 2 Current output negative terminal
3	U3+	Channel 3 Voltage output positive terminal
4	U3-	Channel 3 Voltage output negative terminal
5	I3+	Channel 2 Current output positive terminal
6	I3-	Channel 2 current output negative terminal
7	DATA+	RS-485 Positive end of communication interface
8	DATA-	RS-485 Negative terminal of communication interface
9	+VS	Positive terminal of external power supply(9~30V)
10	GND	Negative terminal of external power supply(grounding)
11	U0+	Channel 0 Voltage output positive terminal
12	U0-	Channel 0 Voltage output negative terminal
13	I0+	Channel 0 Current output positive terminal
14	I0-	Channel 0 Current output negative terminal
15	U1+	Channel 1 Voltage output positive terminal
16	U1-	Channel 1 Voltage output negative terminal
17	I1+	Channel 1 Current output positive terminal
18	I1-	Channel 1 Current output negative terminal
19	U2+	Channel 2 Voltage output positive terminal
20	U2-	Channel 2 Voltage output negative terminal

Note:

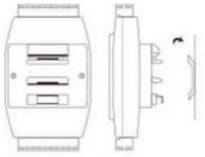
1. The negative terminals of the four channel voltage outputs are internally connected.
2. The negative end of the current output of four channels is internally connected.

■ Overall Dimension



■ Install

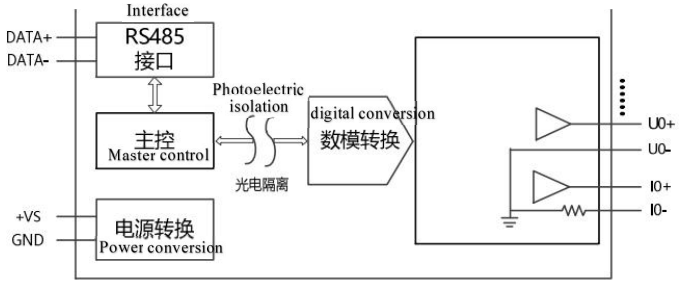
TD-4024 adopts DIN35mm guide rail installation mode. The guide rail shall comply with the installation dimension specification of TH35-7.5 guide rail in the national standard GB/T19334-2003. This standard is equivalent to the international standard of IEC 60715-1981. The installation must be stable and firm.



DIN-Rail Mounting

Overlay installation

■ Internal structure



■ Signal Communication Point Table

Point Table	Attribute	Function	Value range and description
40001	16-bit unsigned Read and write register. Power-off storage Firmware version only:	40001~40004 corresponding Measured digital value of channel 0 to channel 3	0~4095 corresponds to the lower limit and upper limit of the input range, For example, 4~20mA range: 0 corresponds to 4mA, 4095 corresponds to 20mA, in a linear relationship.
40002			
40003			
40004			
40201	16-bit unsigned Read and write register. Power-off storage Firmware version only:	40201~40204 corresponds to the output range of channel 0~3	0~20mA code is 0x0030 4~20mA code is 0x0031 +/-10v code is 0x0032 +/-20mA code is 0x0033 0~10V code is 0x0034
40202			
40011			
40203			
40204			
40231	16-bit unsigned Read and write register. Power-off storage Firmware version only:	40231~40234 corresponds to the output power-on value of channel 0~3	0-4095 corresponds to the lower and upper limit of the output range, the output value of the module when it is powered on, and the output digital value of the calculation method is consistent.
40232			
40233			
40234			
40235	16-bit unsigned Read and write register. Power-off storage Firmware version only:	40231~40234 corresponds to the output safety value of channel 0~3	0-4095 corresponds to the lower and upper limit of the output range, the output value of the module when it is powered on, and the output digital value of the calculation method is consistent
40236			
40237			
40238			
40239	16-bit unsigned Read and write register. Power-off storage Firmware version only:	Communication timeout value	0~999, corresponding to 0~999, when the value is 0, the communication timeout function is invalid

Point Table	Attribute	Function	Value range and description
40211	16-bit read-only register	Module name1	0X4024
40212		Module name2	0X0000
40213		Firmware version	0X0000~0XFFFF
40215	16-bit read and write register power-down storage	Equipment communication address	0X0001~0X00FF Indicates the address of the device
40216		Baud rate	0：1200bps 1：2400bps 2：4800bps 3：9600bps
			4：19200bps 5：38400bps 6：57600bps 7：115200bps
40217		Verification method	0: No verification 1: Odd check 2：even parity check

■ Calculation formula of digital value

Calculate output value from digital value

Measurement range	Calculation formula (D is digital value, 16-bit unsigned integer)
0~20mA	D / 4095 *20(mA)
4~20mA	D / 4095 *16+4(mA)
-10V~+10V	D / 4095 *20-10(V)
-20mA~20mA	D / 4095 *40-20(mV)
0~10V	D/ 65535 *10(V)

Calculate digital value from expected output value

Measurement range	Calculation formula (D is digital value, 16-bit unsigned integer)
0~20mA	D=X /20*4095
4~20mA	D=(X-4) / 16*4095
-10V~+10V	D=(X+10)/20*4095
-20mA~20mA	D=(X+20) /40*4095
0~10V	D=X/10*4095

TD-4024+
Four-Channel Analog Quantity Acquisition Module Instrations(Programming)

NOTICE

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- Please read this manual carefully before installation and use. If you have any questions, please contact our technical support hotline;
- The product need to installed in a safe place;
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■MODBUS-TRU agreement

Profile

The MODBUS-RTU protocol provides multiple function codes to achieve different functions. TD-4000 series products only support some of the function codes. This manual only explains the function codes used. The function codes supported by TD-4000 series products are: 0X01, 0X03, 0X04, 0X06, 0X05, 0X0F, 0X10, of which TD-4024 does not support function codes 0X05 and 0X0F. The corresponding point table addresses and function descriptions of the function codes are shown in the following table:

Function code	symmetric points address	Function description
0X01	0XXXX	Read the status of multiple coils (single bit data)
0X05	0XXXX	Write single coil (single bit data) status (0X0F can be replaced)
0X0F	0XXXX	Write multiple coils (single bit data) status
0X03	4XXXX	Read the value of multiple registers
0X04	4XXXX	Read the value of multiple registers (0X03 can be replaced)
0X06	4XXXX	Write a single register value (0X10 can be replaced)
0X10	4XXXX	Write multiple register values

Function code 0X01

1、The structure of the request message sent by the host, in which the starting address and the number of coils are represented by the large end. The starting address needs to be reduced by one from the point table address, for example, the address of 00016 is 0X000F,

Description	Number of bytes	Value range
Device address	1 byte	0X0001~0X00FF
Function code	1 byte	0X01
Start address	2 byte	0X0000~0XFFFF
Number of coils	2 byte	0X0001~0X0040
CRC verification	2 byte	0X0000~0XFFFF

2、The slave returns the message structure. Each bit of the coil status data represents a coil status 1=ON and 0=OFF, and the LSB (least significant bit) of the first data byte represents the coil status of the starting address. The other coils are analogized, until the highest bit of this byte, and in the order of low to high in the subsequent bytes.

Description	Number of bytes	Value range
Device address	1 byte	Address of module
Function code	1 byte	0X01
Number of coil status bytes	1 byte	N(Notes)
Coil status	N byte	Big end mode, high byte first
CRC verification	2 byte	0X0000~0XFFFF

NOTE：N=Coil quantity / 8，If the remainder is not equal to 0，N=Coil quantity / 8 + 1

3、EG，Read the 24 coil states of 00001~00024 of the module with address 1，

Host sends message：（The message is in hexadecimal format)

01	01	00	00	00	17	3C	00
Module address	Function code	Start address high byte	Start address low byte	Number of coils high byte	Number of coils low byte	CRC verification	CRC verification

Slave return message：（The message is in hexadecimal format)

01	01	03	01	03	07	2C	BC
Module address	Function code	Number of coil status bytes	Coil status byte 0	Coil status byte 1	Coil status byte 2	CRC verification	CRC verification

The coil status byte of 3 bytes in total in the message returned from the slave：

Byte **0:** 0X01 binary system is 0000 0001，from right to left（That is, from the lowest byte to the highest byte），Representative 00001~00008 status is ON, OFF, OFF, OFF, OFF, OFF, OFF, OFF,

Byte **1:** 0X03 binary system is 0000 0011，from right to left（That is, from the lowest byte to the highest byte),Representative 00009~00016 status is ON, ON, OFF, OFF, OFF, OFF, OFF, OFF,

Byte **2:** 0X07 binary system is 0000 0111，from right to left（That is, from the lowest byte to the highest byte),Representative 00017~00024 status is ON, ON, ON, OFF, OFF, OFF, OFF, OFF,

Function code 0X0F

1、The structure of the request message sent by the host, in which the starting address and the number of registers are expressed in the large-end way, and the starting address needs to be reduced by one point table address. For example, the address of 00008 is 0X0007, each bit of the coil status data represents a coil status 1=ON, 0=OFF, and the LSB (least significant bit) of the first data byte represents the coil status of the starting address. The other coils are analogized, until the highest bit of this byte, and in the order of low to high in the subsequent bytes.

Description	Number of bytes	Value range
Device address	1 byte	0X0001~0X00FF
Function code	1 byte	0X0F
Start address	2 bytes	0X0000~0XFFFF
Number of coils	2 bytes	0X0001~0X0040
Number of coil status bytes	1 byte	N（Notes）
Coil status	Nx byte	
CRCverification	2 bytes	0X0000~0XFFFF

Note：N=Number of coils/8，If the remainder is not equal to 0，N=Number of coils/8 + 1

2、The message structure returned by the slave is equivalent to the first 6 bytes of the host message plus 2 bytes of CRC verification；

Description	Number of bytes	Value range
Device address	1 byte	0X0001~0X00FF
Function code	1 byte	0X0F
Start address	2 bytes	0X0000~0XFFFF
Number of coils	2 bytes	0X0001~0X0040
CRCverification	2 bytes	0X0000~0XFFFF

3、EG，Set the status of 8 coils in modules 00017~00024 with address 1 to：ON，OFF，ON，OFF，OFF，OFF，OFF，OFF;

Host sends message：（The message is in hexadecimal format)

01	0F	00	10	00	08	01	05	FF	55
Module address	Function code	Start address high byte	Start address low byte	Number of coils high byte	Number of coils low byte	Number of coil status bytes	Coil status byte 0	CRC verification	CRC verification

Coil status byte 0：0X05 binary system 0000 0101，from right to left（（That is, from the lowest byte to the highest byte），Representative 00017~00024 status is ON, OFF, ON, OFF, OFF, OFF, OFF, OFF,

Slave return message:(The message is in hexadecimal format)

01	0F	00	10	00	08	55	C8
Module address	Function code	Start address high byte	Start address low byte	Number of coils high byte	Number of coils low byte	CRC verification	CRC verification

Function code 0X03

1、The structure of the request message sent by the host, in which the starting address and the number of registers are represented by the large end. The starting address needs to be removed from the first 4 of the point table address and then subtracted by one,for example,address of 40017 is 0X0010

Description	Number of bytes	Value range
Device address	1 byte	0X0001~0X00FF
Function code	1 byte	0X03
Start address	2 bytes	0X0000~0XFFFF
Number of registers	2 bytes	0X0001~0X0040
CRC verification	2 bytes	0X0000~0XFFFF

2、The slave returns the message structure, and each register occupies 2 bytes. For each register, the first byte is the high byte of the register, and the second byte is the low byte of the register (that is, large-end mode)；

Description	Number of bytes	Value range
Device address	1 byte	Module address
Function code	1 byte	0X03
Number of register value bytes	1 byte	2*N(Notes)
Register value	2*Nx byte	Big end mode, high byte first
CRC verification	2 bytes	0X0000~0XFFFF

Note：N=Number of registers

3、for example，Read the value of two registers from 40009 to 40010 of the module with address 1，

Host sends message:(The message is in hexadecimal format)

01	03	00	08	00	02	45	c9
Mod	Fun	Start	Start	Number	Number	CR	CR

ule address	ction code	address high byte	address low byte	of registers high byte	of registers low byte	C verification	C verification

Slave return message：（The message is in hexadecimal format)

01	03	04	F1	03	F7	FF	3E	BF
Module address	Function code	Number of register value bytes	Register byte 0	Register byte 1	Register byte 2	Register byte 3	CRC verification	CRC verification

The register value of 4 bytes in the message returned by the slave：

Byte 0 and byte 1 are the values of register 40009, hexadecimal representation is 0XF103, conversion to 16-bit unsigned number is 61699, conversion to 16-bit signed number is - 3837, byte 2 and byte 3 are the values of register 40010, hexadecimal representation is 0Xf7ff, conversion to 16-bit unsigned number is 63487, conversion to 16-bit signed number is - 2049，

Function code 0X10

1、The request message structure sent by the host, in which the starting address and the number of registers are expressed in the big-end mode. The starting address needs to be removed from the first 4 of the address of the point table, and then subtracted by one. For example, the address of 40004 is 0X0003, and each register occupies 2 bytes. For each register, the first byte is the high byte of the register, and the second byte is the low byte of the register (i.e., the big-end mode)；

Description	Number of bytes	Value range
Device address	1 byte	0X0001~0X00FF
Function code	1 byte	0X10
Start address	2 bytes	0X0000~0XFFFF
Number of registers	2 bytes	0X0001~0X0040
Number of register value bytes	1 byte	2*N（Notes）
Register value	2*Nx byte	Big end mode, high byte first
CRC verification	2 bytes	0X0000~0XFFFF

Note：N=Number of registers

2、The message structure returned by the slave is equivalent to the first 6 bytes of the host message plus 2 bytes of CRC verification；

Description	Number of bytes	Value range
Device address	1 byte	Module address
Function code	1 byte	0X10
Start address	2 bytes	0X0000~0XFFFF
Number of registers	2 bytes	0X0000~0X0040
CRC verification	2 bytes	0X0000~0XFFFF

3、For example, set the value of the two registers of the module 40002~40003 with address 1 to 0XF003 (16-bit unsigned: 65283, 16-bit signed: - 4093), 0X0007 (16-bit unsigned: 7, 16-bit signed: 7);

Host sends message：

01	10	00	01	00	02	04
Module address	Function code	Start address high byte	Start address low byte	Number of registers high byte	Number of registers low byte	Number of register value bytes

F0	03	00	07	B0	A1	
Number of register value bytes 0	Number of register value bytes 1	Number of register value bytes 2	Number of register value bytes 3	CRC verification	CRC verification	

Slave return message：

01	10	00	01	00	02	10	08
Module address	Function code	Start address high byte	Start address low byte	Number of registers high byte	Number of registers low byte	CRC verification	CRC verification