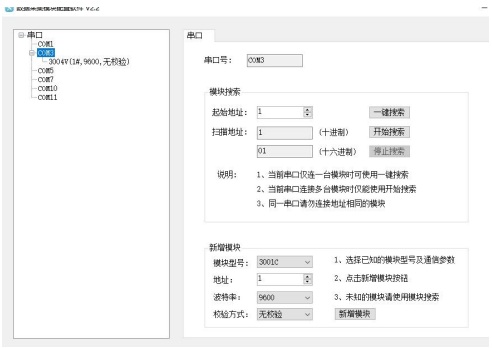
Instructions

一、Open the TD-4000 configuration software through the Start menu shortcut or desktop shortcut. Right click on 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;

二、By left clicking on the serial port number connected to the module with the mouse, multiple functional areas will appear in the pop-up interface. If the software pops up a prompt box indicating that the serial port cannot be connected, please check if the serial port is normal or if it is occupied by other software;



1、Communication configuration is used to set the communication timeout and communication interval of the upper computer. Communication timeout refers to the maximum time that the software waits for the module to return data after sending instructions. If the software fails to receive the returned data within this time, it is considered as a communication failure. Communication interval refers to the time that the software waits for after completing one instruction sending before sending the next instruction. After entering the value to be set, click Apply to proceed;

2、Module search is used to search for module information (device model, communication address, baud rate, verification method). One click search is when the software sends a universal search command to the module (module firmware version must be B0.01 or above, and only one module can be connected to the same serial port). This function can directly obtain module information. The start of the search starts from the starting address and polls the search for module information (supports all firmware versions, and multiple modules with different communication addresses can be connected to the same serial port). It automatically stops when the address is found to 255. The stop of the search stops in advance during the polling search process, and the searched module information will be displayed below the serial port number, as shown in the above figure. The information content is: Yes: device model, communication address, baud rate, verification method;

3、Adding a new module is used to manually add module information. If the information of the module is already known in advance, select a known module model in the module model, a known module address in the address, a known module baud rate in the baud rate, a known module verification method in the verification method, and click on the new module, the new information will be displayed below the serial port number;

四、After obtaining module information, the software will automatically connect to the module by clicking on the module information with the left mouse button, 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, the module's address, baud rate, and verification method can be set. In the communication parameter setting area, select the address, baud rate, and verification method to be modified, and then click the setting button. If the setting is successful, the software will pop up a prompt box, and the module needs to be searched again, If a modification failure prompt box pops up, it is necessary to check if there is a fault.

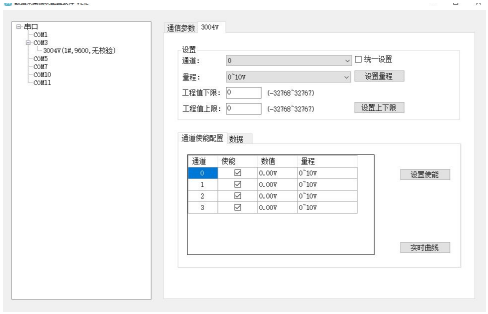
2、TD-300X page is used to view module measurement values, configuration parameters, and modify configuration parameters

(1)、Range configuration, select the channel you want to configure from the channel dropdown box, select the range you want to configure from the range dropdown box, and then click set range. If you want all channels to be set to the same range, you can check the unified setting and click set range.

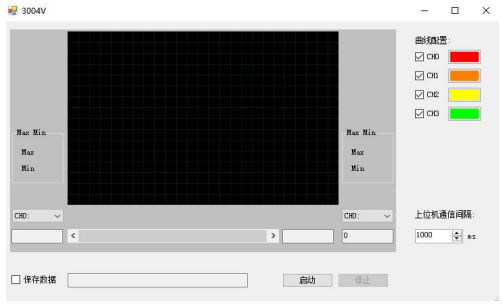
(2)、To configure the upper and lower limits of engineering values, select the channel you want to configure from the channel drop-down box. In the input box for the upper and lower limits of engineering values, enter the upper and lower limits of the engineering values you want to configure, and click Set Upper and Lower Limits. If you want all channels to be set to the same engineering value upper and lower limits, you can check the unified setting option and then click Set Upper and Lower Limits.

(3)、Set enable, select the enable status of the corresponding channel in the selection box on the channel enable configuration page (check to enable, uncheck to disable), and then click Set Enable.

(4)、Real time curve, click the real-time curve button, and the software will pop up the real-time curve interface.



3、The real-time curve interface is shown in the figure



(1)、The highest end of the curve interface corresponds to the upper range limit, and the lowest end of the curve interface corresponds to the lower range limit;

(2)、Check or cancel the channel configuration selection box to select whether to display the corresponding channel's curve;

(3)、Click on the color palette in the channel configuration to select the corresponding curve color for the channel;

(4)、Select the channel dropdown box on the left and right sides of the interface to display the measured values and extreme values of the corresponding channel;

(5)、Enter the collection interval and click on the application to set the cycle for reading data;

(6)、Check the save data selection box to save channel measurement data as CSV file (Excel can be opened);

(7)、Click the Select Save Path button to reselect the file name and path to be saved;

(8)、Click the start button, and the software will start recording data;

(9)、Click the stop button to stop the software from recording data;

(10)、In the stopped state, sliding the scroll bar below the curve can view the recorded data;

TD-300X
Analog acquisition module
User Manual (User Manual)

Profile

The TD-300X is a single ended unipolar analog signal acquisition series product (supported channel numbers and ranges are shown in the table below). The application layer adopts the standard MODBUS-RTU protocol, which is suitable for various industrial occasions and automation systems. Convenient communication with the upper computer, enabling fast networking and construction of monitoring systems.

Model	Channels	Range
TD-3001C	1	4~20mA，0~20mA
TD-3001V	1	0~5V，0~10V
TD-3001S	1	4~20mA，0~20mA，0~5V，0~10V
TD-3002C	2	4~20mA，0~20mA
TD-3002V	2	0~5V，0~10V
TD-3002S	2	4~20mA，0~20mA，0~5V，0~10V
TD-3004C	4	4~20mA，0~20mA
TD-3004V	4	0~5V，0~10V
TD-3004S	4	4~20mA，0~20mA，0~5V，0~10V

Main technical parameters

INPUT

Number of channels: as shown in the table above
Input range: As shown in the table above
Input method: Single ended unipolar input
Sampling frequency: ≤ 8Hz (total, supporting 50/60Hz power frequency suppression), (channel sampling rate=total sampling rate/number of enabled channels, 2Hz when all 4 channels are fully enabled)
Accuracy level: ≤ 0.1%
Input impedance: Current: 50 Ω, Voltage: 1M Ω
Attention: When the voltage range is open circuit, a certain voltage value will be measured

Communication end

Signal type: RS-485 digital signal
Baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200bps
Verification method: No verification, odd verification, or even verification
Data bit: 8 bits Stop bit: 1 bit
Communication protocol: Standard MODBUS-RTU protocol
Communication distance: 1200m (typical value)

Basic parameters

Power supply: DC24V, voltage range: DC 9-30V
Power consumption:<1.5W @ DC 24V
Electromagnetic compatibility: in accordance with GB/T 182681 (IEC 6132-1)
Applicable on-site equipment: Configuration software, PLC, touch screen, computer and other devices that support MODBUS RTU protocol

Indicator light status

1. After power on, the indicator light remains on. If it does not light up, it indicates a power failure or poor contact;
2. During normal communication, the indicator light flashes;
3. When there is no communication, the indicator light flashes, indicating a module failure

Default factory parameters

Device address: 1 Baud rate: 9600bps Verification method: No verification
Data bit: 8 bits Stop bit: 1 bit
Channel range: both C-type and S-type are set to 4-20mA range, while V-type is set to 0-10V, and the acquisition status is enabled;

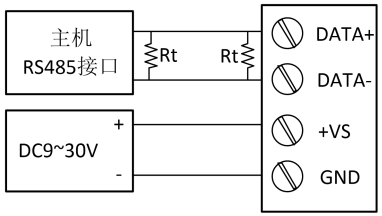
Usage environment

(1) There should be no strong vibrations, impacts, high currents, sparks or other electromagnetic induction effects in the surrounding environment. The air should not contain media that corrode chromium, nickel, and silver coatings, and should not contain flammable or explosive substances;
(2) Continuous working temperature: -40 ℃~+85 ℃;
(3) Relative humidity: 10%~90% RH (without condensation);

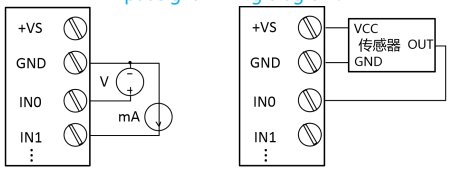
Wiring instructions

Communication and power wiring diagram:

The RS485 communication line is connected hand in hand. If a star connection is required, please add a splitter. The terminal resistor Rt can be added at both ends of the communication line as needed.

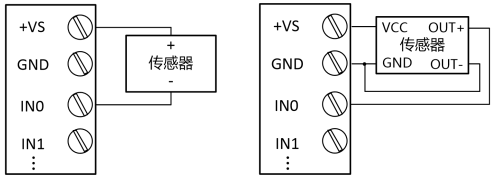


Input signal wiring diagram:



Voltage and current can be input simultaneously (Only supported by 3002S and 3004S)

Three wire sensor wiring



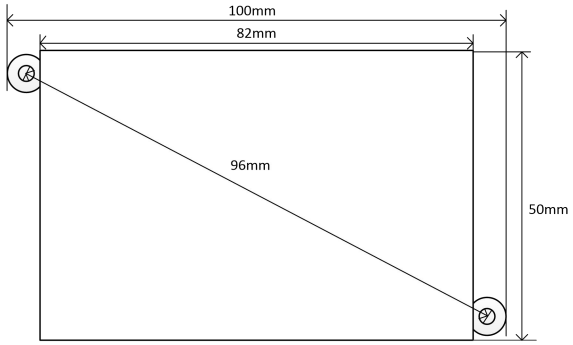
Two wire sensor wiring

Four wire sensor wiring

Wiring Terminal Description

Terminal name	Text Description
DATA+	RS-485 Positive end of communication interface
DATA-	RS-485 Negative end of communication interface
+VS	External power supply positive terminal (9~30V)
GND	External power supply negative terminal (grounded)
IN0	Analog input channel 0 positive end
IN1	Analog input channel 1 positive end
IN2	Analog input channel 2 positive end
IN3	Analog input 3-channel positive terminal

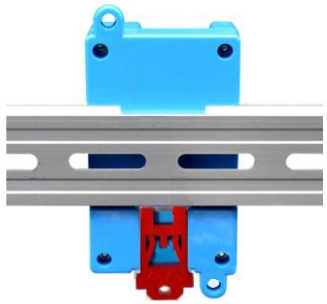
External dimensions



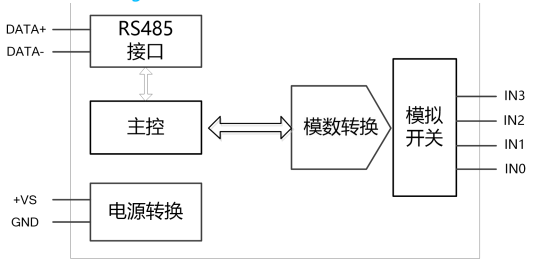
Note: Height 32mm, diagonal mounting hole diameter 4mm

Install

TD-300X adopts DIN35mm guide rail installation method. The guide rail should comply with the installation dimension specifications of TH35-7.5 guide rails in the national standard GB/T19334-2003. This standard is equivalent to the international standard of the International Electrotechnical Commission (IEC 60715-1981). The installation must be stable and firm.



Internal structure diagram



Note:
3001C、3001V和3001S only include IN0;
3002C、3002V和3002S only include IN0和IN1;

■ Communication point table

Point table	Attribute	Description	Value range and description
40001 40002 40003 40004	16 bit unsigned Read-only register	Corresponding to 40001-40004 Measurement digital values for channels 0 to 3	0-4095 corresponds to the lower and upper limits of the input range, such as the 4-20mA range: 0 corresponds to 4mA, 4095 corresponds to 20mA, showing a linear relationship
40009 40010 40011 40012	16 bit unsigned Read-only register	Corresponding to 40009-40016 Measurement raw values for channels 0 to 3	-32768~32767, corresponding relationship: 1000 times the current values of 4-20mA and 0-20mA; 1000 times the voltage values of 0-10V and 0-5V; For example, if the range is 0-10V and the reading value is 1123, the actual value is 1.123V
40017 40018 40019 Lower limit of engineering value for channel 3	16 bit unsigned Read-only register Lower limit of engineering value for channel 3	Corresponding to 40017-40004 Measurement engineering values for channels 0 to 3 Lower limit of engineering value for channel 3	-32768~32767, related to the upper and lower limits of engineering values and measurement values; For example, in a 4-20mA range, the upper limit of the engineering value is 1000, and the lower limit of the engineering value is 0. When a 10mA current is connected, the engineering value is 375 Lower limit of engineering value for channel 3
40101	16 bit unsigned Read and write registers Power failure storage Firmware version only: Effective for B0.01 and above	Lower limit of engineering value for channel 0	-32768~32767, The lower limit of engineering value corresponds to the lower limit of measurement range The engineering value upper limit corresponds to the range upper limit For example, if the range is 4-20mA and the sensor range is 0-1.6Mpa, the lower limit of the engineering value can be set to 0 and the upper limit of the engineering value can be set to 16000. When the engineering value of the corresponding channel is read as 3954, the actual value is 0.3954Mpa
40102		Channel 0 engineering value upper limit	
40103		Lower limit of engineering value for channel 1	
40104		Channel 1 Engineering Value Upper Limit	
40105		Lower limit of engineering value for channel 2	
40106		Upper limit of engineering value for channel 2	
40107		Lower limit of engineering value for channel 3	
40108		Upper limit of engineering value for channel 3	
40201 40202 40203 40204	16 bit Read and write registers Power failure storage	The input range for channels 0 to 3 corresponding to channels 40201-40208	4~20mA Code is 0x0007 0~10V Code is 0x0048 0~5V Code is 0x0049 0~20mA Code is 0x004D

point table	attribute	Function Description	Value range and description
40211	16 bit Read-only register	Type 1	0X300X(X is1、2 or 4)
40212		Type 2	0X4300，0X5600or 0X5300
40213		Firmware version	0X0000~0XFFFF
40215	16 bit Read and write registers Power failure storage	Device communication address	0X0001~0X00FF Address representing the device
40216		BAUD	0：is 1200bps 1：is 2400bps 2：：is 4800bps 3：：is 9600bps 4：：is 19200bps 5：：is 38400bps 6：：is 57600bps 7：：is 115200bps
40217		Parity	0：No parity 1：Odd check 2：even parity check

Note：

TD-3001C、TD-3001V、TD-3001S Only channel 0 related point table is valid；

TD-3001C、TD-3001V、TD-3001S Only channel 0 and 1 related point tables are valid；

TD-3001C、TD-3001V、TD-3001S The relevant point tables for channels 0 to 3 are all valid；

■ Formula for calculating numerical values

RANGE	Calculation formula (D is a numerical value, 16 bit unsigned integer)
4~20mA	D ÷ 4095 × 16 + 4 (mA)
0~10V	D ÷ 4095 × 10 (V)
0~5V	D ÷ 4095 × 5 (V)
0~20mA	D ÷ 4095 × 20 (mA)

TD-300X
Analog acquisition module
User Manual (Programming Section)

■ MODBUS-RTU协议

Profile

The MODBUS-RTU protocol specifies multiple function codes to achieve different functions. TD-3000 series products only support some of these function codes, and this manual only explains the used function codes. TD-4000 series products support function codes such as 0X01, 0X03, 0X04, 0X06, 0X05, 0X0F, 0X10, among which TD-300X does not support function codes 0X01, 0X05, and 0X0F. The corresponding point table addresses and function descriptions for function codes are shown in the table below:

Function code	Corresponding point table 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 coil (single bit data) states
0X03	4XXXX	Read values from multiple registers
0X04	4XXXX	Read values from multiple registers (0X03 can be replaced)
0X06	4XXXX	Write a single register value (0X10 can be replaced)
0X10	4XXXX	Write multiple register values

Function code0X01

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

Description	Byte count	Value range
Device Address	1byte	0X0001~0X00FF
Function code	1byte	0X01
start address	2bytes	0X0000~0XFFFF
Number of coils	2bytes	0X0001~0X0040
CRC check	2bytes	0X0000~0XFFFF

2、The slave returns a message structure, where each bit of the coil state data represents a coil state 1=ON and 0=OFF, and the LSB (least significant bit) of the first data byte represents the coil state of the starting address. The other coils follow in sequence until the highest bit of this byte, and in subsequent bytes, they follow the order from low to high.

Description	Byte count	Value range
Device Address	1byte	Module address
Function code	1byte	0X01
Bytes of coil status	1byte	N(NOTE)
Coil status	N byte	Large end mode, high byte first
CRC check	2byte	0X0000~0XFFFF

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

3. For example, reading the status of 24 coils from 00001 to 00024 of a module with address 1,

Host sends message: (message in hexadecimal format)

3、For example, reading the status of 24 coils from 00001 to 00024 of a module with address 1,

Host sends message: (message in hexadecimal format)

01	01	00	00	00	18	3C	00
Module address	Function code	Starting address high byte	Starting address low byte	Number of coils high byte	Number of coils low byte	CRC 校验	CRC 校验

Slave return message: (message in hexadecimal format)

01	01	03	01	03	07	2C	BC
Module address	Function code	Coil status	Coil status byte 0	线圈状态字节 1	线圈状态字节 2	CRC 校验	CRC 校验

The message returned by the slave contains 3 bytes of coil status bytes:

Byte 0:0X01 is binary and represents 0000 0001. From right to left (i.e. from the lowest byte to the highest byte), it represents that the states of 00001~00008 are ON, OFF, OFF, OFF, OFF, OFF, OFF, OFF, OFF,

Byte 1: 0X03 binary is 0000 0011, from right to left (i.e. from the lowest byte to the highest byte) represents that the states of 00009~00016 are ON, ON, OFF, OFF, OFF, OFF, OFF, OFF, OFF,

Byte 2:0X07 binary is 0000 0111, from right to left (i.e. from the lowest byte to the highest byte) represents 00017~00024 status as ON, ON, ON, OFF, OFF, OFF, OFF, OFF, OFF, OFF,

Function code0X0F

1. The request message structure sent by the host, where the starting address and number of registers are represented in a large end manner, and the starting address needs to be subtracted by one from the point table address. For example, if 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 follow in sequence until the highest bit of this byte, and in subsequent bytes, they follow the order from low to high.

Description	Byte count	Value range
Device Address	1byte	0X0001~0X00FF
Function code	1byte	0X0F
start address	2bytes	0X0000~0XFFFF
Number of coils	2bytes	0X0001~0X0040
Bytes of coil status	1bytes	N
Coil status	Nbytes	
CRC check	2bytes	0X0000~0XFFFF

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

2. The message structure returned from the machine is equivalent to the first 6 bytes of the host message plus 2 bytes of CRC verification;

Description	Byte count	Value range
Device Address	1byte	0X0001~0X00FF
Function code	1byte	0X0F
start address	2byte	0X0000~0XFFFF
Number of coils	2byte	0X0001~0X0040
CRC check	2byte	0X0000~0XFFFF

3、For example, set the states of the 8 coils in modules 00017~00024 with addresses 1 to: ON, OFF, ON, OFF, OFF, OFF, OFF, OFF, OFF;Host sends message:

(message in hexadecimal format)

01	0F	00	10	00	08	01	05	FF	55
Module address	Function code	Starting address high byte	Starting address low byte	Number of coils high byte	Number of coils low byte	Bytes of coil status	Coil status byte 0	CRC check	CRC check

The binary value of coil status byte 0:0X05 is 0000 0101. From right to left (i.e. from the lowest bit to the highest bit of the byte), it represents that the states of 00017~00024 are ON, OFF, ON, OFF, OFF, OFF, OFF, OFF, OFF,

Slave return message: (message in hexadecimal format)

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

Function code0X03

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

Description	Byte count	Value range
Device Address	1byte	0X0001~0X00FF
Function code	1byte	0X03
start address	2bytes	0X0000~0XFFFF
Number of Registers	2bytes	0X0001~0X0040
CRC check	2bytes	0X0000~0XFFFF

2、The slave returns a message structure, with each register occupying 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., in the large end mode);

Description	bytes	Value range
Device address	1byte	Module address
Function code	1byte	0X03
Register Value Bytes	1byte	2*N
Register value	2*N byte	Large end mode, high byte first
CRC check	2bytes	0X0000~0XFFFF

Note: N=Number of registers

3. For example, reading the values of two registers from 40009 to 40010 in the module with address 1,

Host sends message: (message in hexadecimal format)

01	03	00	08	00	02	45	c9
Module address	Function code	Starting address high byte	Starting address low byte	Number of registers high byte	Number of registers low byte	CRC check	CRC check

Slave return message: (message in hexadecimal format)

01	03	04	F1	03	F7	FF	3E	BF
Module address	Function cod	Register Value Bytes	Register Byte 0	Register Byte 1	Register Byte 2	Register Byte 3	CRC check	CRC check

	e							

The message returned by the slave contains a register value of 4 bytes in total: Byte 0 and byte 1 are the values of register 40009, represented in hexadecimal as 0XF103, converted to 16 bit unsigned number as 61699, converted to 16 bit signed number as -3837, byte 2 and byte 3 are the values of register 40010, represented in hexadecimal as 0Xf7ff, converted to 16 bit unsigned number as 63487, converted to 16 bit signed number as -2049,

Function code 0X10

1. The request message structure sent by the host, where the starting address and number of registers are represented in a large end manner. The starting address needs to be removed from the starting 4 of the point table address 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., in a large end manner);

Description	Byte count	Value range
Device Address	1byte	0X0001~0X00FF
Function code	1byte	0X10
start address	2bytes	0X0000~0XFFFF
Number of Registers	2bytes	0X0001~0X0040
Register Value Bytes	1byte	2*N
Register value	2*N byte	Large end mode, high byte first
CRC check	2bytes	0X0000~0XFFFF

Note: N=Number of registers

2. The message structure returned from the machine is equivalent to the first 6 bytes of the host message plus 2 bytes of CRC verification;:

Description	Byte count	Value range
Device Address	1byte	Module address
Function code	1byte	0X10
start address	2byte	0X0000~0XFFFF
Number of Registers	2bytes	0X0000~0X0040
CRC check	2bytes	0X0000~0XFFFF

3.For example, for modules 40002-40003 with address 1, set the values of the two registers 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	Starting address high byte	Starting address low byte	Number of registers high byte	Number of registers low byte	Register Value Bytes

F0	03	00	07	B0	A1	
Register value byte 0	Register value byte 1	Register value byte 2	Register value byte 3	CRC check	CRC check	

Slave return message:

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