Blue Guardian Temperature Control: Precise Temperature Regulation

User Manual for TMA Series Temperature Control Equipment

V1.20

Update record for the manual			
Date	Edition	Update content	Remarks
2023-02-10	V1.00	Initial release	
2023-03-01	V1.01	Optimize the content of <2.4 section> and <3.3 section>	
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If you encounter any difficulties or technical issues while using the modular temperature control system, please contact us promptly. We will provide you with the most satisfactory and timely technical support. We also welcome your valuable feedback.

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Blue Guardian Temperature Control: Precise Temperature Regulation

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pay attention to

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scope of application

This instruction manual is applicable to the use of modular temperature control equipment (TMA\\TEB\\TEU\\TEN\\TEC\\TES) products.

Catalogue

Preface

Company Profile

Guangzhou Blue Guardian is a high-tech enterprise specializing in industrial temperature control, automation control, and information system integration. It provides precise temperature control, environmental monitoring, and industrial data interconnection solutions for industries such as optoelectronic manufacturing, semiconductors, thermal equipment, new energy, rubber and plastics, and research institutions.

With the mission of "Smart Temperature Control for More Efficient and Safe Industries", the company provides customers with a series of temperature control products featuring high-precision data acquisition and intelligent control algorithms. These include modular thermostats, TEC thermostats, integrated thermostats, power regulators, I/O acquisition modules, protocol gateways, and host computer software platforms.

unit type

Device name	Model	Remarks
Combination temperature control equipment	TMA\TEB\TEU\TEN\TEC\TES	

Suitable Object

Applicable to: R&D engineers, technical support engineers, and end users

Brief Introduction of the Content

This document describes the use of temperature control module equipment.

Chapters and sections	Content	Remarks
1 Device Features	Introduce the overall function and performance index parameters of the equipment	
2 Device installation and connection	Introduction to Equipment Installation and Wiring Marking	
3 Device application and debugging	Introduction to the networking and debugging of equipment application groups	
4 Common faults	Introduction to the common equipment failure and troubleshooting	
5 Maintenance	Introduce the maintenance of the equipment	
6 safety requirements	Safety tips for device use	

1 Device Features

About this chapter

Chapters and sections	Content	Remarks
1.1 Device Overview	Introduce the basic device information	
1.2 demonstration of the type	Introduce the device model and combination usage instructions	
1.3 Device features	Introduce the basic features of the device	
1.4 TMA parameters	Introducing the detailed parameters of temperature control module TMA	
1.5 TEB parameters	Display detailed parameters of the output module TEB	
1.6 TEU parameters	Display TEU detailed parameters for the output module	
1.7 TEN parameters	Introducing the detailed parameters of the temperature control module TEN	
1.8 Temperature Emission Control Module (TEC) parameters	Introducing the detailed parameters of temperature control module TEC	
1.9 Serial acquisition module (TES) parameters	Introducing the detailed parameters of the serial port module TES	

1.1 Device Overview

The combination temperature control equipment is a multi-channel control output and temperature acquisition temperature control equipment which can be expanded by modules.

64 The system features DO/AO control outputs, 64 temperature control channels, and 192 inspection channels. It also provides a single RS485 interface for connecting to a host computer.

The device connects to an external temperature collector via a single RS485 interface for downlink communication. It uses the standard Modbus RTU protocol and supports up to 16 devices.

The device uses the 485 bus.

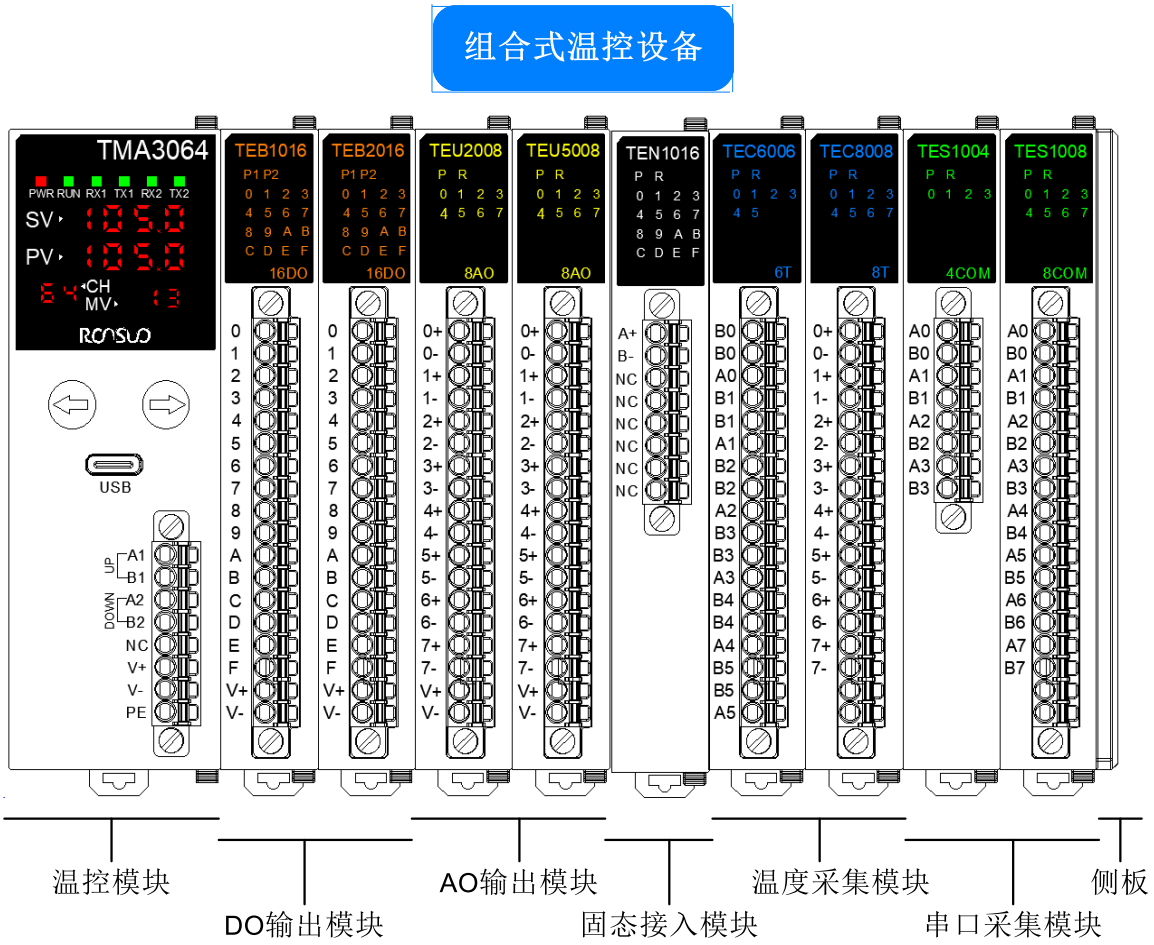
The temperature control module features a display screen that shows SV, PV, CH, MV values and alarm codes. The device offers precise temperature control.

It features high accuracy, excellent stability, strong anti-interference capability, and multi-stage over-temperature protection. The system halts output when the controlled temperature triggers an over-temperature alarm.

The alarm output is disabled when the upper limit is reached, which effectively protects the safety of the controlled items.

1.2 Demonstration of the Type

The modular temperature control system consists of a temperature control module (TMA), output expansion modules (DO/TEB/AO/TEU), a regulator access module (TEN), a temperature acquisition module (TEC), and a serial acquisition module (TES). When connected to an external temperature acquisition board, the system requires only the 485 interface on the TMA's downstream side.**For integrated deployment, the TEB/TEU/TEN modules must be directly connected to the TMA host unit**. The system configuration model is illustrated in the diagram below:



Device model list:

Order number	class	Name	Model	Explain
1	Temperature control host	Temperature control module	TMA1864	Features 8-channel NPN outputs, expandable to TEB/TEC/TES, with a maximum of 64 channels
2		Temperature control module	TMA2864	Features 8 PNP outputs and supports expansion to TEB/TEC/TES, with a maximum of 64 outputs.
3		Temperature control module	TMA3064	Scalable TEB/TEU/TEC/TES, with a maximum of 64 output channels
4	DO module	Output expansion module	TEB1016	16 NPN output expansion module for use with TMA
5		Output expansion module	TEB2016	16 The PNP output expansion module is designed to work with TMA.
6	AO module	Output expansion	TEU2008	8 AO output expansion module, 0~10V, compatible with

		module		TMA
7		Output expansion module	TEU5008	8 AO output expansion module, 4~20mA, compatible with TMA

8	Solid state comm-unication module	Regulator Access Module	TEN1016	The regulator access module supports 16 SxA or SUD power regulation modules connected via the 485 bus, designed for use with TMA.
			TEN2064	The regulator access module supports connecting 8 SSA 1008 power regulation modules in series via an RJ45 interface, designed for use with TMA.
9	AI module	Temperature Coll-ection Module	TEC6006	6 The PT100 acquisition module, available in 3-wire or 2-wire configurations, is designed for use with TMA.
10		Temperature Coll-ection Module	TEC8008	8 K/T-type acquisition module, designed for use with TMA
11	Serial module	Serial data acquisi-tion module	TES1008	8 The serial port acquisition module connects to the acquisition board and works with TMA.
12		Serial data acquisi-tion module	TES1004	4 The serial port acquisition module connects to the acquisition board and works with the TMA.

1.3 Device Features

1.3.1 Industrial-Grade Design

- High performance industrial 32-bit processor
- Supports long-term stable operation at-20 to 85°C
- High-temperature resistant, flame-retardant injection-molded casing

1.3.2 Reliability and Stability

- With a watchdog design, the system ensures long-term stable operation
- Adopt a robust protection mechanism to ensure equipment stability
- Built-in surge protection for power supply and RS485 interface
- Input power interface anti-reverse connection protection
- DO/AO output short-circuit protection function

1.3.3 Product Usability

- The equipment is installed with standard DIN35 guide rails and can be assembled using modular splicing.
- The device features industrial-grade spring-type terminals (screw-free), ensuring easy installation.
- Supports plug-and-play without complex configuration
- The device has a display for on-site viewing
- The device supports the Modbu-RTU protocol.
- The device has a TYPE-C debugging interface for on-site debugging
- Supports unified configuration management for dedicated host computer software

1.3.4 Product Features

- Supports flexible modular combinations (TMA+TEB+TEU+TEN+TEC+TES) for versatile system integration
- Supports up to 64 control outputs (DO type: NPN or PNP; AO type: 0~10V or 4~20mA)
- The temperature control module supports 64 temperature control channels and 192 inspection channels.
- Supports the Modbus RTU standard protocol and function codes 01,03,05,06,15, and 16.
- The temperature control module supports RS485 bus communication (up to 16 devices) with optically isolated RS485 interface.
- All modules feature standard DIN35 rails for easy installation, with compact designs that minimize space requirements.
- The temperature control module supports open PID parameter settings, allowing independent configuration for each channel.
- multiple overtemperature protection mechanism
- Temperature control accuracy: ≤±0.5℃
- Configuration parameter power failure retention

1.4 TMA Parameters

The temperature control module is available in three variants: TMA3064 (TEB/TEU/TEN/TEC/TES expandable module, host module without output); TMA1864 (TEB/TEC/TES expandable module with 8-channel NPN DO output); and TMA2864 (TEB/TEC/TES expandable module with 8-channel PNP DO output). Detailed specifications for each model are provided below.

Technical parameters of TMAxx64 temperature control module				
Project		TMA3064	TMA1864	TMA2864
Module power supply	Mode of connection	8P-3.50 spring terminal, power input occupies 3P		
	Working voltage	24VDC（12~36V）		
	Module dissipation	≤1W		
	Power supply protection	Surge protection, static protection, anti-reverse connection protection		
Modular communication	Interface type	8P-3.50 spring terminal, 4P for RS485 communication (up/down)		
	Serial port count	2 RS485 communication interface (uplink to host computer, downlink to acquisition board)		
	Protocol	Standard Modbus-RTU protocol, supporting function codes 03,05,06, and 16		

	Communication mode	Supports RS485 bus usage (0x01~0x10)
	Serial port parameters	Baud rate: 9600,19200,38400 (default), and 115200 Check bit: None, data bit: 8, stop bit: 1

	Transmission distance	⩽1000m	
	Isolation method	Photoelectric isolation	
	Serial port protection	Surge protection and electrostatic protection	
Outgoing channel	Interface type	–	9P spring terminal
	Output channels	–	8 Road DO
	Output type	–	NPN mould / PNP mould
	Drive current	–	⩽60mA/ channel
	Output protection	–	Short-circuit protection
Combined application extension module	Extension Module	TEB/TEU/TEN/TEC/TES	TEB/TEC/TES
	Maximum output channel	64 Road DO or AO output	64 Road Output
	Extended Channel Type	(DNPN or PNP) AO (0~10V or 4~20mA)	(DNPN or PNP)
	Extended acquisition channel	The temperature control module supports 64 temperature control channels and 192 inspection channels.	
Design feature	Shell material	High temperature resistant and flame retardant PC	
	Way to install	Standard DIN35 guide rail installation	
	Product size	Height 100mm*Width 34mm*Depth 71mm	
Service environment	Working temperature	-20~85℃	
	Storage temperature	-20~105℃	
	Working humidity	10~95% (no condensation)	

1.5 TEB Parameters

The output expansion modules (DO) are available in two variants: NPN and PNP. The TEB1016 supports 16 NPN-channel outputs, while the TEB2016 supports 16 PNP-channel outputs. The technical specifications for both models are detailed below.

TEBx016 Output Extension Module Technical Specifications			
Project		TEB1016	TEB2016
Module power supply	Mode of connection	18P-3.50 spring terminal, power input occupies 2P	
	Working voltage	24VDC (12~36V), external power input	
	Module dissipation	≤0. 1W	
	Power supply protection	Anti-inversion protection	
Outgoing channel	Interface type	18P-3.50 spring terminal, occupies 16P	
	Output channels	16 Road DO	
	Output type	NPN mould	PNP mould
	Drive current	≤60mA/ channel	
	Output protection	Short-circuit protection	
Usage mode	Combination Application	Use with TMA temperature control module	
Design feature	Outer shell material	High temperature resistant and flame retardant PC	
	Way to install	Standard DIN35 guide rail installation	
	Product size	Height 100mm*width 15.6mm*depth 71mm	
Service environment	Working temperature	-20~85℃	
	Storage temperature	-20~105℃	
	Working humidity	10~95% (no condensation)	

1.6 TEU Parameters

The output expansion module AO is available in two variants (0~10V and 4~20mA). The TEU2008 supports 8-channel 0~10V outputs, while the TEU5008 supports 8-channel 4~20mA outputs. The technical specifications for both models are detailed below.

Technical parameters of the TEUx008 output expansion module			
Project		TEU2008	TEU5008
Module power supply	Mode of connection	18P-3.50 spring terminal, power input occupies 2P	
	Working voltage	24VDC (18~36V), external power input	
	Module dissipation	≤0. 2W	
	Power supply protection	Anti-inversion protection	
Outgoing channel	Interface type	18P-3.50 spring terminal, occupies 16P	
	Output channels	8 AO Road	
	Output type	0~10V	4~20mA
	Output loading	＞500Ω	＜600Ω
	Output protection	Short-circuit protection	
Usage mode	Combination Application	Use with TMA temperature control module	
Design feature	Shell material	High temperature resistant and flame retardant PC	
	Way to install	Standard DIN35 guide rail installation	
	Product size	Height 100mm*width 15.6mm*depth 71mm	
Service environment	Working temperature	-20~85℃	
	Storage temperature	-20~105℃	
	Working humidity	10~95% (no condensation)	

1.7 TEN Parameters

The TEN1016 module can connect to two types of power regulation modules (SxA for DC-controlled AC solid-state and SUD for DC-controlled DC solid-state). The TMA supports one TEN module and 16 SxA or SUD connections. The TEN2064 supports 8 SSA1008 modules.

The power regulator and two TEN modules have the following detailed specifications:

Technical Parameters of TEN1016 Controller Access Module			
Project		TEN1016	TEN2064
Module power supply	Mode of connection	TMA host power supply	
	Module dissipation	≤0.3W	
External communication interface	Interface type	8P-3.50 Spring terminal	Standard RJ45 network port
	Number of channels	1 Road	
	Communication port type	RS485	RJ45 (Private Communication Interface)
	Enable access	16 SxA or 8 SUDs	8 An SSA1008
	Communication cycle	≤100ms	
	Transmission distance	≤1000m	The bus length is ≤30m (TEN to end SSA)
	Isolation method	Photoelectric isolation	–
	Serial port protection	Surge protection and electrostatic protection	Electrostatic protection
Usage mode	Combined application	Use with TMA temperature control module	
Design feature	Outer shell material	High temperature resistant and flame retardant PC	
	Way to install	Standard DIN35 guide rail installation	
	Product size	Height 100mm*width 15.6 mm*depth 71mm	Height 100mm*width 37.5mm* depth 71mm
Service environment	Working temperature	-20~85℃	
	Storage temperature	-20~105℃	
	Working humidity	10~95% (no condensation)	

1.8 Temperature Emission Control (TEC) Parameters

The temperature acquisition module is available in two variants: PT100 and thermocouple. The TEC 6006 supports 6-channel PT100 temperature acquisition, while the TEC8008 accommodates 8-channel thermocouple temperature acquisition. The technical specifications of these two models are detailed below.

Technical specifications of the TECx00x temperature acquisition module			
Project		TEC6006	TEC8008
Module power supply	Mode of connection	TMA host power supply	
	Module dissipation	≤0.2W	≤0.3W
Acquisition channel	Interface type	18P-3.50 Spring terminal	18P-3.50 spring terminal, occupies 16 P
	Number of acquisition channels	6 Road	8 Road
	Sensor type	PT100 (2-wire/3-wire)	K/N/E/J/T thermocouple
	Temperature range	0~250℃	K/N/E/J type (0~650℃), T type (0~400℃)
	Temperature measurement accuracy	≤±0.5℃	≤±1.0℃
	Resolution ratio	0.01℃	
	Sampling period	≤100ms	
Usage mode	Combination Application	Use with TMA temperature control module	
Design feature	Outer shell material	High temperature resistant and flame retardant PC	
	Way to install	Standard DIN35 guide rail installation	
	Product size	Height 100mm*width 15.6mm*depth 71mm	
Service environment	Working temperature	-20~85℃	
	Storage temperature	-20~105℃	
	Working humidity	10~95% (no condensation)	

1.9 Serial Acquisition Module (TES) Parameters

The serial acquisition module is an RS485 serial port type. The TES1004 model supports 4-channel serial acquisition, while the TES1008 model supports 8-channel serial acquisition. The parameter specifications of these two models are as follows.

Technical Parameters of TES100x Serial Data Acquisition Module			
Project		TES1004	TES1008
Module power supply	Mode of connection	TMA host power supply	
	Module dissipation	≤0.5W	
485 joggle	Interface type	8P-3.50 Spring terminal	18P-3.50 spring terminal, occupies 16P
	Number of channels	4 Road	8 Road
	Number of acquisition channels	A single module can collect up to 64 temperature channels	
	Communication cycle	≤100ms	
	Serial port type	RS485	
	Enable access	Temperature collector	
	Postal address	485 Interface communication address 0x01	
	Transmission distance	≤1000m	
	Isolation method	Photoelectric isolation	
	Serial port protection	Surge protection and electrostatic protection	
Usage mode	Combination Application	Use with TMA temperature control module	
Design feature	Outer shell material	High temperature resistant and flame retardant PC	
	Way to install	Standard DIN35 guide rail installation	
	Product size	Height 100mm*width 15.6mm*depth 71mm	
Service environment	Working temperature	-20~85℃	
	Storage temperature	-20~105℃	
	Working humidity	10~95% (no condensation)	

2 Device Installation and Connection

About this chapter

Chapters and sections	Content	Remarks
2.1 Device appearance dimensions	Describe the device's dimensions	
2.2 equipment installation	Introduce the installation steps and precautions	
2.3 Device interface functions	Introduce the functions of each interface of the device	
2.4 device wiring	Introduce the detailed wiring diagram of the equipment	

pay attention to ：

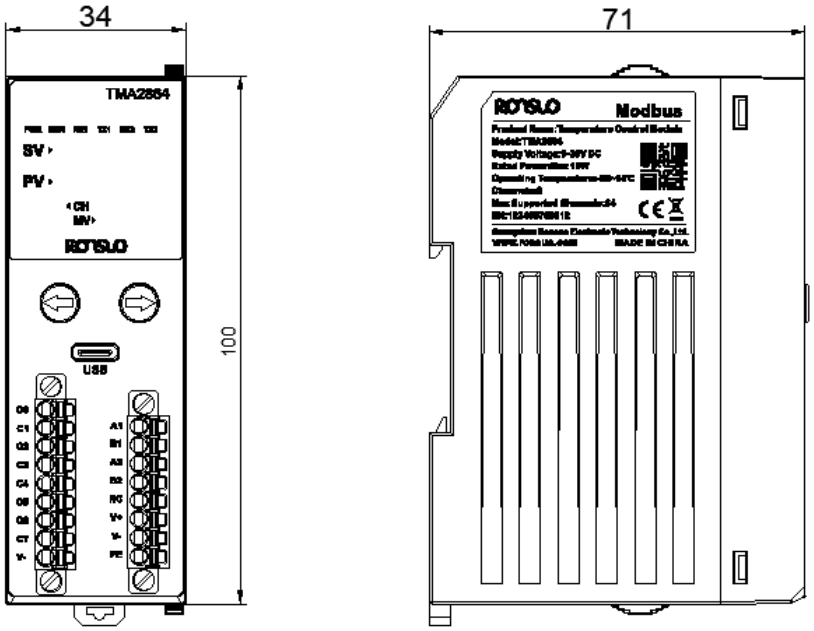
The modular temperature control system requires proper installation to achieve its designed functionality. Before installation, carefully read the user manual before proceeding. For any questions, please contact our company.

2.1 Device Appearance Dimensions

2.1.1 Dimensions of the Temperature Control Module

The temperature control module (TMAxx64) has dimensions ranging from 1 to 2, as shown in the figure below.

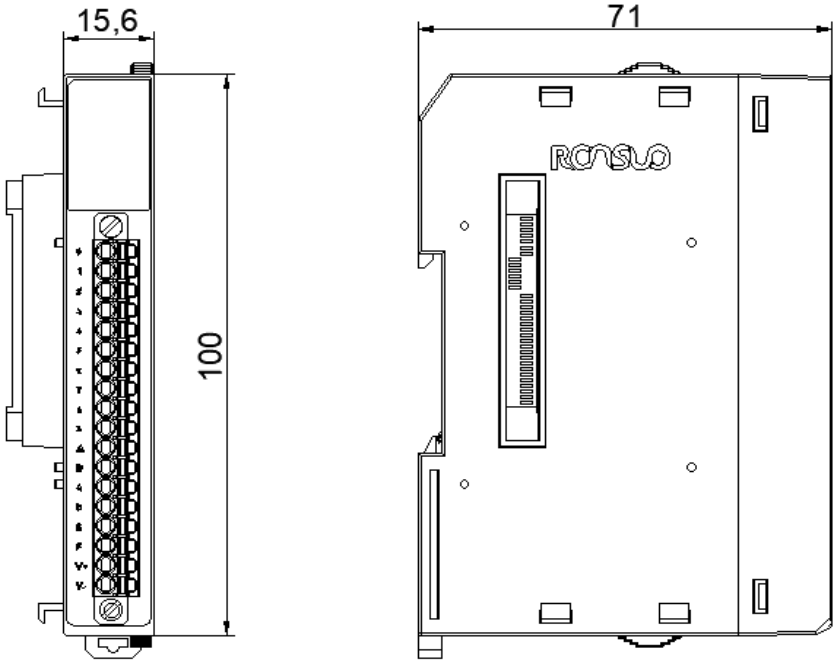
温控模块外观尺寸



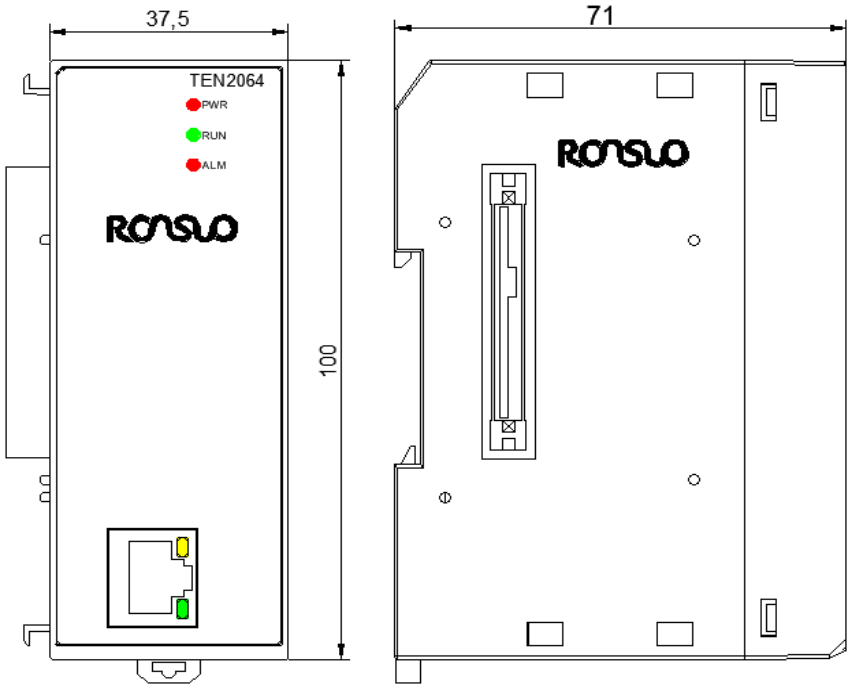
2.1.2 Extension Module Dimensions

The dimensions of the extended modules (TEB, TEU, TEN, TEC, and TES) and the TEN2064 are detailed in the figure below.

扩展模块外观尺寸



TEB/TEU/TEN1016/TEC/TES

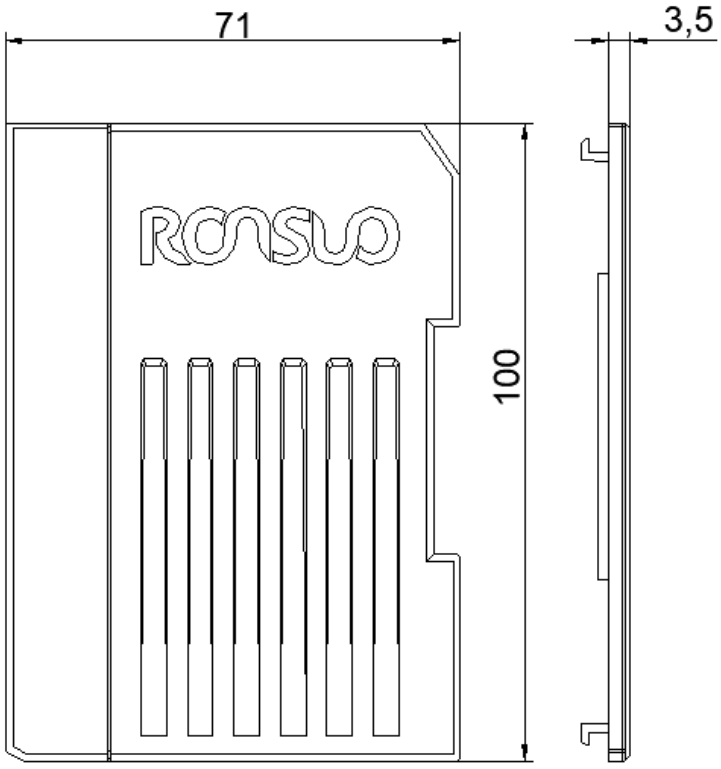


TEN2064

2.1.3 External Dimensions of the Side Panel

The side panel of the modular temperature control system is installed at the terminal end of the unit, with its dimensions shown in the figure below.

侧板外观尺寸



2.2 Equipment Installation

2.2.1 Installation Requirements

1、 Installation Notes

All modular temperature control units utilize standard DIN35 rails for easy installation. These units must be installed in electrical cabinets with rails and require a well-ventilated, dry installation environment. When installed in electrical cabinets, the rails must be properly grounded, and the front panel's grounding terminal (PE terminal) of the temperature control module must also be securely grounded.

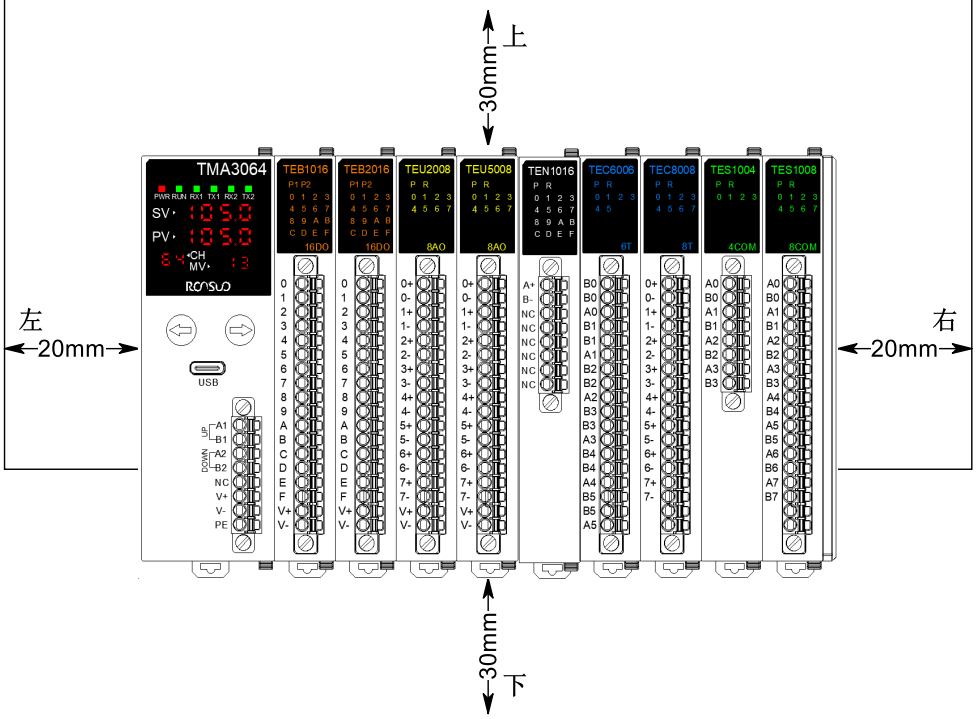
Do not install the modular temperature control equipment in environments with strong electromagnetic interference, humidity, or flammable/explosive conditions, as this may cause unnecessary malfunctions or accidents.

The installation sequence for modular temperature control systems requires the following configurations: TMA+TEB+TEC/TES modules, TMA+TEU+TEC/TES modules, or TMA+TEN+TEC/TES modules. The TEB, TEU, and TEN1016 modules must be directly connected to the TMA host before connecting the TEC or TES modules. When combined with TEN2064, the TEN2064 module must be installed at the end of the system. When all expansion modules are used with the TMA, only one of the following three models (TEB, TEU, or TEN) can be connected:

2、 Installation space requirements

When installing or removing modular temperature control devices, maintain a minimum operational clearance: at least 20mm between left and right sides, and at least 30mm between top and bottom. See the diagram below for details.

设备安装空间要求


上
30mm
左
20mm
右
20mm
30mm
下
TMA3064
TEB1016
TEB2016
TEU2008
TEU5008
TEN1016
TEC6006
TEC8008
TES1004
TES1008
USB

2.2.2 Device Module Installation

Install the assembled equipment module onto the DIN35 rail as shown in the following steps and diagrams.

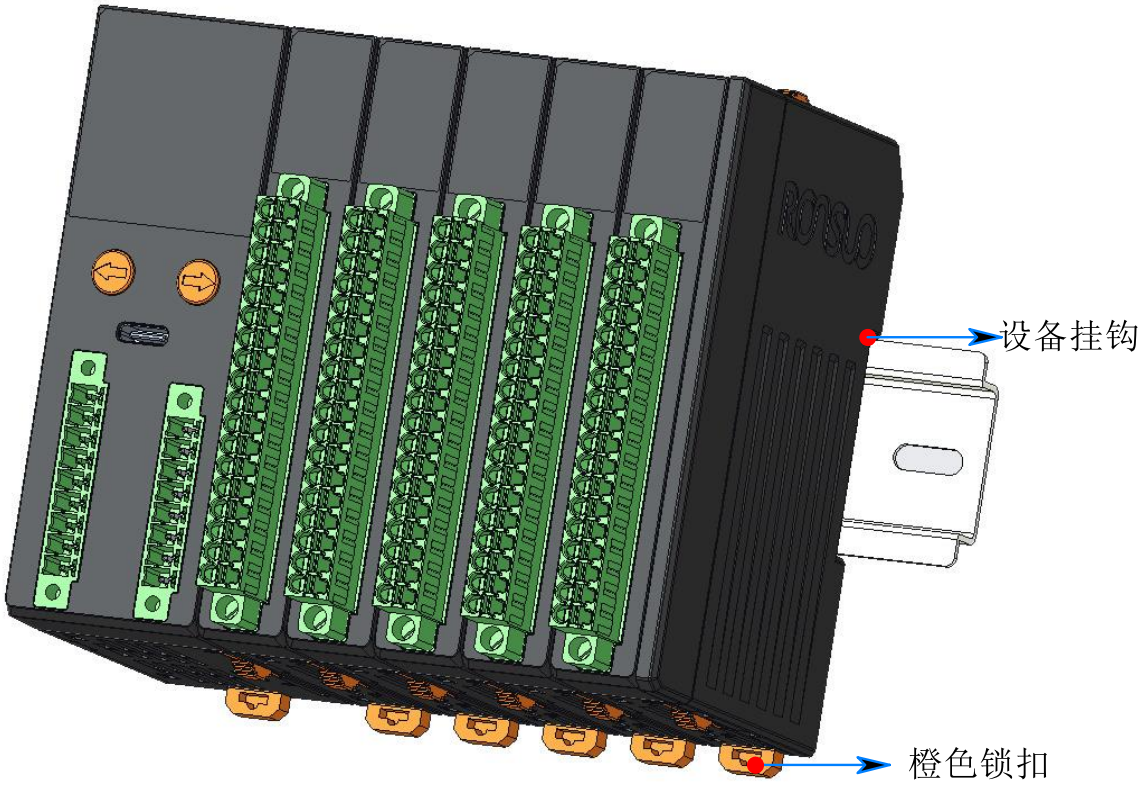
1、 Pull all the **orange clips** at the bottom of the device downward to release them;

2、 **Hook the combined device** to the DIN35 rail;

3、 Then pull the **orange buckle** at the bottom of the device upward to lock the device;

4、 The device is installed.

设备模组安装图



2.2.3 Add Module Installation

Add an expansion module (TEB, TEC, or TES) to the installed device, as shown below:

1、 Pull all the **orange clips** at the bottom of the module to be installed downward and release them;

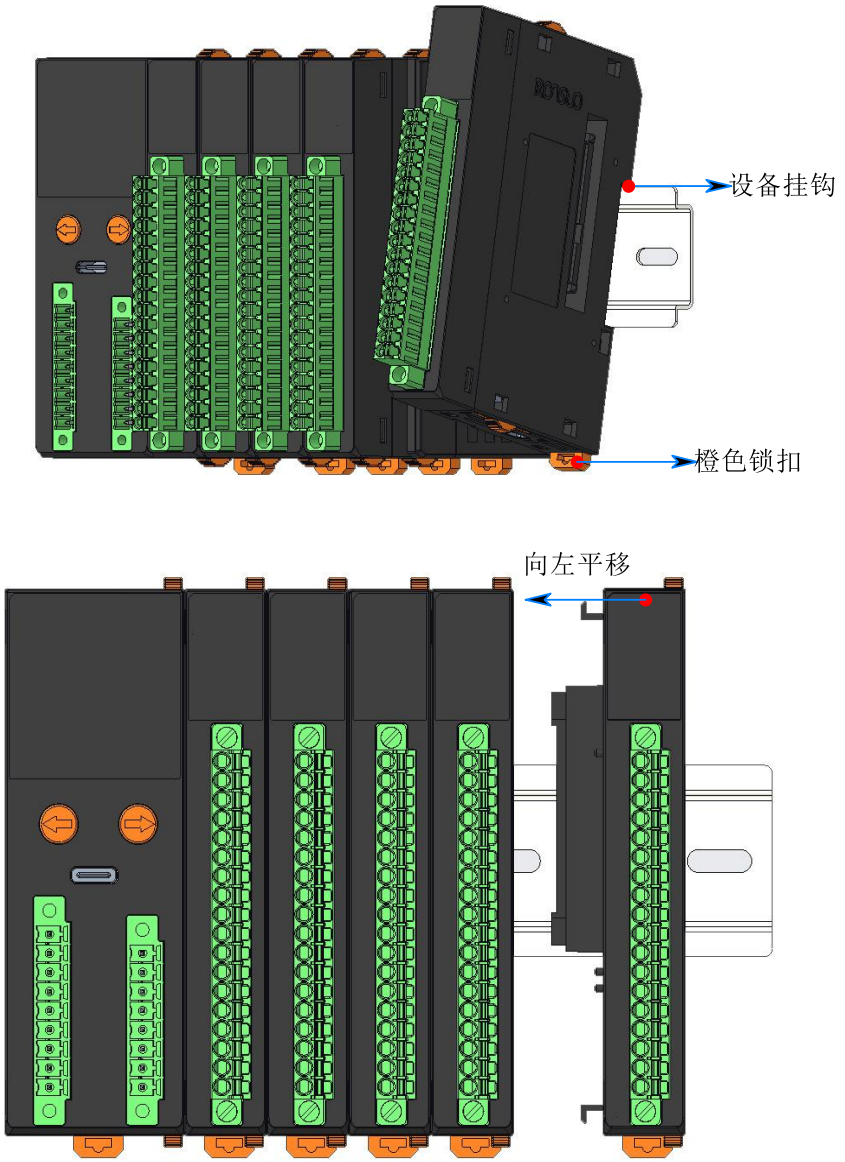
2、 **Hook the module** to the DIN35 rail;

3、 Then the module is **translated to the left** until the left module is integrated;

4、 Then pull the **orange buckle** at the bottom of the module upward to lock the equipment;

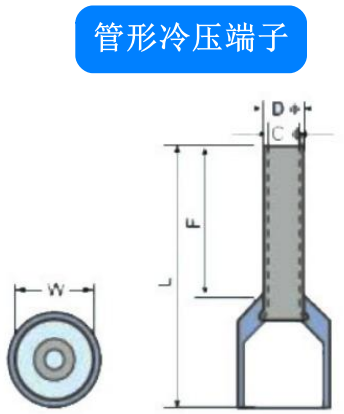
5、 Module installation is complete.

新增模块安装图



2.2.4 Equipment Wiring Requirements

The modular temperature control system employs plug-and-play spring-type terminals (3.50mm²) for both input and output ports. All connected wires must have a cross-sectional area of 2mm². When using the terminals, simply strip the insulation from the wire and connect it directly, or alternatively, utilize cold-pressed tube-type terminals for secure crimping. For cold-pressed tube-type terminal applications, follow the diagram below:



1、 Specifications for tubular cold-pressed terminals:

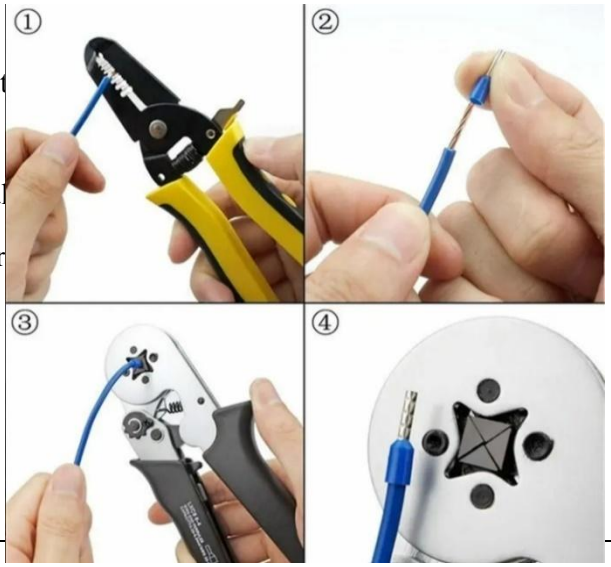
Conductor cross-section National standard mm²	Terminal size (-indicates no special requirements)				
	F	L	W	D	C
0.2~1.5	10.0mm	-	≤3.5mm	≤1.5mm	-

2、 Use a special wire crimping pliers (hexagonal) to crimp the wire. The operation steps are shown in the figure below: Note: 1) Use a wire stripper to pull off 10mm length of the wire at one end;

2) The wire end was pulled out and put pressed terminal;

3) Use a wire clamp to secure the terminal

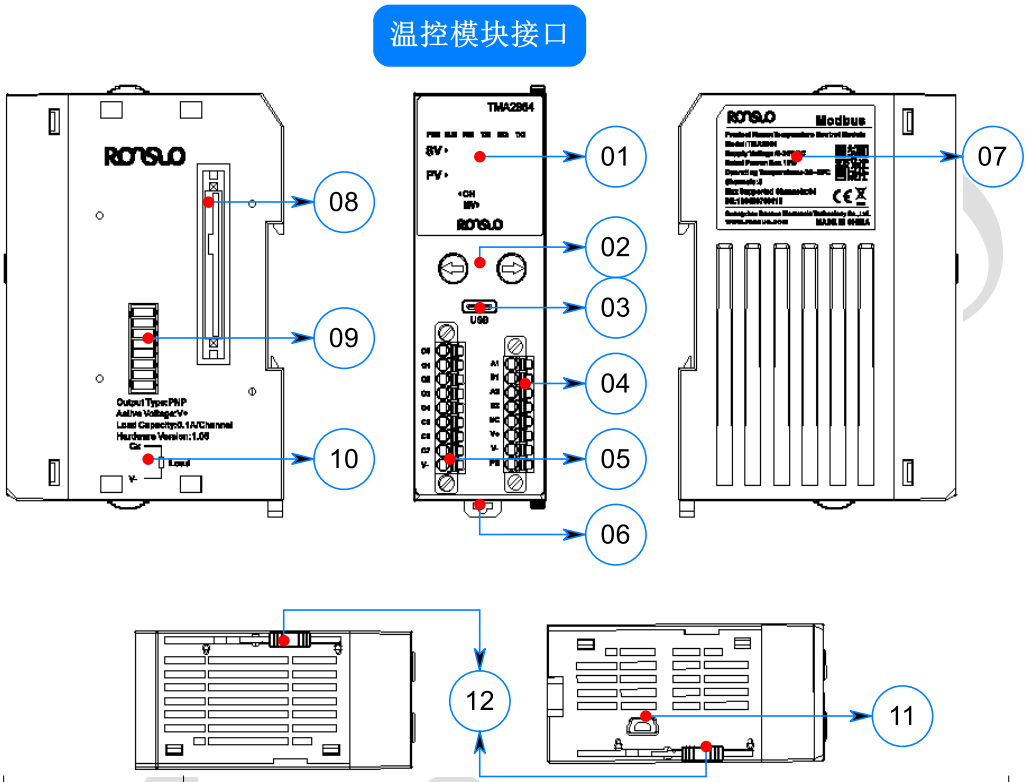
4) Ensure the crimped wire terminals ar nor broken.



2.3 Device Interface Functions

2.3.1 Interface Function of Temperature Control Module (TMA)

1、 The interface functions of the temperature control modules (TMA1864, TMA2864, and TMA3064) are detailed in the figure below.



2、 Temperature Modulation Module (TMA) Interface Specification:

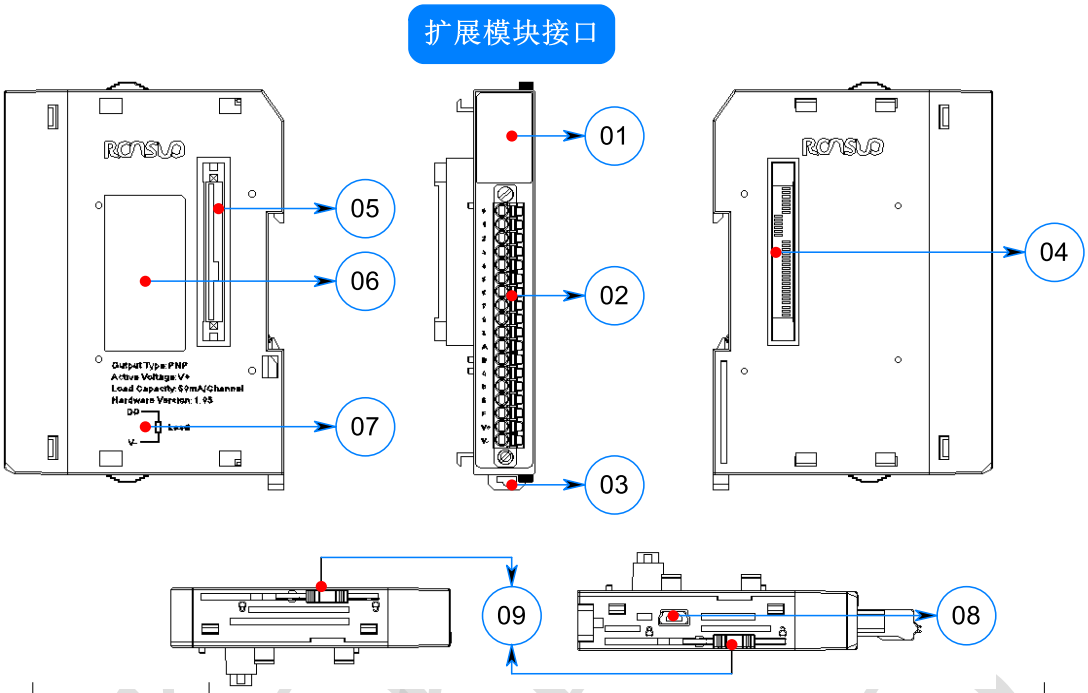
Number	Definition	Explain	Remarks
01	Module Display	**Temperature control module model:** TMA1864: Features 8-channel NPN control outputs, expandable up to 64 channels TMA2864: Features 8 PNP control outputs, expandable up to 64 outputs TMA3064: No control output, supports up to 64 output channels **Pilot lamp ：** PWR (red): Power indicator light that remains on during power-on RUN (green): Status indicator that flashes once per second when the device is operating normally RX1 (green): Flashes when receiving data TX1 (green): Flashes when sending data upstream RX2 (green): Flashes when receiving data downstream. Configure as an external temperature collector. TX2 (green): Flashes when sending data downstream. Configure as an external temperature collector.	Display screen

		SV: Set the temperature value of the display module (for example, 105.0 means 105.0 degrees Celsius)	
		PV:shows the real-time temperature value of the module (e.g. 105.0 indicates 105.0 degrees Celsius)	
		CH: The display module output channel (e.g. 01 indicates channel 1) can be switched between left and right buttons	
		MV: The display module outputs the ratio value (e.g. 100 means 100% output) and displays the alarm code when an alarm is generated (see Section 3.4 for details)	
		LOGO:RONSUO brand LOGO	
02	Left and right buttons	◄Press the left arrow key to switch to the previous channel. Hold it down to switch channels continuously. ►Right arrow key: Press to switch to the next channel, long press to switch channels continuously◄►Press and release both left and right arrow keys to display the device's basic configuration information	
03	Type-C port	Connect to the computer debugging interface (fixed communication parameters: 921600, N, 8, 1)	
04	8P terminal	Up and down RS485 interfaces, 24VDC power supply interface, and ground interface (see 2.4.1.1 for details)	
05	9P terminal	8 The DO control outputs (C0 to C7) support connections to solid-state and power relays (see 2.4.1.2 for details). The TMA1864 chip integrates 8 NPN-type control outputs. TMA2864: Integrated 8-channel PNP control outputs TMA3064: No integrated control output (this 9P terminal is absent)	
06	Guide rail clip	DIN35 guide rail mounting and securing clip	
07	Tag information	Print information on the left side, including module name, model, power supply, and production serial number (SN).	
08	Extension interface	Use with extension modules	
09	8 bit position code	Bits 1-4: RS485 uplink communication address (0x01-0x10) Bits 5-6: Uplink baud rate settings (9600,19200,38400, and 115200) 7th bit: NC (Keep) 8th bit pull-out: auto control switch Barcode switch function definition (see 2.4.1.3 for details)	
10	Wiring Label	Output type and wiring method of the identification module (TMA3064 lacks this identification information)	
11	Mini USB port	Modular firmware local update interface	
12	Module latch	When installing the modular assembly, fasten the upper and lower clamps (to	

		Pull the lock to open the direction indicator. The directional lock mechanism requires both upper and lower latches to be pulled in the same direction to open or secure the module. Unlock the latches: Pull both upper and lower latches toward the front panel of the module. Locking mechanism: Both upper and lower latches are pulled toward the rear of the module.	

2.3.2 Interface Functions of the Extended Module (TEB\\TEU\\TEN\\TEC\\TES)

1、 The interface functions of the output expansion module (TEB/TEU), regulator access module (TEN), temperature acquisition module (TEC), and serial acquisition module (TES) are detailed in the figure below.



2、 Interface specifications for the extended modules (TEB, TEU, TEN, TEC, and TES):

Number	Definition	Explain	Remarks
01	Module Display	**Extension module model:** TEB1016:16-channel NPN output expansion module TEB2016:16-channel PNP output expansion module TEU2008:8-channel analog output (0~10V) expansion module; TEU5008:8-channel analog output (4~20mA) expansion module TEN1016:1 channel 485 serial regulator access module TEC6006:6-channel PT100 temperature acquisition module TEC8008:8-channel K/T thermocouple temperature acquisition module TES1004:4-channel 485 serial data acquisition module TES1008:8-channel 485 serial data acquisition module	
		TEB module indicator light: P1 (red): Power indicator light, which remains on during module power-up P2 (red): External power indicator light that remains on when connected to an external power source (TEB1016 does not have this light) 0-F (green): Corresponds to module output channels 1-16. The indicator lights up when PWM signal output is active. **TEU module indicator light:**	

		P (red): Power indicator, remains on when the module is powered on R (green): Status indicator light that flashes every 200ms when the module is operating normally 0-7 (green): Corresponds to module output channels 1-8, remains on when signal output is active **TEN1016 module indicator light:** P (red): Power indicator, remains on during module power-up R (green): Status indicator light that flashes every 200ms when the module is operating normally 0-F (green): Connects to the solid-state module of station number 1 to 16. It remains illuminated when communication is normal. **TEN2064 module indicator light:** PWR (Red): Power indicator light, remains on during module power-up RUN (Green): The status indicator flashes 200 times when the module is operating normally. ALM (Red): The alarm indicator light remains on when the communication link between the alarm and the SSA module fails. **TEC module indicator light:** P (red): Power indicator, remains on when the module is powered on R (green): Status indicator light that flashes every 200ms when the module is operating normally 0-5 (green): The TEC6006 module will remain illuminated when the PT100 sensor is properly connected 0-7 (green): The TEC8008 module's thermocouple sensor remains illuminated under normal conditions **TES module indicator light:** P: Power indicator (red) remains on during module power-up R: The status indicator light (green) flashes once every 200ms when the module is operating normally. 0-8: TES module serial ports 1-8 remain illuminated when communication with the acquisition board is normal.	
02	8/18P terminal and RJ45 port	TEB: Output Expansion Module Terminal Wiring Specifications (Refer to Section 2.4.2 for details) TEU: Terminal Wiring Specifications for Output Expansion Module (Refer to Section 2.4.3 for details) TEN1016: Terminal wiring specifications for the regulator access module (refer to 2.4.4 for details) TEN2064: RJ45 interface specifications for the regulator access module (refer to 2.4.4 for details)	

		TEC: Terminal Wiring Specifications for Temperature Acquisition Module (Refer to Section 2.4.5 for details) TES: Serial Port Acquisition Module Terminal Wiring Specifications (Refer to Section 2.4.6 for details)	
03	Guide rail clip	DIN35 guide rail mounting and securing clip	
04	Extension Interf-ace 1	Use in combination with the previous module	
05	Extension Interf-ace 2	Use to combine with the next module	
06	Tag information	Print information on the right side: module name, model, power supply, and production serial number (SN).	
07	Wiring labels	Input/output type and wiring method of the identification module	
08	Mini USB port	Local firmware update interface (TEB module does not support this feature)	

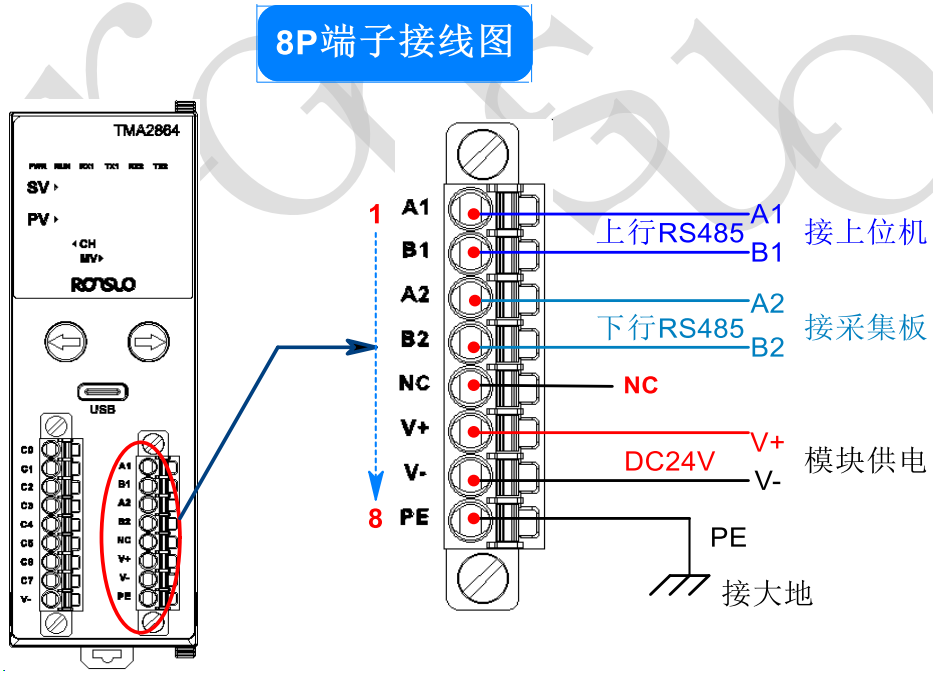
09	Module latch	When installing the modular assembly, fasten the upper and lower clamps (to Pull the lock to open the direction indicator. The directional lock mechanism requires both upper and lower latches to be pulled in the same direction to open or secure the module. Unlock the latches: Pull both upper and lower latches toward the front panel of the module. Locking mechanism: Both upper and lower latches are pulled toward the rear of the module.	

2.4 Device Wiring

2.4.1 TMA Wiring

2.4.1.1 Power Supply and 485 Terminal Wiring

1、 The 8P plug-and-play 3.5V spring terminals on the temperature control module (TMA1864/TMA2864/ TMA3064) provide both the device's RS485 communication ports for up/down line signals and power output interfaces, with wiring configurations as shown in the diagram below.



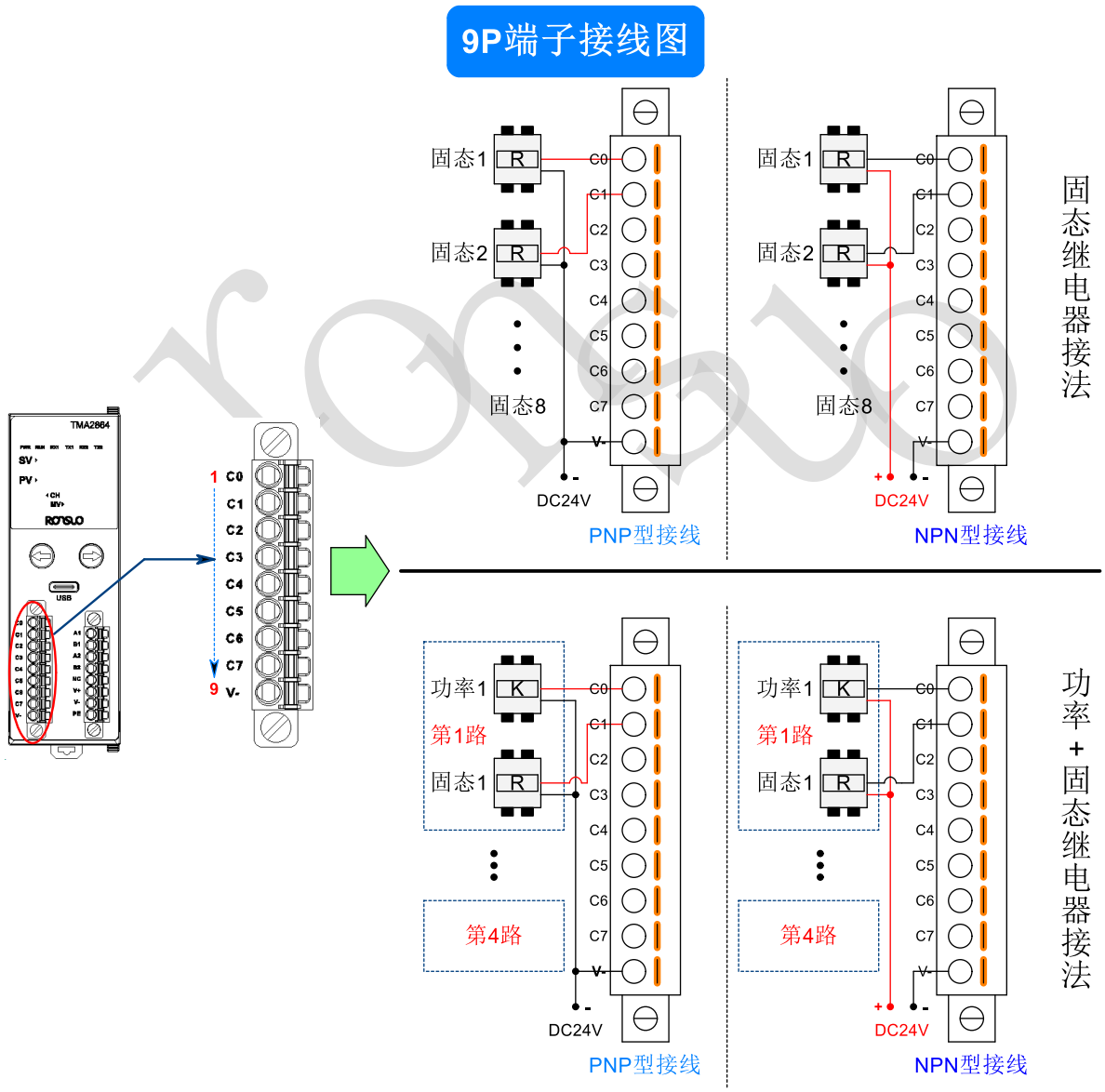
2、 8P Terminal Definition:

Terminal number	Silk screen logo	Explain
1	A1	The RS485 communication interface connects to the host computer via the UP (uplink) module.
2	B1	
3	A2	DOWN-Up RS485 communication interface connects to the temperature acquisition board (for external acquisition boards)
4	B2	

5	NC	Continue to have
6	V+	24VDC power input positive terminal
7	V−	Negative terminal of the 24VDC power input
8	PE	Grounding

2.4.1.2 Control the Wiring of the Output Terminals.

1、 The 9P plug-and-play 3.50 spring terminals on the temperature control module (TMA1864/TMA2864), where TMA1864 integrates 8-channel **NPN** control outputs and TMA2864 integrates 8-channel **PNP** control outputs (TMA3064 lacks this row of terminals), with detailed wiring methods shown in the figure below:



Note: 1. The temperature control module's integrated output can be PNP or NPN type. Users should connect it correctly according to the module model.

2、 The solid state relay supports 8 control outputs when connected individually.

3、 The power supply and solid-state relay support 4 control outputs (C0&C1 as the first output, C2&C3 as the second, and so on).

4、 The temperature control module (TMA3064) lacks the 9P terminal and integrated control output functionality, and can only be used with an output expansion module.

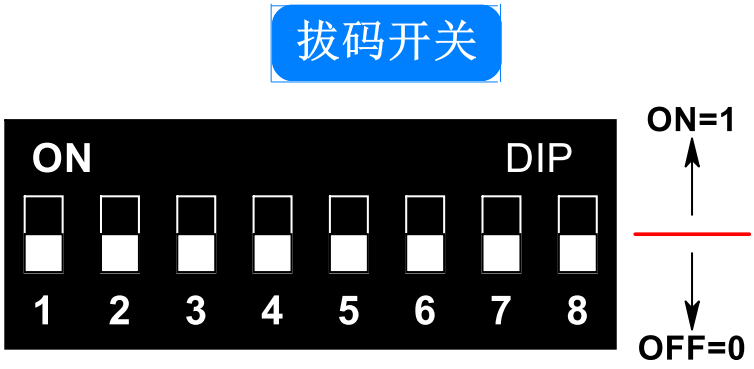
2、 9P terminal definition:

Terminal number	Definition	Explain	
		Solid-state relay control output	Power + solid-state relay control output
1	C0	Control Output Channel 1	Control Output Channel 1
2	C1	Control Output Channel 2	
3	C2	Control Output Channel 3	Control Output Channel 2
4	C3	Control Output Channel 4	
5	C4	Control Output Channel 5	Control Output Channel 3
6	C5	Control Output Channel 6	
7	C6	Control Output Channel 7	Control Output Channel 4
8	C7	Control Output Channel 8	
9	V-	Connect to the negative terminal of the power supply	

2.4.1.3 Definition of the Function of the Barcode Scanning Switch

1、 The temperature control module (TMA) features an 8-bit pull-up switch on its right side, enabling RS485 communication via module configuration selection.

Address, baud rate, and control output switch (**change the pull-out switch, the device needs to be restarted to take effect**),as shown in the figure below:



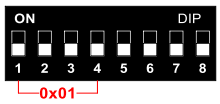
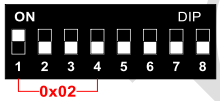
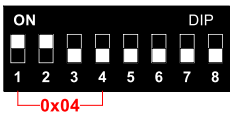
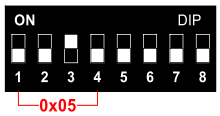
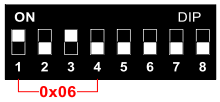
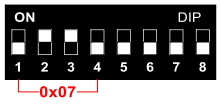
Note: The pull-out direction is defined as follows, as shown in the figure above:

1、 When the **1~4** bit is OFF, the 485 communication address is 0x01;

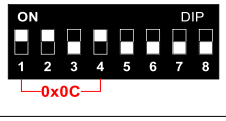
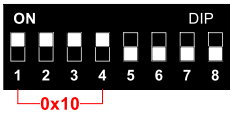
2、 When the **5~6** bit pull code is OFF, the communication baud rate is 38400

3、 **7th bit is pulled out NC,retained**;

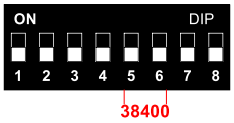
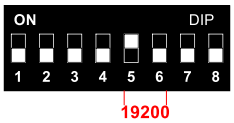
4、 When the **8** position pull-out code is OFF, the heating main switch will be turned off for automatic control. 2. RS485 communication address definition:

RS485 communication address definition (uplink)					
ON=1 OFF =0	Extract the first 4 bits				Address
	1st	2nd	3rd	4th	
	0	0	0	0	0x01
	1	0	0	0	0x02
	0	1	0	0	0x03
	1	1	0	0	0x04
	0	0	1	0	0x05
	1	0	1	0	0x06
	0	1	1	0	0x07
	1	1	1	0	0x08

	0	0	0	1	0x09

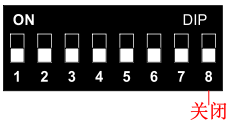
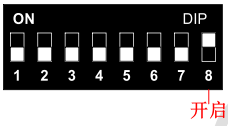
	1	0	0	1	0x0A
	0	1	0	1	0x0B
	1	1	0	1	0x0C
	0	0	1	1	0x0D
	1	0	1	1	0x0E
	0	1	1	1	0x0F
	1	1	1	1	0x10

3、 RS485 Communication Baud Rate Definition:

RS485 communication baud rate (uplink)			
ON=1 OFF =0	Extract the 5th and 6th bits		Baud rate
	5th	6th	
	0	0	38400
	1	0	19200
	0	1	9600

	1	1	115200

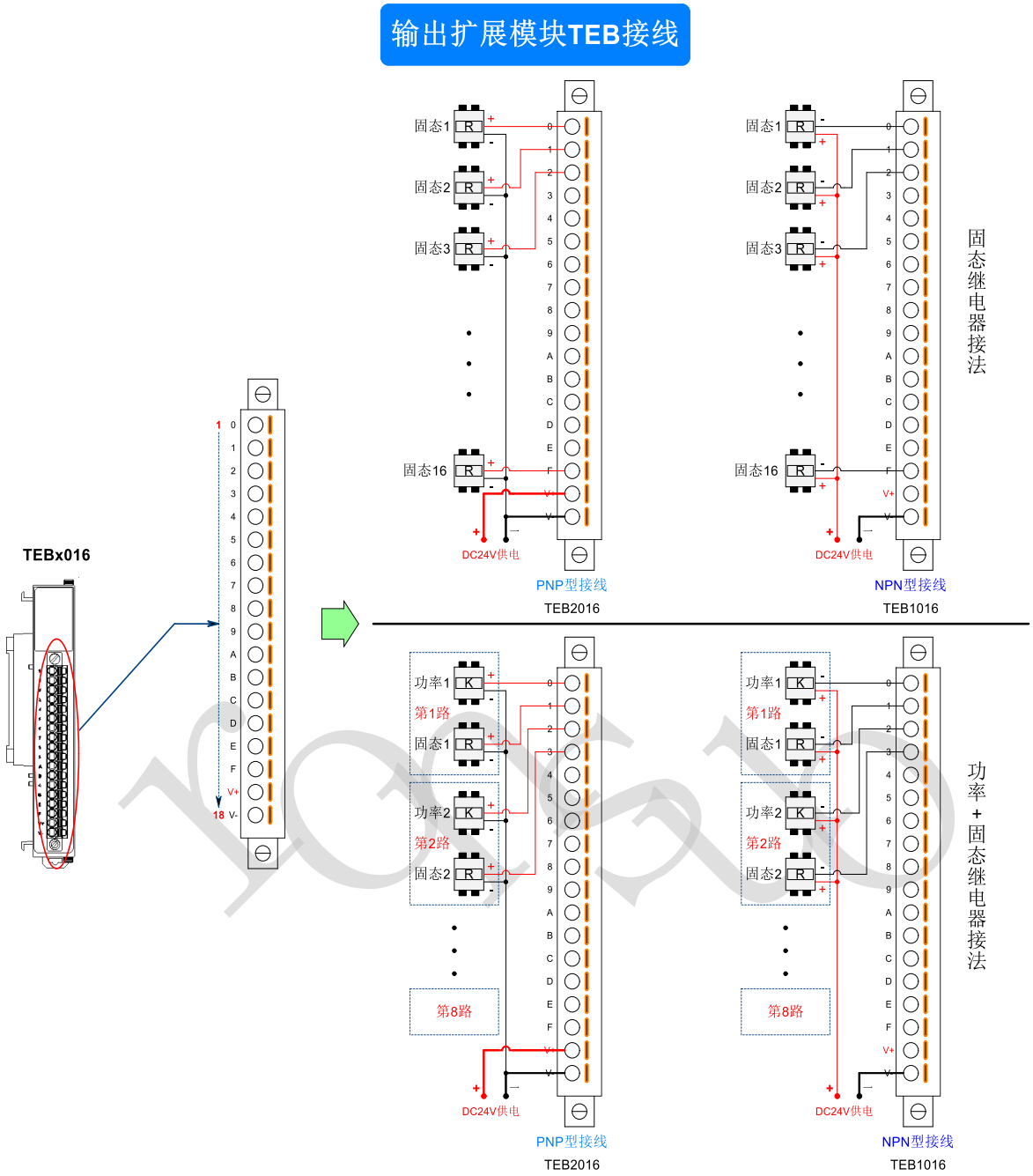
4、 Control master switch definition:

Control master switch definition			
ON=1 OFF =0	7th to 8th bit extraction		Automatic control switch
	7th	8th	
	NC	0	Close
	NC	1	Open

Note: If the 8th bit pull-out switch is set to 1, the module will activate the automatic temperature control output upon power-on.

2.4.2 TEB Wiring

1、 The 18P plug-and-play 3.50 spring terminals on the TEB output expansion module feature TEB1016 (16-channel NPN type) and TEB2016 (16-channel PNP type) control outputs. Each module has an independent external power supply design, with detailed wiring shown in the figure below.



Note: 1. The DO output expansion module supports PNP and NPN types. Users should connect it correctly according to the device model.

2、 The single solid state relay supports 16 control outputs.

3、 When power and solid-state relay are connected, it supports 8 control outputs (C0&C1 as the first output, C2&C3 as the second, and so on).

2、 TEB 18P Terminal Definition:

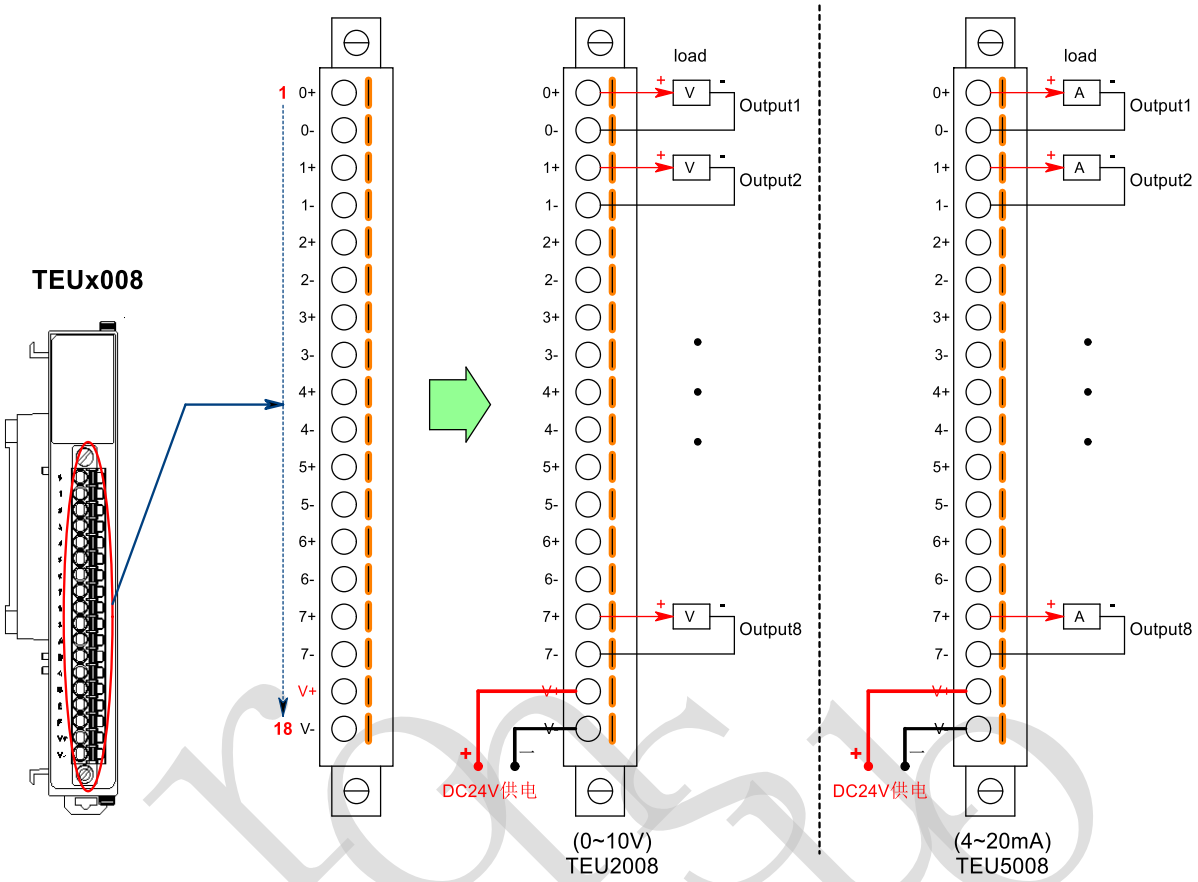
Terminal number	Silk screen logo	Explain	
		Solid-state relay control output	Power + solid-state relay control output
1	0	Control Output Channel 1	Control Output Channel 1

2	1	Control Output Channel 2	
3	2	Control Output Channel 3	Control Output Channel 2
4	3	Control Output Channel 4	
5	4	Control Output Channel 5	Control Output Channel 3
6	5	Control Output Channel 6	
7	6	Control Output Channel 7	Control Output Channel 4
8	7	Control Output Channel 8	
9	8	Control Output Channel 9	Control Output Channel 5
10	9	Control Output Channel 10	
11	A	Control Output Channel 11	Control Output Channel 6
12	B	Control Output Channel 12	
13	C	Control Output Channel 13	Control Output Channel 7
14	D	Control Output Channel 14	
15	E	Control Output Channel 15	Control Output Channel 8
16	F	Control Output Channel 16	
17	V+	Positive terminal of the DC24V power supply input	
18	V-	Negative terminal of the DC24V power supply input	

2.4.3 TEU Wiring

1、 The 18P plug-in 3.50 spring terminals on the TEU output expansion module feature control outputs TEU2008 (8-channel 0~10V) and TEU5008 (8-channel 4~20mA). The detailed wiring configuration is illustrated in the diagram below.

输出扩展模块TEU接线



Note: 1. The AO output expansion module provides 0~10V and 4~20mA outputs. Users should connect them correctly according to the specific equipment model.

2、 The module supports 8 analog control outputs and requires external power supply.

3、 When connecting the analog load controller, pay attention to the correct connection of the positive and negative signs of the interface.

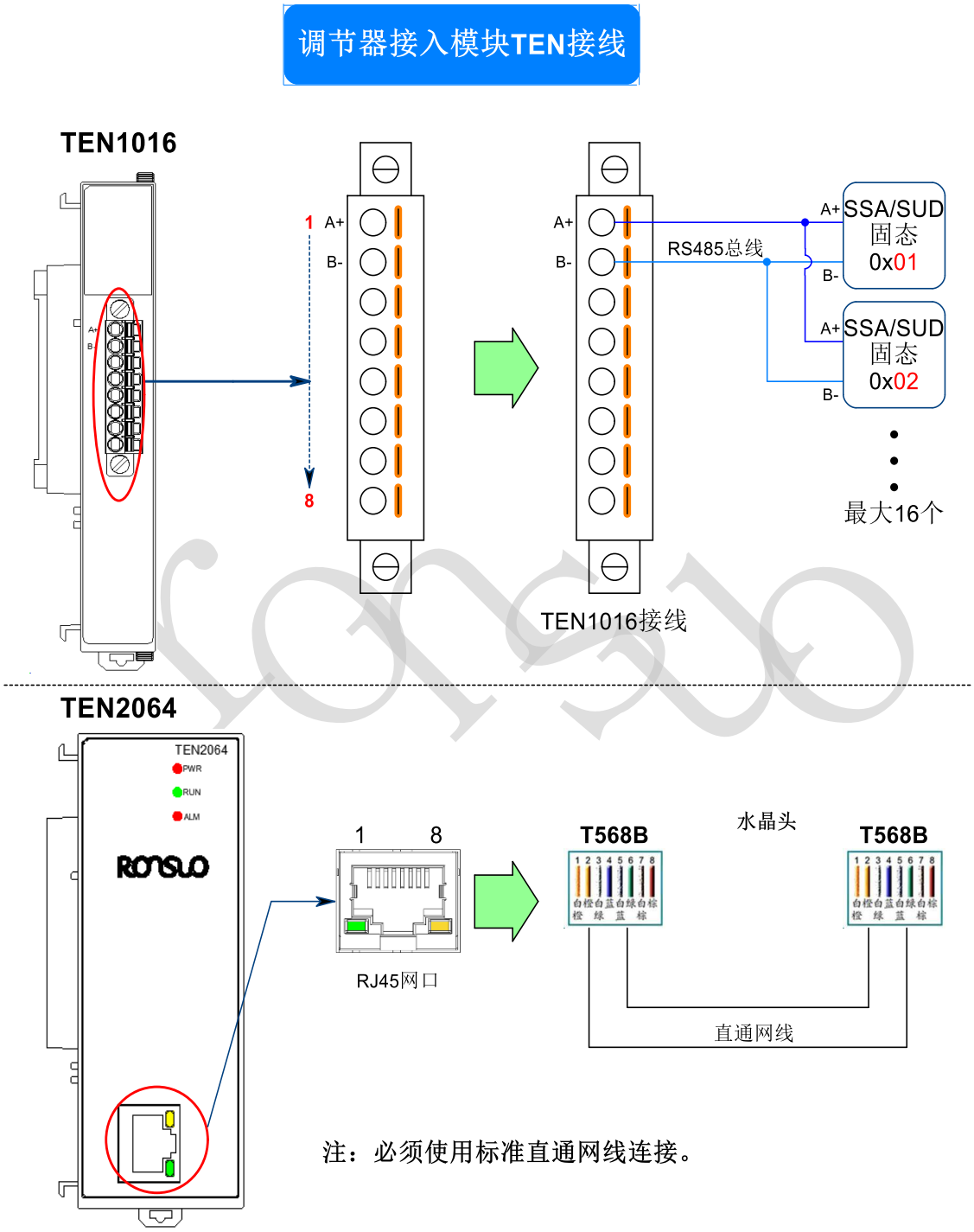
2、 TEU 18P Terminal Definition:

Terminal number	TEU2008		TEU5008	
	Characteristic	Explain	Characteristic	Explain
1	0+	0~10V Output Channel 1	0+	4~20mA Output Channel 1

2	0−		0−	
3	1+	0~10V Output Channel 2	1+	4~20mA output channel 2
4	1−		1−	
5	2+	0~10V Output Channel 3	2+	4~20mA output channel 3
6	2−		2−	
7	3+	0~10V Output Channel 4	3+	4~20mA output channel 4
8	3−		3−	
9	4+	0~10V Output Channel 5	4+	4~20mA output channel 5
10	4−		4−	
11	5+	0~10V Output Channel 6	5+	4~20mA output channel 6
12	5−		5−	
13	6+	0~10V Output Channel 7	6+	4~20mA output channel 7
14	6−		6−	
15	7+	0~10V output channel 8	7+	4~20mA output channel 8
16	7−		7−	
17	V+	Positive terminal of the DC24V power supply input		
18	V−	Negative terminal of the DC24V power supply input		

2.4.4 TEN Module Wiring

1、 The TEN 8P plug-in module features 3.50mm spring terminals, with detailed wiring instructions as shown in the diagram below.



Note: 1. The TEN1016 module features a single RS485 interface, supporting integration with our company's SxA/SUD power regulation modules.

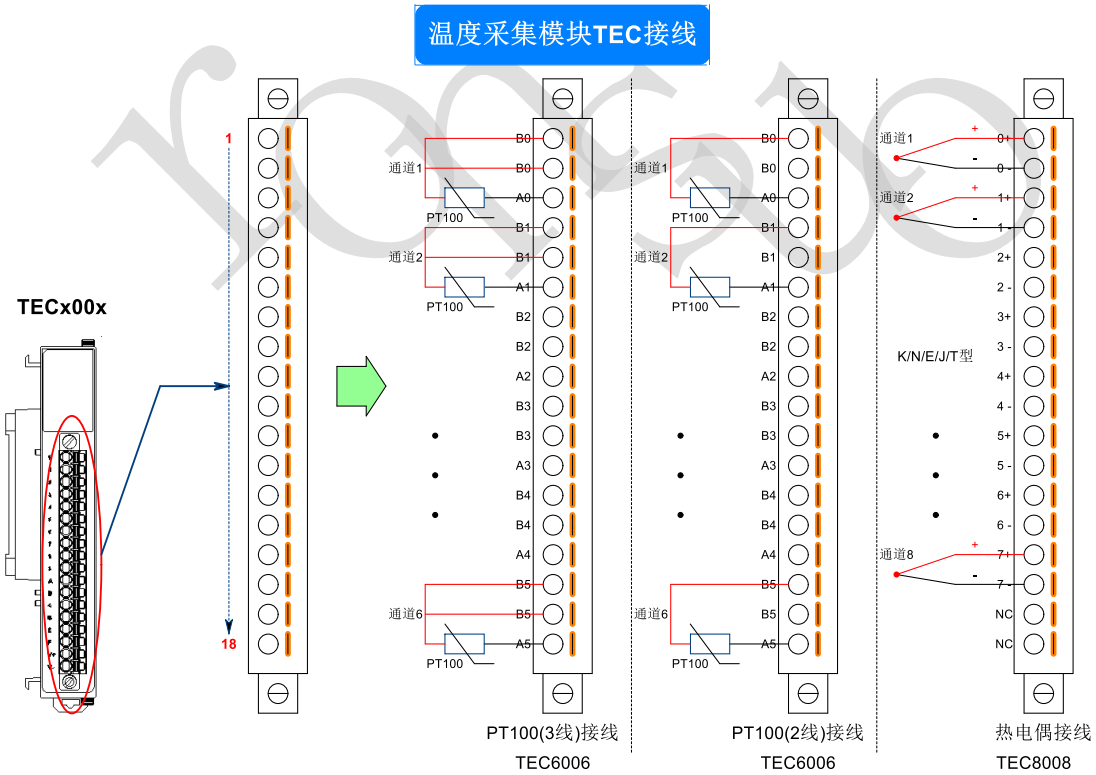
2、 The TEN2064 module features 1 RJ45 port, supporting integration with our company's SSA1008 power regulation module.

2、 TEN Terminal 8P Debugging Module Connection Specifications:

Terminal number	Silk screen logo	TEN1016 Interface Description
1	A+	A RS485 serial port for connecting SSA or SUD power regulators
2	B−	
3	−	Continue to have
4	−	Continue to have
5	−	Continue to have
6	−	Continue to have
7	−	Continue to have
8	−	Continue to have

2.4.5 Temperature Acquisition Module (TEC) Wiring

1、 The 18P plug-and-play 3.50mm spring terminals on the Temperature Acquisition Module (TEC) connect to the TEC6006 (6-channel PT100) and TEC8008 (8-channel thermocouple) sensors, with the detailed wiring configuration shown in the diagram below.



pour ：

1、 The temperature acquisition module is available in two types: PT100 and thermocouple, with users connecting them correctly according to the equipment model.

2、 The TEC6006 data acquisition module supports 6-channel PT100 sensor connections (default 3-wire configuration).

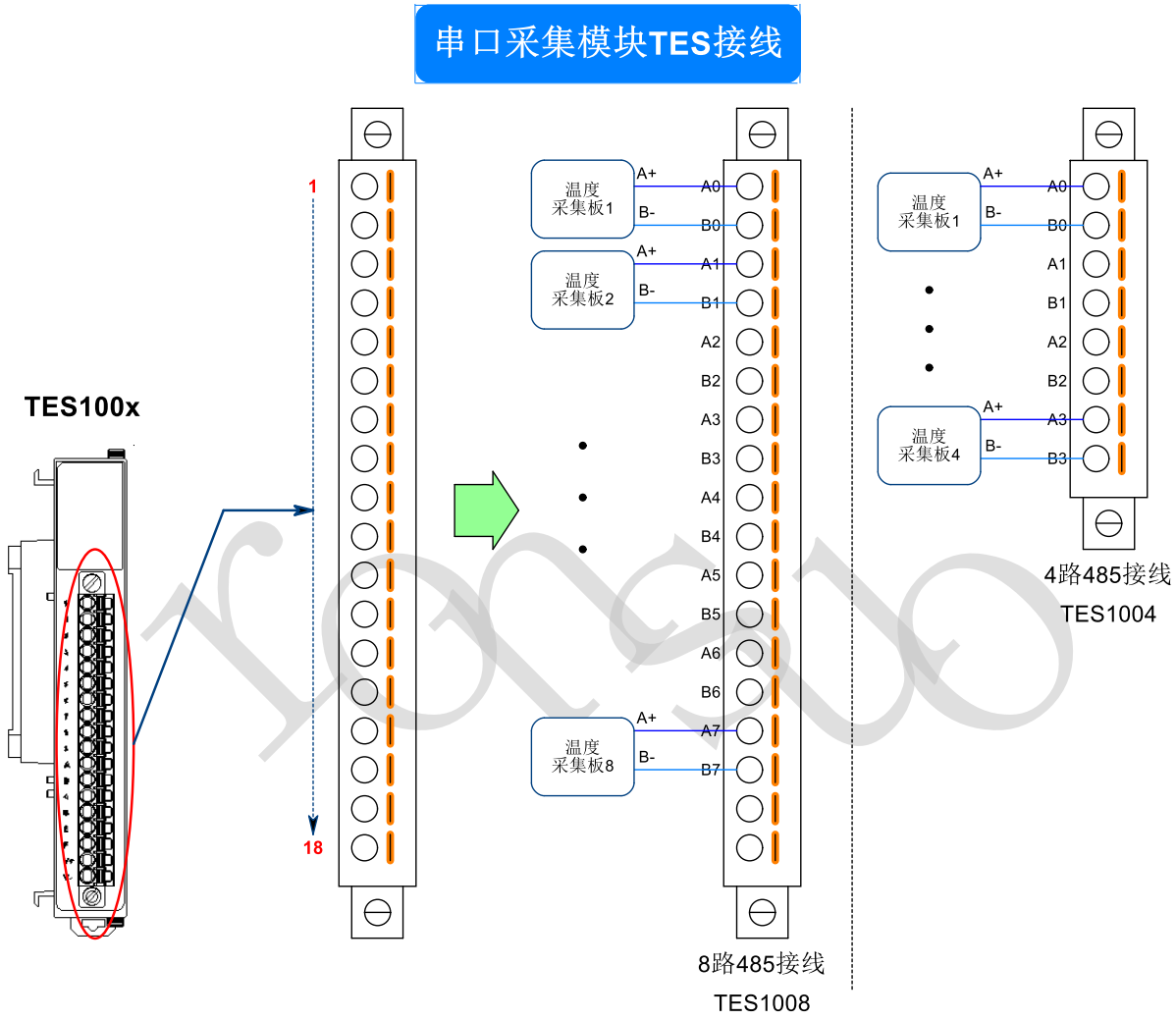
3、 The TEC8008 acquisition module supports 8-channel K/N/E/J/T thermocouple sensors.

2、 Temperature Acquisition Module (TEC) 18P Terminal Definition:

Terminal number	PT100 sensor (TEC6006)			K/N/E/J/T Type Thermocouple Sensor (TEC 8008)	
	3 Line Control Mark	2 Line Control Mark	Explain	Characteristic	Explain
1	B0	B0	Channel 1	0+	Channel 1
2	B0	NC		0−	
3	A0	A0		1+	Channel 2
4	B1	B1	Channel 2	1−	
5	B1	NC		2+	Channel 3
6	A1	A1		2−	
7	B2	B2	Channel 3	3+	Collection Channel 4
8	B2	NC		3−	
9	A2	A2		4+	Channel 5
10	B3	B3		4−	
11	B3	NC	Channel 4	5+	Collection Channel 6
12	A3	A3		5−	
13	B4	B4	Channel 5	6+	Channel 7
14	B4	NC		6−	
15	A4	A4		7+	Collection Channel 8
16	B5	B5	Channel 6	7−	
17	B5	NC		NC	Continue to have
18	A5	A5		NC	

2.4.6 Serial Data Acquisition Module (TES) Wiring

1、 The serial acquisition module (TES) 18P features plug-and-play 3.50mm spring terminals for TES1008 (8-channel) and TES1004 (4-channel) RS485 interfaces. The detailed wiring configuration is illustrated in the diagram below.



pour ：

1、 The serial acquisition module supports 8 or 4 RS485 channels, exclusively for temperature acquisition boards. Users should connect it correctly according to the device model.

2、 The TES1008 data acquisition module supports 8-channel 485 interfaces, while the TES1004 module supports 4-channel 485 interfaces.

2、 Serial Acquisition Module (TES) 18P Terminal Definition:

Terminal number	Silk screen logo	Demonstration of the type	
		TES1008 (18P terminal)	TES1004 (8P terminal)
1	A0	RS485 Serial Port 1	RS485 Serial Port 1
2	B0		
3	A1	RS485 Serial Port 2	RS485 Serial Port 2
4	B1		
5	A2	RS485 Serial Port 3	RS485 Serial Port 3
6	B2		
7	A3	RS485 Serial Port 4	RS485 Serial Port 4
8	B3		
9	A4	RS485 Serial Port 5	–
10	B4		
11	A5	RS485 Serial Port 6	–
12	B5		
13	A6	RS485 Serial Port 7	–
14	B6		
15	A7	RS485 Serial Port 8	–
16	B7		
17	–	–	–
18	–	–	–

3 Device Application and Debugging

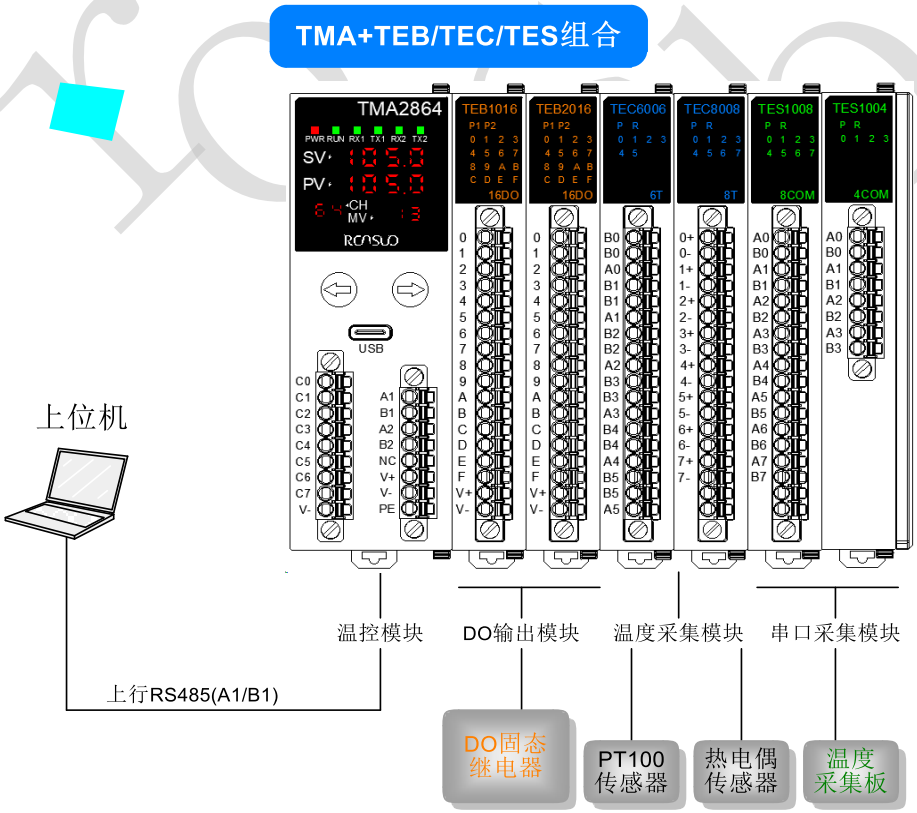
About this chapter

Chapters and sections	Content	Remarks
3.1 Network application example	Introduction to the application of various networking devices	
3.2 Device setup and connection	Introduction to the device debugging and connection method	
3.3 The host computer software (TSC) is used	Introduce the detailed method of upper computer software configuration	
3.4 Alarm code	Introducing the explanation of device abnormal alarm codes	

3.1 Typical Network Application Examples

3.1.1 Application Example 1 (TMA+TEB/TEC/TES)

The network topology for the modular temperature control system (TMA+TEB+TEC or TES) is illustrated below:



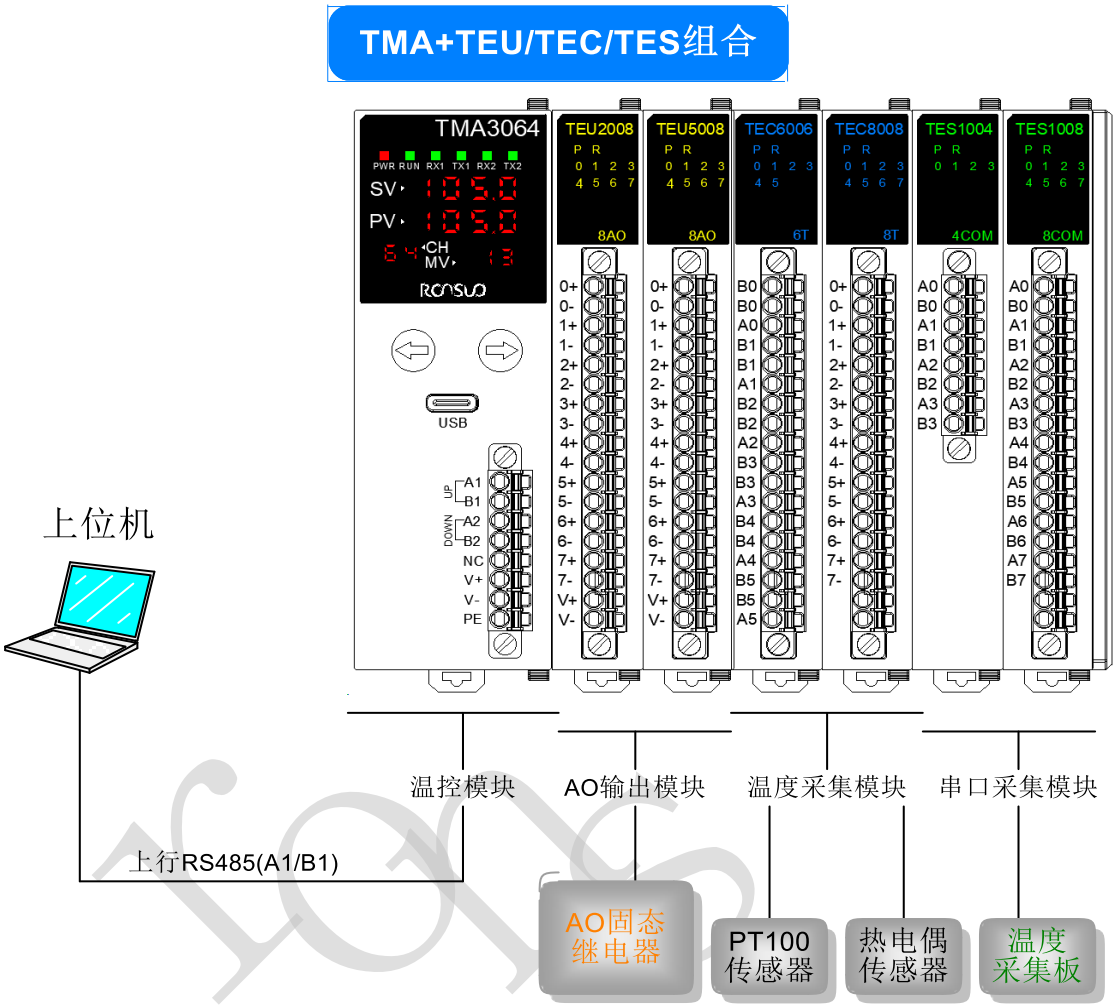
pour ：

1、 In the proposed TMA+TEB+TEC or TES system configuration, TEB functions as the DO output, while TEC serves as a temperature acquisition module that can directly interface with PT100 or thermocouple sensors for temperature control. TES acts as a serial acquisition module, which connects to a temperature acquisition board to collect and utilize temperature data for control purposes.

2、 For other networking solutions, please contact our company to customize a tailored networking plan.

3.1.2 Application Example 2 (TMA+TEU/TEC/TES)

The network topology for the modular temperature control system (TMA+TEU+TEC or TES) is illustrated below:



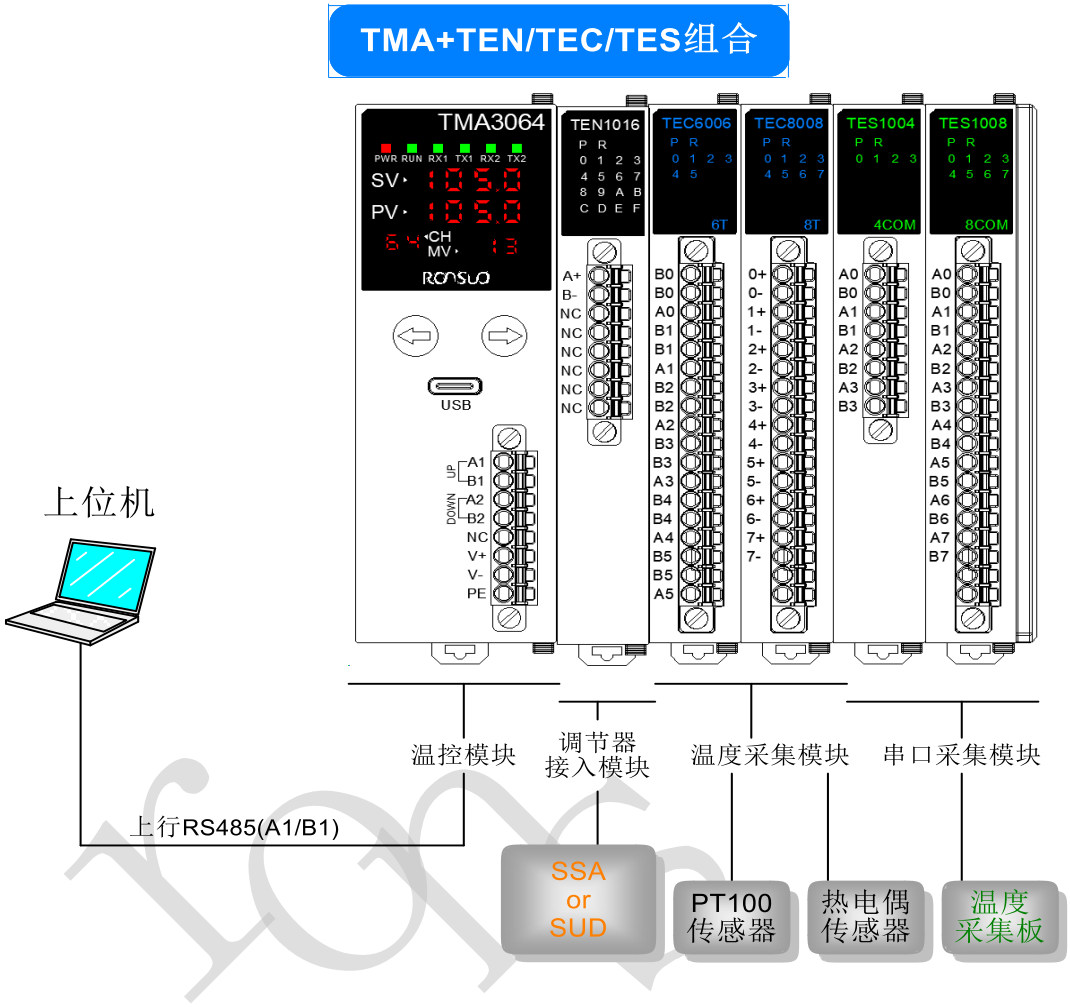
pour ：

1、 In the proposed TMA+TEU+TEC or TES system configuration, TEU serves as the AO output module, while TEC functions as a temperature acquisition module that can directly interface with PT100 or thermocouple sensors for temperature control. TES acts as a serial acquisition module, which connects to a temperature acquisition board to collect and utilize temperature data for control purposes.

2、 For other networking solutions, please contact our company to customize a tailored networking plan.

3.1.3 Application Example 3 (TMA+TEN/TEC/TES)

The network topology for the modular temperature control system (TMA+TEN+TEC or TES) is illustrated below:



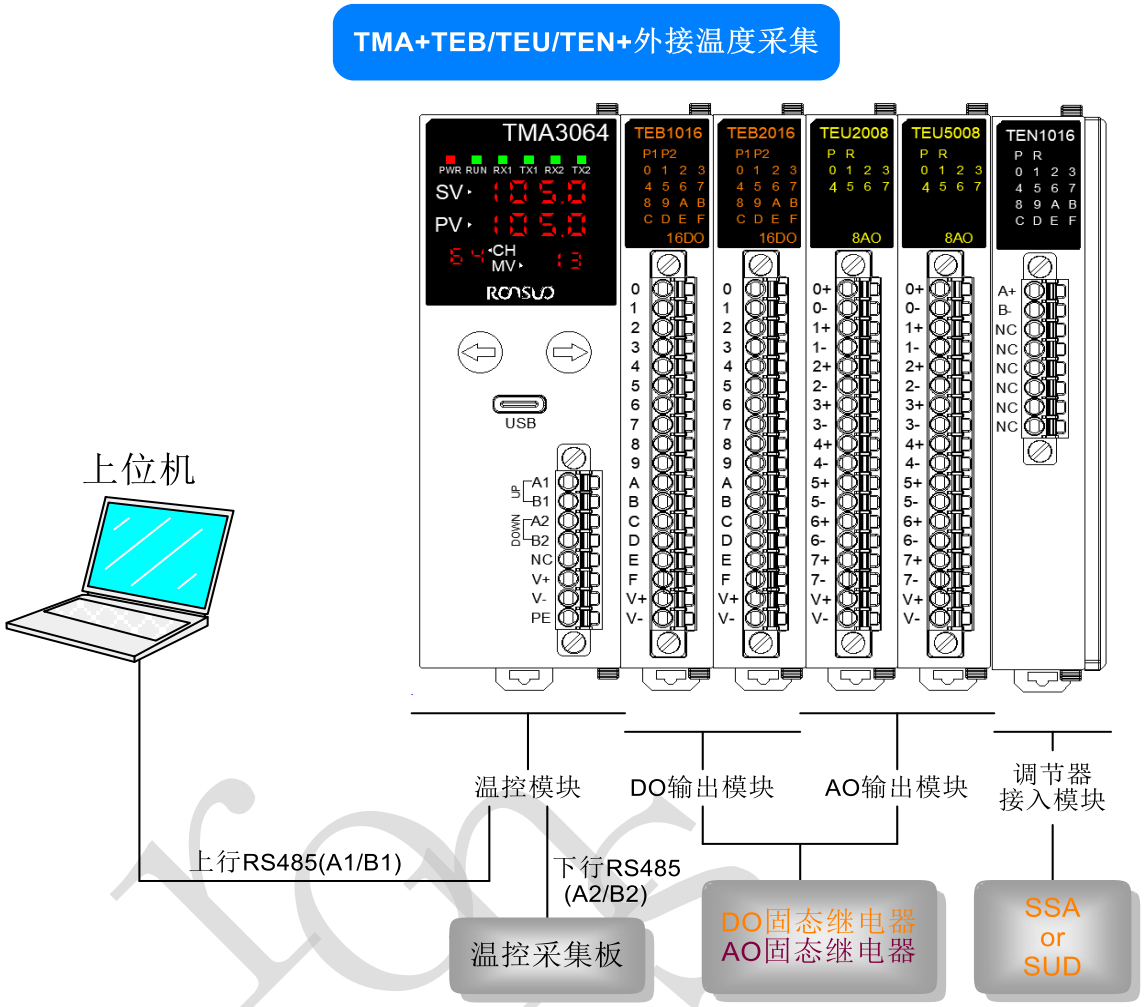
pour ：

1、 The proposed solution combines TMA, TEN, and TEC or TES modules. The TEN module, functioning as a regulator access module, exclusively supports SxA or SUD power regulators. The TEC module, serving as a temperature acquisition module, can directly connect to PT100 or thermocouple sensors for temperature control. The TES module, acting as a serial acquisition module, integrates with a temperature acquisition board to collect and utilize temperature data for control purposes.

2、 For other networking solutions, please contact our company to customize a tailored networking plan.

3.1.4 Application Case 4 (TMA+TEB/TEU/TEN+External Acquisition Board)

The typical networking configuration for the temperature control module (TMA+TEB/TEU/TEN with external temperature acquisition) is illustrated in the following topology diagram:



pour ：

1、 In the aforementioned solution, when TEB/TEU and TEN modules are spliced with TMA, only one model type is permitted for combination use with TMA.

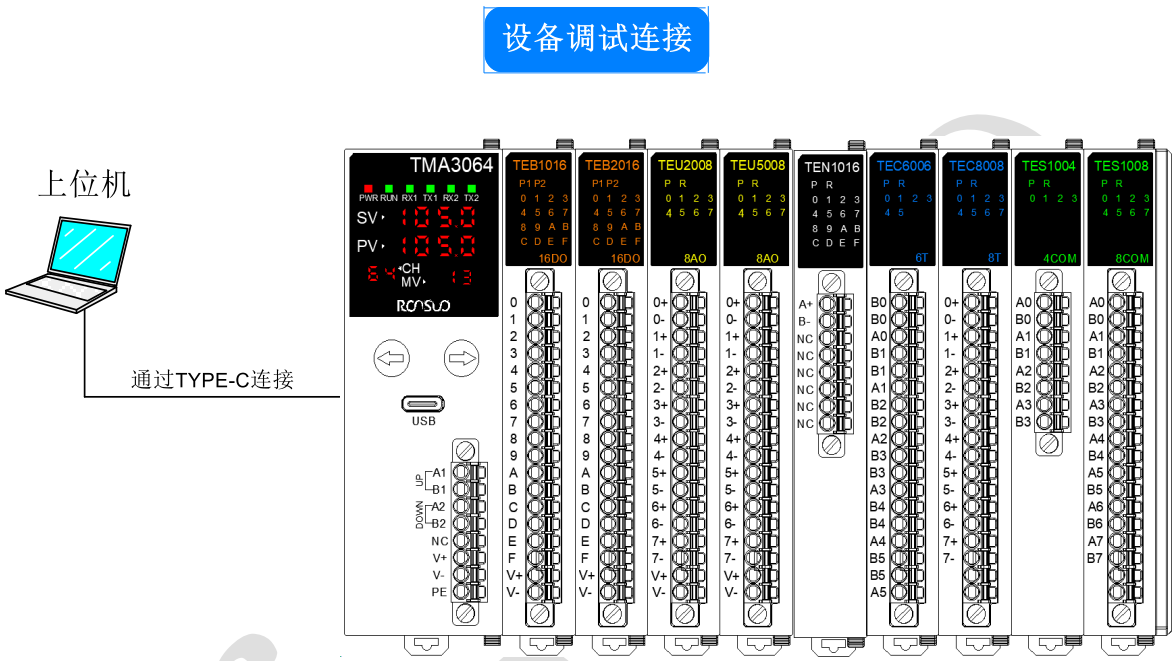
2、 The TEB/TEU and TEN modules are connected in the splicing mode as shown in Examples 1-3. The external temperature acquisition board used in this solution must be connected to the TMA module's downstream 485 interface. Once the 485 interface is activated, the TMA will no longer allow splicing of TEC or TES modules.

3、 The external temperature acquisition board collects the temperature and uses it as the temperature control of TMA.

4、 For other networking solutions, please contact our company to customize a tailored networking plan.

3.2 Device Setup and Connection

The device comes with default settings upon factory delivery. For field deployment, simply use the Temperature Control System Configuration Tool (TSC) to configure it according to your project's specific requirements for proper operation. Connect the device to the host computer using the following method: (Connect the computer to the device's Type-C port and set the communication parameters as follows: 921600, N, 8,1), as shown in the figure below:



pour ：

1、 For on-site debugging, connect the computer to the device's Type-C port using a USB cable as described above.

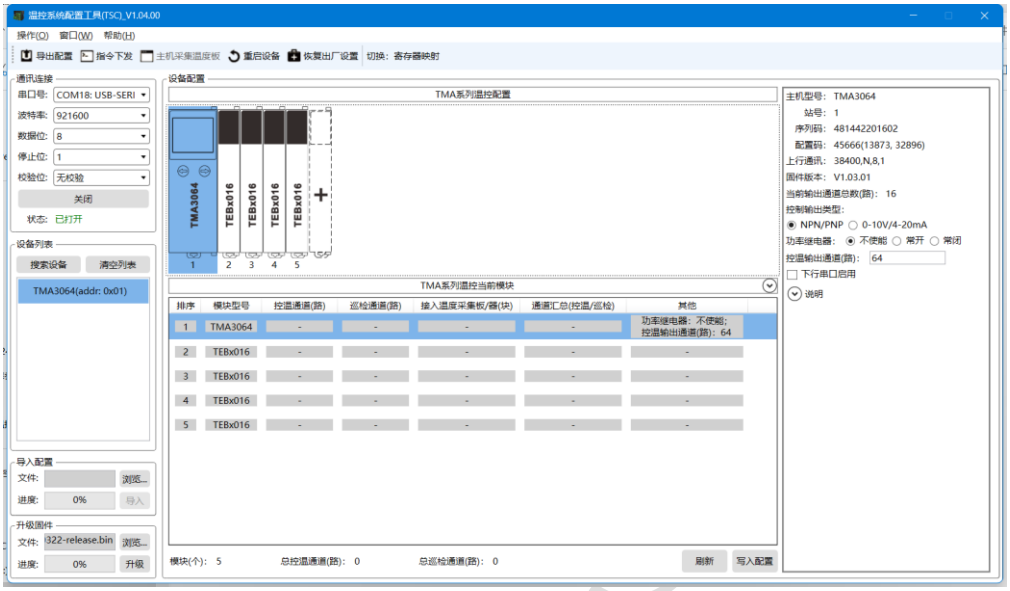
2、 The computer connects to the device via a TYPE-C port. Communication parameters: 921600, N, 8, 1。

3、 Use the upper computer tool "Temperature Control System Configuration Tool (TSC)" on the computer for configuration management.

3.3 The Host Computer Software (TSC) Is Used

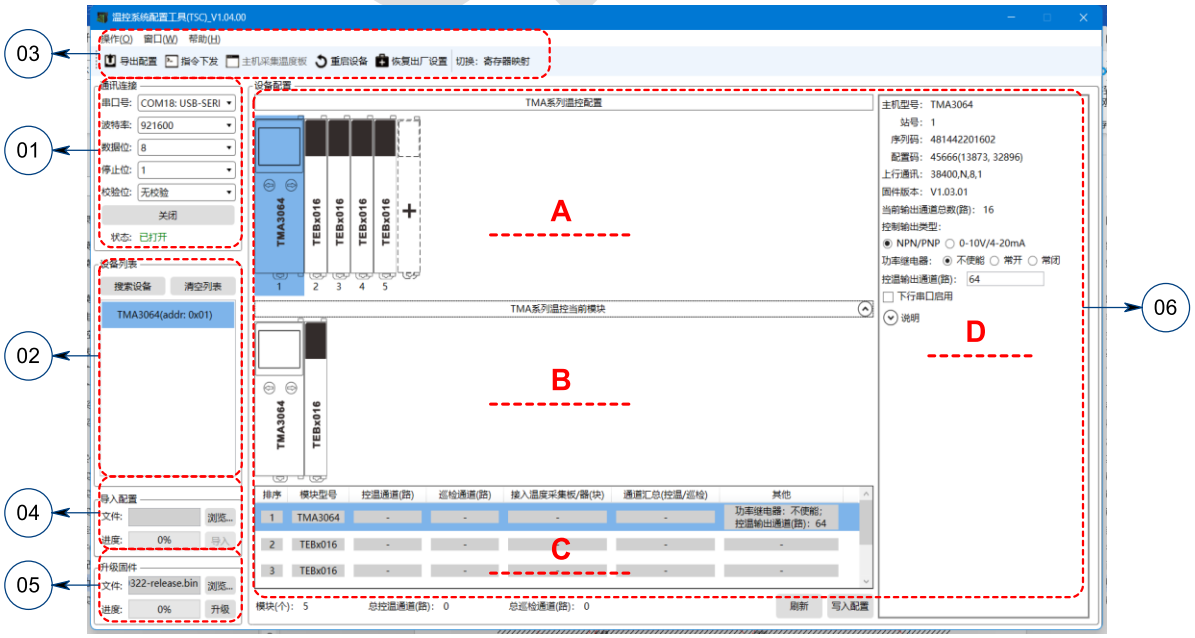
3.3.1 Open the Configuration Software

The combination temperature control equipment supports the use of the desktop "Temperature Control System Configuration Tool (TSC)" for configuration management. Double-click [TSC.exe] to open the configuration software, and the home page is shown as follows:



3.3.2 Software Feature Introduction

1、 TSC tool function partition, as shown in the figure below:



2、 TSC Tool Feature Guide:

Number	Definition	Explain
01	Communication junct-ion	Configure communication parameters for connected devices: Serial port name: Select the correct COM port for the current connected device Baud rate: 9600~921600 (fixed at 921600 when connected via TYPE-C; select 9600,19200,38400, or 115200 through the 485 uplink port, set by the side pull-code switch) Data bits: 8 by default Stop bit: 1 bit by default Check digit: No check by default Open/Close: Action button Status: Open/Closed, indicating serial port connection status
02	Device list	After searching for devices, the connected device list is displayed: Search devices: Search connected devices Clear list: Clear the devices displayed in the list List window: Displays the found device models and station numbers with addresses (shown in hexadecimal format). Selected device: Clicks on any found device to display its information on the right side of the tool software.
03	Quick Access	Export configuration: Export the device's configuration file (.cfg) for import into other devices of the same model. Command issued: Debugging application window. Use when debugging is needed. Host temperature acquisition board: Used for debugging when connected to the corresponding station number of the downlink temperature acquisition board Restart device: Restart the connected device Restore factory settings: Restore the current connected device to its factory default configuration Switch to Device Configuration/Register Mapping to change the configuration window interface
04	Import configuration	Used for importing device configuration files (in practice, you only need to configure one device to export the file, which can then be imported to other devices of the same model): File: Click the [Browse Files] button to select the path to the.cfg file Progress: Click the [Import] button to display the import progress percentage
05	Upgrade firmware	For device firmware update: File: Click the [Browse Files] button to select the path to the.bin file Progress: Click the [Upgrade] button to display the upgrade progress percentage Cancel: Click to cancel this firmware upgrade during the process
06	Application Settings	This feature area primarily configures module parameters for actual device application scenarios: **A:**The diagram shows the way the **configured** modules of the device are spliced **B:**The diagram shows the module splicing mode of the device **connected in real time**

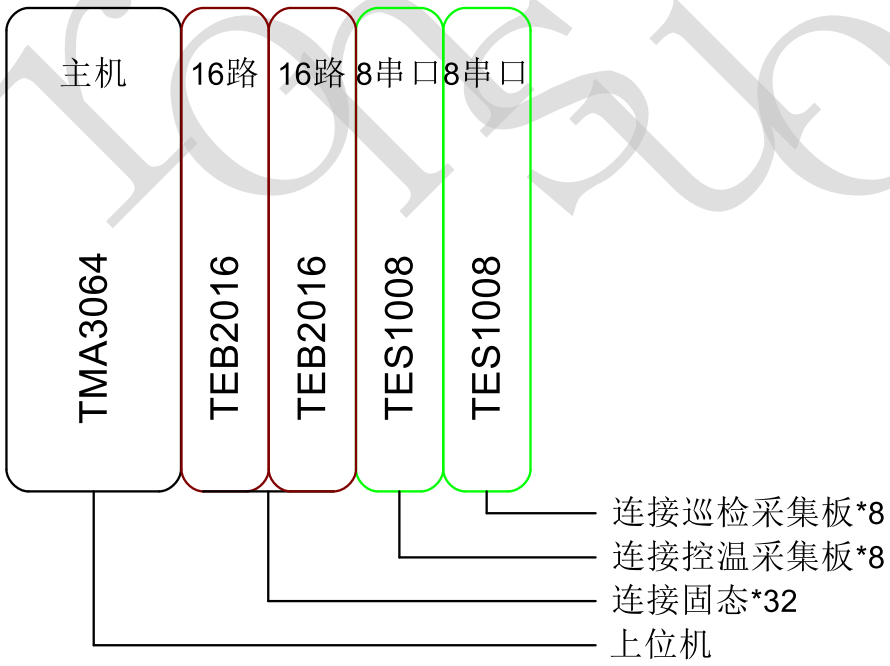
		C:List the module information **configured** by the device (single module) Module: Display the number of access modules Total temperature control channel: Number of channels configured in the acquisition module connected to the TMA host Total inspection channel: Number of channels configured in the acquisition module connected to the TMA host

		Refresh: Click to get TMA host information again Write configuration: To modify parameters of the TMA host or connected TEC/TES modules, click this button to write the configuration to the TMA host. **D:**Device detailed attribute parameters, display module configuration or read-only attribute parameter information. Control output signal type: The output module is TEB. Select [NPN/PNP]. The output module selects a power relay (0~10V/4~20mA) for TEU: disabled (default)

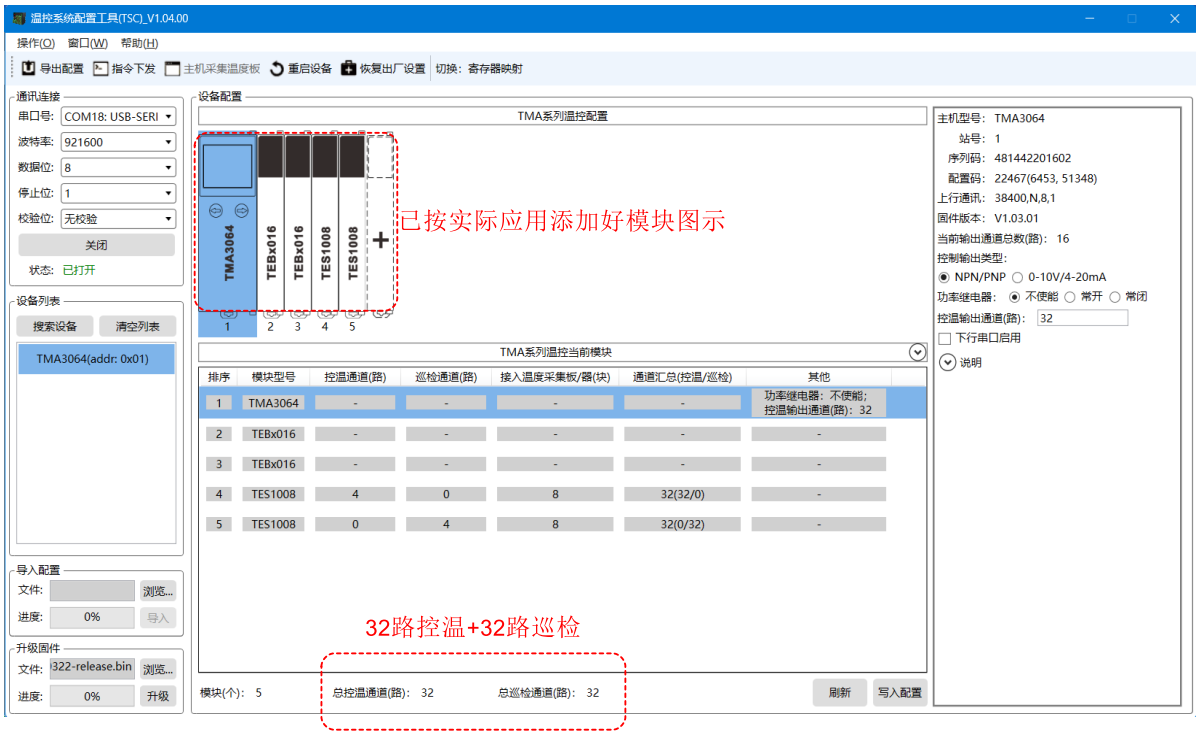
3.3.3 Application Instance Configuration

3.3.3.1 Splicing Module Mode (32 Temperature Control + 32 Patrol Inspection)

1、 System Description: This setup utilizes one TMA3064 temperature control module, two TEB 2016 expansion output modules, and two TES1008 serial acquisition modules (connecting to 164-channel temperature acquisition boards). It enables temperature control for eight fixtures, with each fixture supporting 4-channel temperature control and 4-channel inspection. The detailed configuration is illustrated in the diagram below.



2、 The host computer software configuration is shown below:

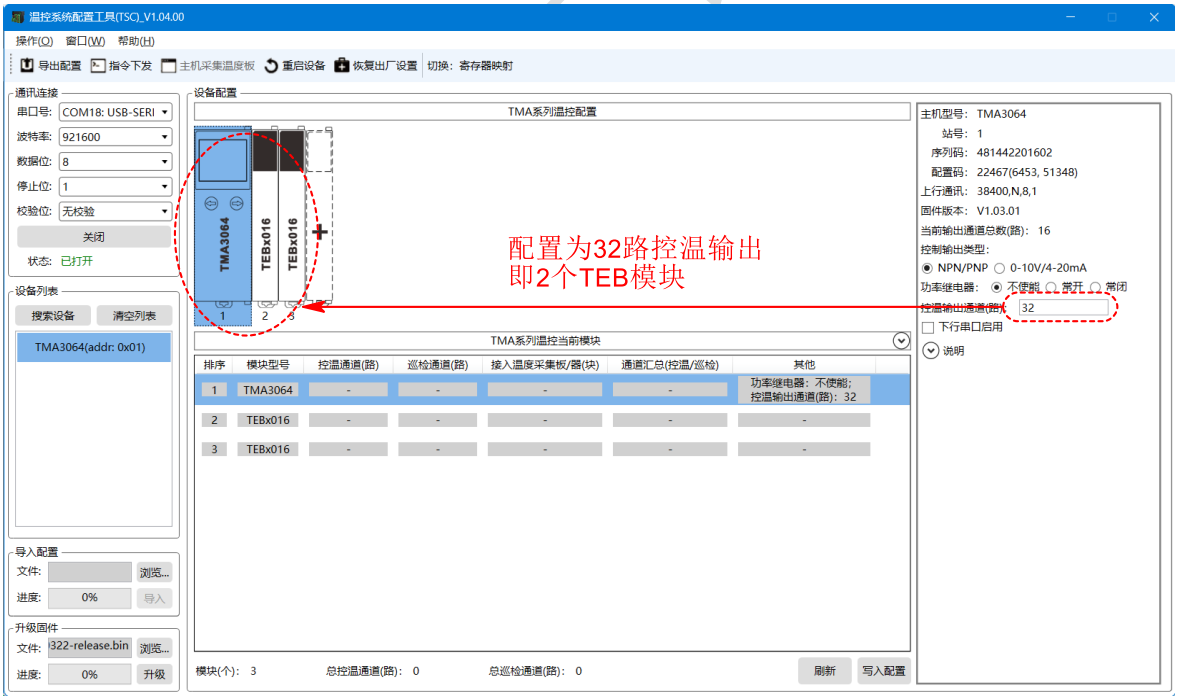


Step 1:

TMA host configuration output channels (16 channels per TEB module). When configuring temperature control output channels 1-16, the system automatically adds one additional channel.

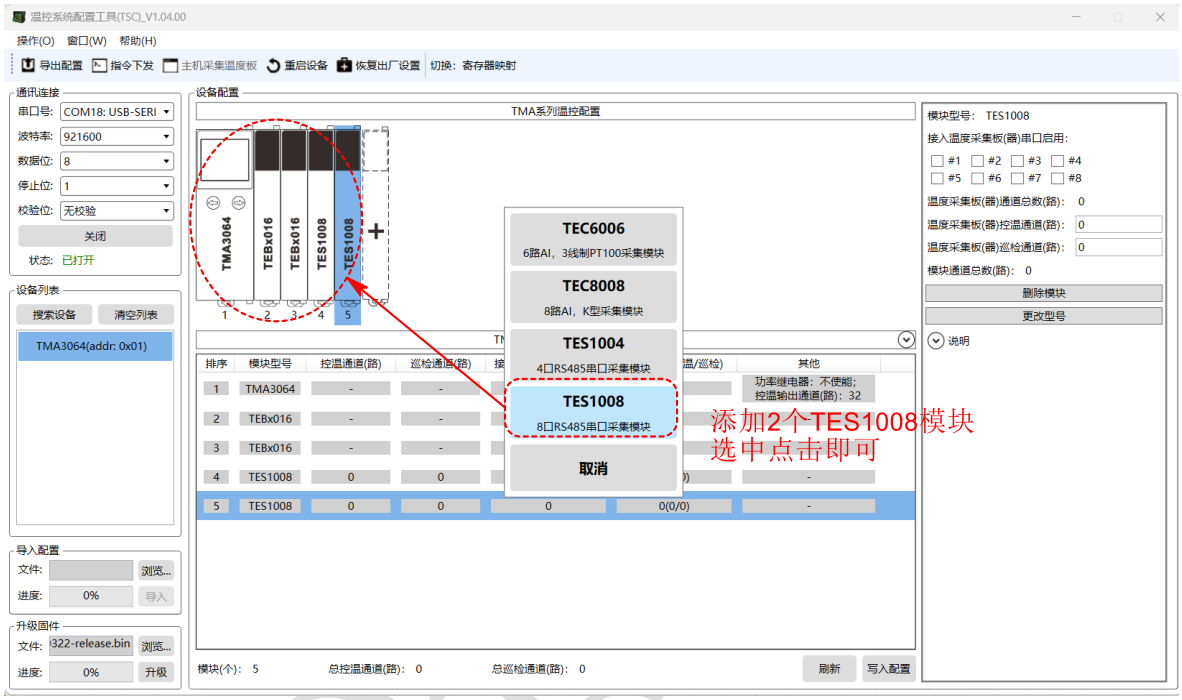
TEB module. When configured with 17 to 32 units, the system automatically adds 2 TEB modules, and so on, with a maximum output of 64 channels. The configuration method is as follows

As shown:



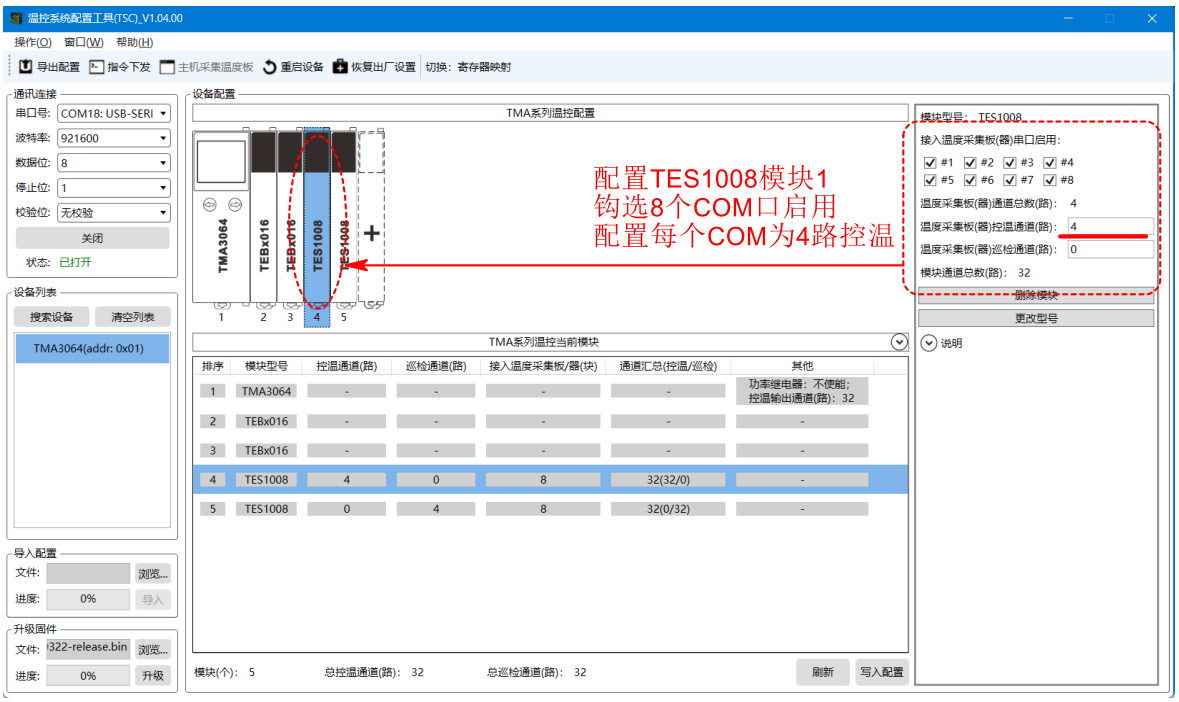
Step 2:

Add two TES modules (TES1008 Module 1 for temperature control and TES1008 Module 2 for inspection), as shown in the configuration diagram below.

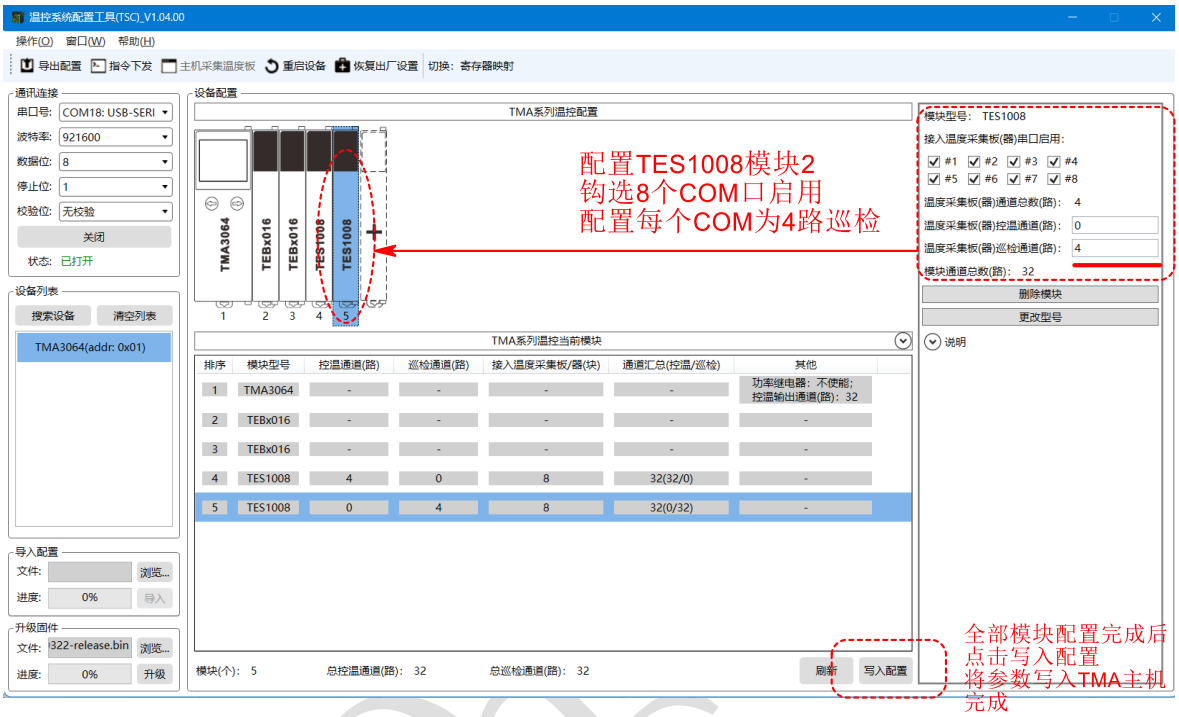


Step 3:

A.Configure TES1008 Module 1 for Temperature Control. The Configuration Method Is Shown in the Figure Below:



b.Configure TES1008 module 2 for inspection. After the configuration is completed, click the [Write Configuration] button to complete the configuration of the entire temperature control system. The configuration method is shown in the figure below:

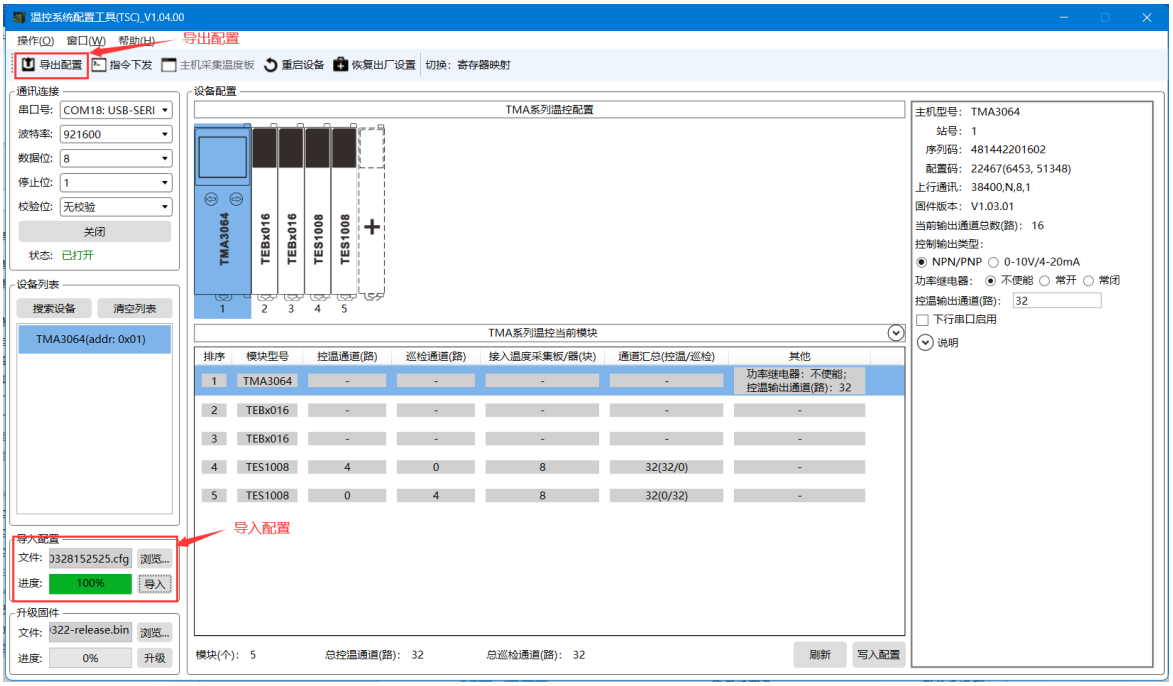


Step 4:

After completing the device configuration, you can export the configuration. Click the [Export Configuration] button in the quick menu bar to export the configuration file.

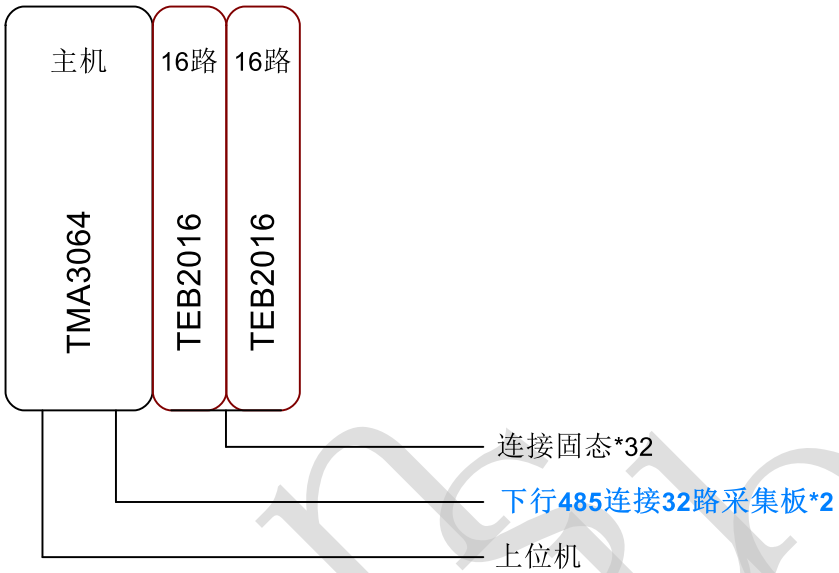
Save. Exported files can be imported to another device of the same model to achieve one-to-one configuration between two devices without repeated configuration. As shown below

As shown:

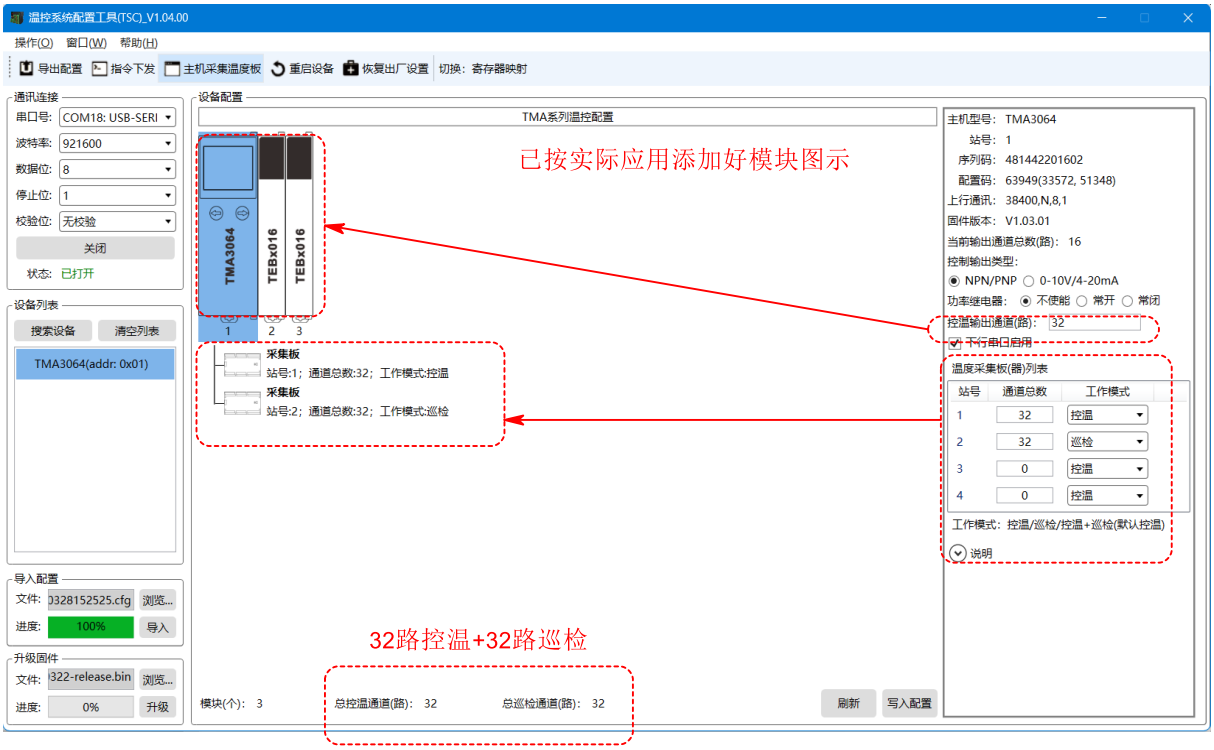

温控系统配置工具(TSC)_V1.04.00
操作(O) 窗口(W) 帮助(H)
导出配置
导出配置
指令下发
主机采集温度板
重启设备
恢复出厂设置
切换：寄存器映射
通讯连接
串口号: COM18: USB-SERI
波特率: 921600
数据位: 8
停止位: 1
校验位: 无校验
关闭
状态: 已打开
设备列表
搜索设备
清空列表
TMA3064(addr: 0x01)
导入配置
文件: 0328152525.cfg
浏览...
进度: 100%
导入
升级固件
文件: 322-release.bin
浏览...
进度: 0%
升级
设备配置
TMA系列温控配置
TMA3064
TEBx016
TEBx016
TES1008
TES1008
1 2 3 4 5
TMA系列温控当前模块
排序 模块型号 控温通道(路) 巡检通道(路) 接入温度采集板/器(块) 通道汇总(控温/巡检) 其他
1 TMA3064 - - - - 功率继电器：不使能; 控温输出通道(路)：32
2 TEBx016 - - - - -
3 TEBx016 - - - - -
4 TES1008 4 0 8 32(32/0) -
5 TES1008 0 4 8 32(0/32) -
导入配置
模块(个)： 5
总控温通道(路)： 32
总巡检通道(路)： 32
刷新
写入配置
主机型号： TMA3064
站号： 1
序列码： 481442201602
配置码： 22467(6453, 51348)
上行通讯： 38400,N,8,1
固件版本： V1.03.01
当前输出通道总数(路)： 16
控制输出类型：
NPN/PNP 0-10V/4-20mA
功率继电器： 不使能 常开 常闭
控温输出通道(路)： 32
下行串口启用
说明

3.3.3.2 External Acquisition Board Mode (32 Temperature Control Units + 32 Patrol Inspection Units)

1、 System Description: This setup utilizes one TMA3064 temperature control module, two TEB2016 expansion output modules, and two 32-channel temperature acquisition boards to regulate temperature for a single fixture, enabling 32-channel temperature control and 32-channel inspection. The detailed configuration is illustrated in the diagram below.

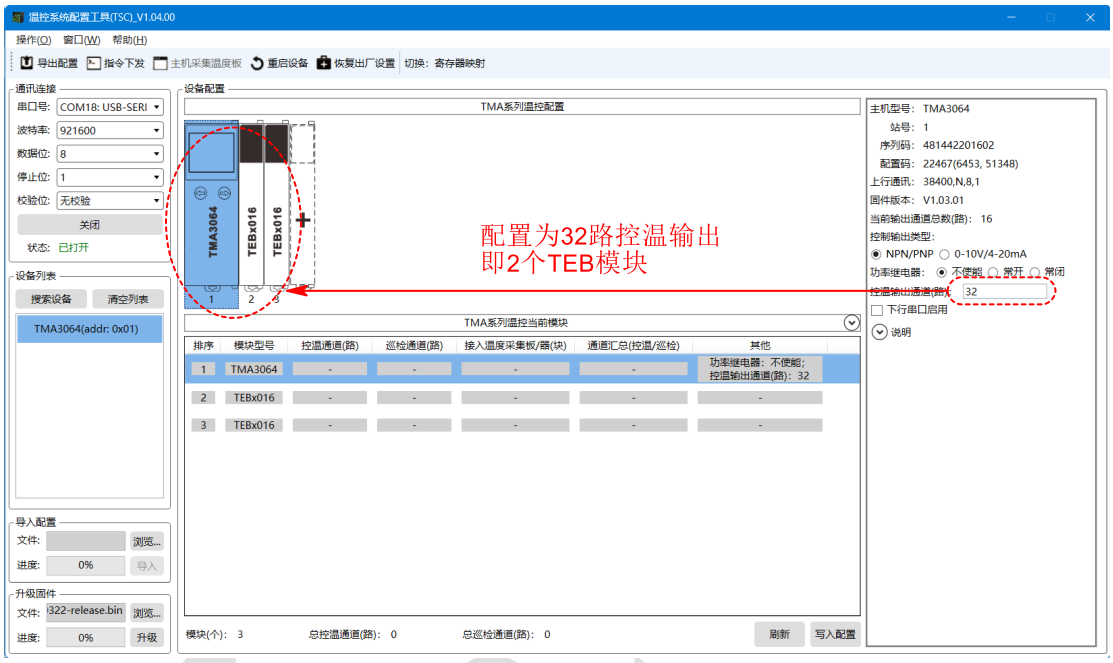


2、 The host computer software configuration is shown below:



Step 1:

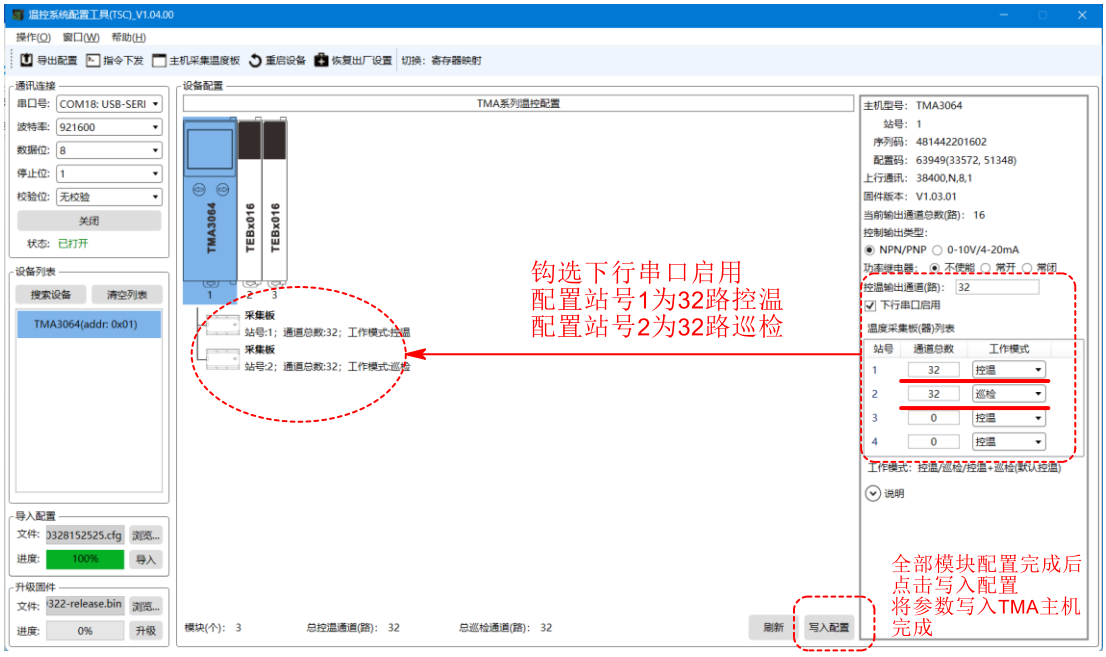
The TMA host configuration specifies the number of output channels (16 channels per TEB module). When configuring temperature control output channels from 1 to 16, the system automatically adds one TEB module; for 17 to 32 channels, it adds two modules, and so on, with a maximum output of 64 channels. The configuration method is shown in the figure below.



Step 2:

Enable the downstream serial port (activating it switches to external acquisition board mode. Station 1's acquisition board is configured for 32-channel temperature control, while Station 2...

The data acquisition board is configured for 32-channel inspection, as shown in the figure below.



3.4 Alarm Code

Order number	Alarm code (MV display)	Description (TMA panel display)
1	E0	No output channel detected
2	E1	Unauthorized
3	E2	Hardware self-test error alert
4	E3	Output channel short circuit (requires restart to recover)
5	P0	Unreceived TEC or TES acquisition module
6	P1	Communication with the data acquisition board is interrupted
7	P2	Configuration error in the collector board register
8	P3	The number of channels in the TEC or TES acquisition module configuration does not match
9	C0	Overlimit alarm: If the temperature of any circuit exceeds the limit, the output of that circuit will be disconnected. The output will not automatically resume when the temperature returns to normal. You can enable the output to clear the alarm (disabled by default).
10	C1	Temperature alarm: Displays when any channel exceeds the temperature alarm threshold and automatically clears when normal. (Default: 2°C over-temperature)
11	C2	Temperature abnormal during inspection. An alarm is triggered if any temperature control deviates from the inspection temperature by more than the set value. The deviation is automatically eliminated when normal (disabled by default).
12	C3	Low-temperature alarm: When the abnormal detection time expires, the system will trigger an alarm if any channel's temperature drops below the set value by 5 °C. The alarm will automatically clear when temperatures return to normal (disabled by default).
13	MV digital flicker	The configured output channels exceed the physical output channels.
14	MV digital always on	System is working properly

4 Common Faults

The device may experience certain malfunctions during use. Users can troubleshoot based on the following symptoms and solutions to restore normal operation. If the issue persists, please contact our company.

power failure

The problem is that the indicator lights on the back panel do not light up after power-on.

Exclusion method:

1、 Check if the power wiring is properly connected to the terminals.

2、 Check if the positive and negative terminals of the power cord are reversed.

3、 Use a multimeter to check if the input voltage is within the specified range (12~36VDC).

Communication error

Fault: RS485 communication failed

Exclusion method:

1、 Check if the device parameters are configured correctly.

2、 Check if the device panel indicator lights are displaying correctly.

3、 Check if the communication wiring is correct. After confirming the wiring is correct, verify that the communication parameters are properly configured.

4、 Check if the 485 DIP switch address matches the host computer's communication address.

5 Maintenance

When the device requires maintenance, disconnect the power first. Under normal operating conditions, the device does not require frequent maintenance. Simply every

12 Check the equipment status and terminal connections for looseness monthly, and clean the surface dust with a dry soft-bristled brush. Long-term storage

When not in use, disconnect the device from power. Avoid placing it in areas with extreme temperatures or high humidity.

6 Safety Requirements

Please read the following safety precautions to avoid personal injury and prevent damage to this product or any other connected products. To avoid potential hazards, this product must be used only within the specified scope.

Only authorized technicians from our company are permitted to perform the repairs.

Use the appropriate power source.

Check the input power type, voltage value and polarity of the equipment.

Connect and disconnect correctly.

Do not disconnect the data communication cable while the device is powered on.

equipment ground 。

To prevent electric shock, the casing grounding wire must be connected to the ground. Before connecting to the input or output terminals of this product, ensure the device is properly grounded with a resistance below 1 Ω.

Correct connection.

Use the original accessories when connecting. If you need to make special connections, pay attention to the interface labels.

Avoid contact with exposed circuits.

Do not touch exposed contacts or components when the equipment is energized.

Do not operate if there is a suspected fault.

If you suspect this product is damaged, please have it repaired by our authorized service personnel.

Provide good ventilation.

Handle this device carefully to avoid strong impacts or vibrations. Do not install it in areas with severe shaking.

Do not touch the power switch or this device with wet hands.

Do not operate in humid environments.

Do not operate in explosive environments.

Keep the surface of the device clean and dry.