TA-133 Series Motion Controller

user manual

Preface

TA-133 series logic motion controller, is based on ARM processor hardware platform, PLC open-compliant high-performance multi-axis motion controller. It has pulse and EtherCAT control modes, which can realize multi-axis servo control, especially suitable for the control of medium load computing equipment and small and medium-sized equipment in advanced manufacturing industry. This manual describes the installation and wiring of the controller, including mechanical installation, electrical installation, operating instructions, etc.

More information

Data Name	About us
PLC Software Manual	This paper introduces the basic function, network configuration and programming foundation of medium PLC software.
Manual (Motion Control)	This paper introduces the composition of motion controller application system, motion control program mechanism, motion control related instructions, simulation and debugging related operations.
Instruction Manual	Introduction to basic instructions

Version change records

Date of revision	Release version	Change contents
2024-3	1.0	First edition

Warranty statement

Under normal use, the product fails or is damaged, and Just Motion Control provides warranty service within the warranty period (see the order form for product warranty period). Maintenance fees will be charged after the warranty period expires.

During the warranty period, repair costs will be charged for product damage caused
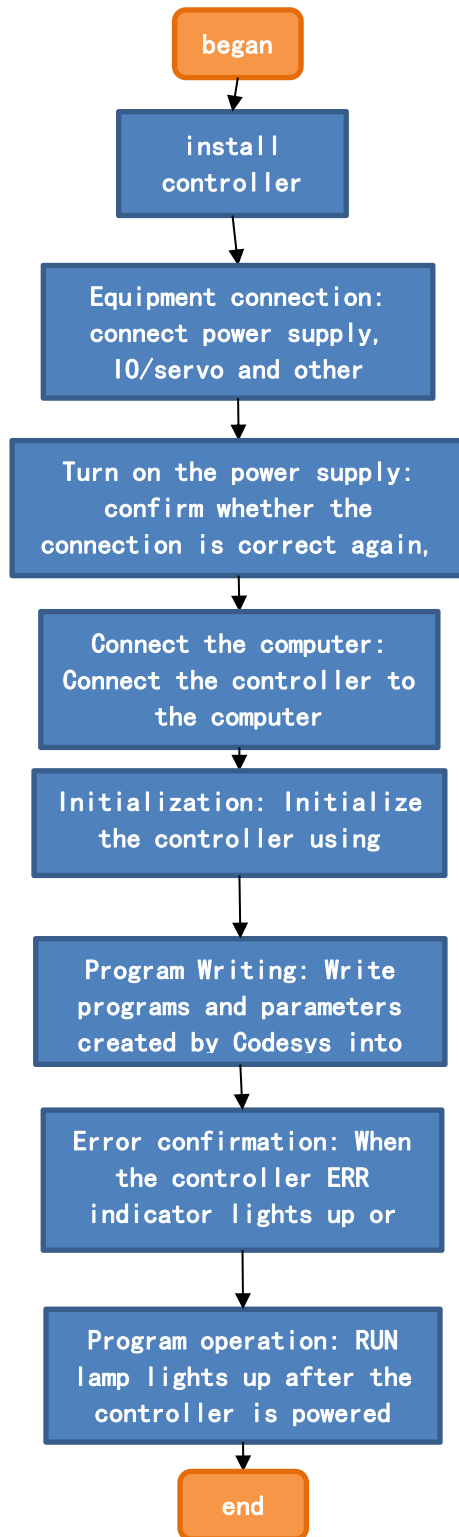by the following circumstances:

- Failure to operate the product according to the manual may cause damage to the product.
- Use of this product for abnormal functions, resulting in product damage.
- Product damage caused by exceeding the specified use range of the product.
- Secondary damage caused by force (natural disaster, earthquake,
- lightning strike, fire) factors.

The service fees are calculated according to the uniform standards of

manufacturers and, if contracts exist, they will be dealt with on a contractual basis.

For detailed warranty instructions, please refer to Product Warranty Card.

Manual instructions

Welcome to use "TA-133 Series Controller User Manual,For users who are using this product for the first time, they should read this manual carefully. If you have questions about some features and performance, please consult our technical support staff for assistance.

System Startup Flow Chart

```
began
```

install controller

Equipment connection: connect power supply, IO/servo and other

Turn on the power supply: confirm whether the connection is correct again,

Connect the computer: Connect the controller to the computer

Initialization: Initialize the controller using

Program Writing: Write programs and parameters created by Codesys into

Error confirmation: When the controller ERR indicator lights up or

Program operation: RUN lamp lights up after the controller is powered

```
end
```

Directory

Safety precautions

Security Statement

■ This chapter describes the safety precautions required for proper use of this product. Before using this product, please read the relevant information in the product manual to ensure correct and safe use. Failure to observe the safety precautions may result in death, serious injury, or damage to equipment.

■ The use of "Danger","Warning" and "Caution" in the manual does not represent all safety matters to be observed, but only as matters requiring special attention when operating this product.

■ This product shall be used in an environment conforming to design requirements, otherwise it may cause product failure or casualties. Functional abnormality or component damage caused by failure to comply with relevant regulationsis not within the scope of product quality assurance.

■ Shenzhen Just Motion Control Electromechanical Co., Ltd. will not assume any legal responsibility for personal safety accidents and property losses caused by illegal operation of products.

Definition of safety level

dangerous	"Danger" means that failure to comply with regulations could result in death or serious injury.

warning	"Warning" means that failure to follow instructions may result in death or serious injury.
noted	"CAUTION" Minor injury or equipment damage may result if not followed.

Safety precautions

■ Before installing, operating, checking and maintaining this product, please read this instruction manual and other accompanying materials carefully and use it correctly. When using this product, please ensure the integrity of the product and operate according to the provisions of the manual.

Unpacking
warning
◆ Before unpacking, please check whether the outer packaging of the product is intact, there is no damage, moisture, deformation and other conditions. ◆ When unpacking, please check the surface of the product parts for damage, rust, etc. If there is, do not install! ◆ After unpacking, please carefully check the order, check whether the product quantity and information are complete, if the product does not match the name of the packing list, do not install!
Transportation and storage
noted
◆ When handling the product, please be sure to lift it gently, pay attention to holding the body firmly, pay attention to the objects under your feet at any time, and prevent tripping, otherwise there is a danger of injury or product damage! ◆ Please store and transport in strict accordance with the storage and transportation conditions required by the product, otherwise there is a risk of product damage. ◆Avoid product storage time more than 3 months, storage time is too long, please use closed box and necessary inspection. ◆ Avoid storage and transportation in places with high temperature, dew, wind and rain, impact, etc. ◆ It is strictly prohibited to mix this product with equipment or articles that may affect or damage this product.
Installation
warning
◆ Please read the product manual and safety precautions carefully before installation! ◆ It is strictly prohibited to disassemble and modify this product without authorization! ◆ Do not install this product in places with rain, direct sunlight, strong electric field, strong magnetic field and strong

vibration!

◆ Do not wear loose clothes or accessories when installing, otherwise there may be a risk of electric shock!

◆When the product is installed in a closed environment (such as a cabinet or a cabinet), please use a cooling device (such as a cooling fan or a cooling air conditioner) to fully cool it, and at the same time, it is necessary to provide a corresponding fire protection shell, electrical protection shell and mechanical protection shell to meet the installation environment requirements, otherwise it may cause overheating or fire disaster.

◆ It is forbidden to screw the fixing bolts of product parts and components!

◆ When it is necessary to install equipment with strong electromagnetic interference such as transformers, please install shielding protection devices to avoid miss operation of this product.

◆ Do not tighten the machine with excessive torque to avoid damage to the machine.

◆ Please install the product on a flat surface. If the mounting surface is uneven, it may cause excessive force on the circuit board, resulting in failure.

⚠ **danger ous**

◆ Only professionals trained in electrical equipment and with electrical knowledge can operate it. No non-professionals allowed!

⚠ **noted**

◆ When installing, be sure to cut off the power supply. If the installation is carried out under the power-on state, it may cause damage to the controller and casualties.

◆ For a device operating at constant speed, resonance may occur when it is operated at variable speeds. At this time, in order to reduce resonance, install anti-vibration rubber under the motor frame or use vibration suppression function.

wiring

⚠ **danger ous**

◆ Non-professionals are strictly prohibited to install equipment and wiring!

◆ During bolt processing and wiring operation, please cover the top of the product with cloth to prevent metal chips and wire heads from falling into the vent hole of the controller during drilling, otherwise it may lead to fire.

◆ Please do wiring work under the condition of cutting off the power supply, do not directly touch the conductive parts of the product, otherwise there will be the danger of electric shock.

◆ Please ensure that the equipment is well grounded, otherwise there will be electric shock hazard.

⚠ **warnin g**

◆ It is strictly prohibited to connect the input power to the output terminal of the equipment or product,otherwise it will cause equipment damage or even cause fire.

◆ When the driver is connected with the motor, please ensure that the phase sequence of the driver and the motor terminal is accurate and consistent to avoid reverse rotation of the motor.

◆ The cable used in wiring must meet the corresponding requirements of wire diameter and shielding, and the shielding layer of shielded cable needs to be grounded reliably at one end!

◆ Please tighten the terminal screws according to the tightening torque specified in the manual. Insufficient or excessive tightening torque may lead to overheating and damage of the connection part, causing fire hazard.

◆ After the wiring is completed, please check that the cable wiring is correct, and there are no screws, wire heads or washers falling inside the product, otherwise there may be electric shock danger, fire and miss operation.

power-up
⚠️ **dangerous**
◆ Before power-on, please confirm that the product is installed in good condition, the peripheral equipment cables, input and output cables are firmly connected, and the motor device is allowed to restart.   ◆ Before power-on, please confirm that the output voltage of the power supply is consistent with the rated voltage of the programmable controller, and the positive and negative connections of the power supply are correct, otherwise the product may be damaged.   ◆ When energized, it is forbidden to open the product cover, touch any terminal of the product, disassemble the product, otherwise there is a risk of electric shock!
⚠️ **warning**
◆ After the wiring and parameter setting are completed, please conduct the machine trial operation to confirm that the machine can operate safely, otherwise it may cause miss operation, personal injury or equipment damage.   ◆ Before power-on, please ensure that the power supply voltage of the product is consistent with the power supply voltage. If the power supply voltage is used incorrectly, it may cause damage to the controller.   ◆Before energizing, please pay attention to stay away from the mechanical movement range, otherwise it may cause personal injury or death.
start
⚠️ **dangerous**
◆ It is strictly prohibited for non-professionals to operate the product, otherwise there will be miss operation, personal injury or death!   ◆ Do not touch any conductive parts of the product, disassemble any device or parts of the product under operation, otherwise there will be electric shock danger and casualties!
⚠️ **warning**
◆ It is strictly prohibited to directly touch the equipment shell or resistor to test the temperature, otherwise it may cause electric shock or burns!   ◆ During operation, avoid other items or metal objects falling into the vent of the product, otherwise it may cause product damage or fire!
maintenance
⚠️ **dangerous**
◆ It is strictly prohibited for non-professionals to carry out product maintenance, inspection or component replacement!   ◆ It is strictly prohibited to carry out equipment maintenance under energized state, otherwise there is a risk of electric shock!   ◆ Please use the battery correctly, do not charge, heat, reverse connection, short circuit and other operations on the

battery.

<table>
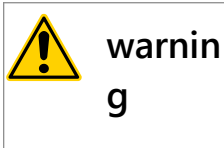<tr><td>⚠ warning</td></tr>
<tr><td>◆ Please check and maintain equipment and products regularly according to equipment maintenance and maintenance requirements, and make maintenance records.</td></tr>
<tr><td>maintenance</td></tr>
<tr><td>⚠ dangerous</td></tr>
<tr><td>◆ Non-professionals are strictly prohibited to inspect, repair or replace equipment!
◆ It is strictly prohibited to carry out equipment maintenance in the energized state, otherwise it may cause life danger!
◆ After cutting off the power supply of all equipment, please wait at least 10 minutes before carrying out equipment inspection, maintenance and other operations, otherwise there will be electric shock danger!</td></tr>
<tr><td>⚠ warning</td></tr>
<tr><td>◆ Please repair the equipment according to the product warranty card.
◆ When the equipment fails or is damaged, professional maintenance personnel will troubleshoot and repair the equipment, and make maintenance records.
◆When replacing product parts,please standardize the operation.
◆ Do not continue to use the damaged machine, otherwise it will cause greater damage and even cause accidents such as fire.
◆ After replacing the equipment, be sure to re-check the equipment and power wiring and set the parameters.</td></tr>
</table>

1 Product information

1.1 overview

TA-133 series intelligent mechanical controller is based on ARM and Codesys motion control platform pulse and EtherCAT bus motion controller, using all-metal body, providing rich network interface,

can meet the expansion needs of various projects, with strong motion control performance. This product supports multiple interfaces, including up to 3 Ethernet interfaces, 6 pulse axis interfaces,1 USB 2.0 interface, 1 RS 485 interface, 1 RS 232 interface, etc.

This series of products has a wide temperature range (-5 ~55 ° C), good EMC performance; equipped with the highest ARM A7*4, can provide excellent computing power; In addition, the product is also equipped with up to 1GB DDR4 memory and 8GB EMMC hard disk, very suitable for applications.
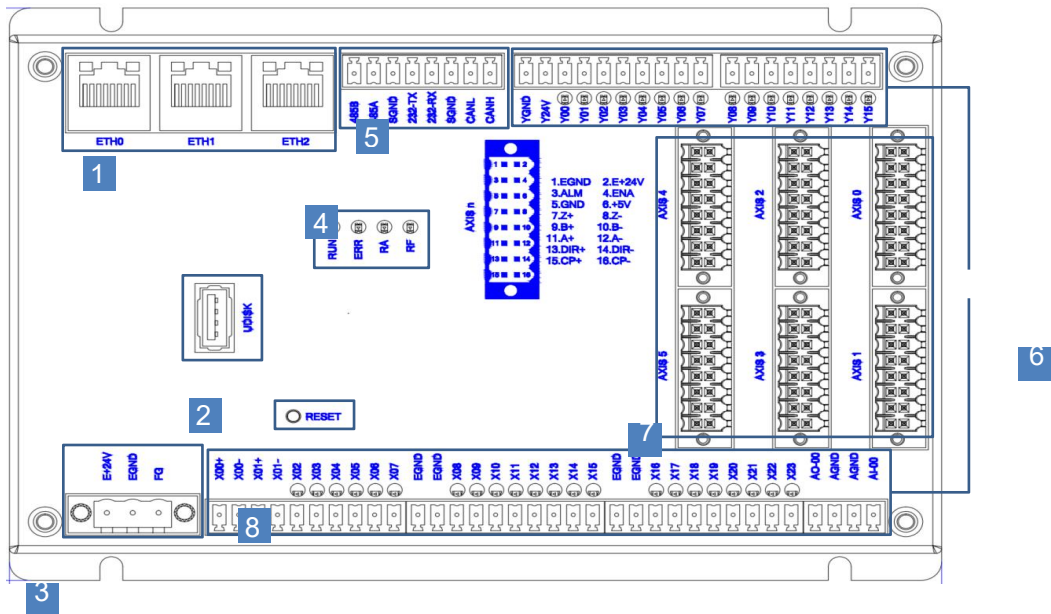
1.2 Product composition and function

1.2.1 Controller appearance

Figure 1-2 Controller Appearance
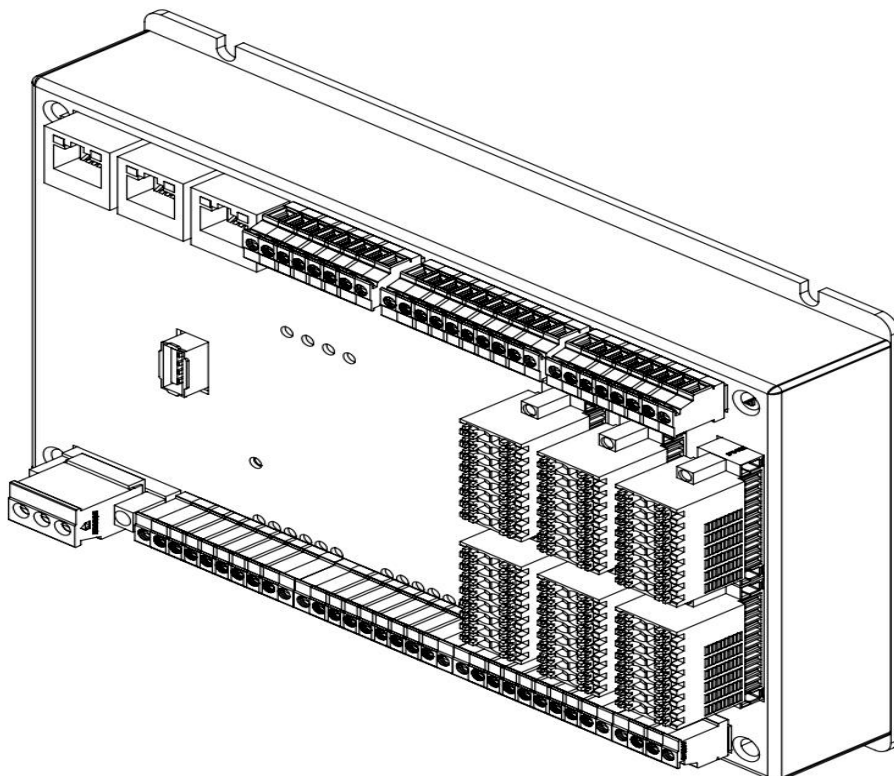
External interfaces ofTA-130 series box controller are as follows:

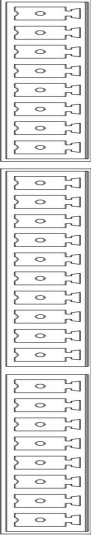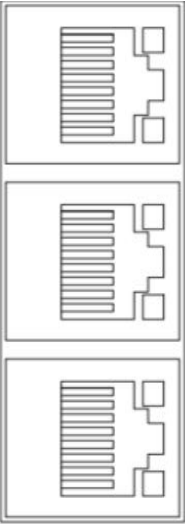| number	Interface name	Described
1	LAN port	3 Ethernet ports
2	USB interface	1 USB port
3	power interface	24V power input
4	status indicator	For the specific definition of the indicator, please refer to the table below "1.3.2 LED Status Indicator"
5	communication interface	RS485/RS232/CAN2.0 (reserved)
6	IO interface	24DI/16DO 1AI/1AO
7	pulse shaft interface	6 pulse axes +6 encoder
8	reset button	initialization controller
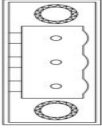
1.2.2 LED Status Indicator

Indicator lights are defined as follows:

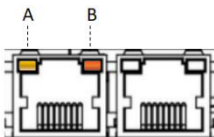| Serial number	LED	name	functional description	state	defined
1	RUN	Running indicator light	Operational status	green	Extinguishing: System not started Flashing: User program running Always on: System started but user program not running
2	ERR	error indicator	Operational error	red	Extinguished: Normal Flashing: System factory reset or system update Always light 1. Over temperature alarm, EtherCAT bus or pulse shaft abnormality 2. User program operation failure 3. System failure alarm
3	RA	Operating status of IO module	running state	yellow	Flashing: slow flash IO not ready, flash IO ready
4	RF	pulse shaft operating state	running state	yellow	Constant extinction: axis error Flashing: slow flashing indicates normal operation of pulse axis Always bright: axis error

1.2.3 Controller interface

The following table summarizes the interfaces of theTA-130 series

Serial number	Port name	functional description	Joint form	Terminal style
1	Input power	24VDC(-20%~+20%)	3PPluggable 5.08mm pitch Euro terminals with set screws, black	
2	IO/communication terminals	RS485 interface	Plug 3.81mm pitch European terminals, black. Support Modbus master-slave and no-protocol communication, serial port default parameters: baud rate 115200, no check, 8 data bits, 1 stop bit.	
		RS232 interface	Plug 3.81mm pitch European terminals, black. Modbus communication is supported.	
		24DI、16DO 1AI、1AO	Plug 3.81mm pitch European terminals, black.	
3	network port	Ethernet interface	3 ETH ports, ETH 0/ETH 1/ETH 2 from bottom to top. The Ethernet port provides three standard RJ-45 jacks.	

4	pulse shaft interface	6 pulse axis interfaces 6 encoders	6* 16P plug 3.5mm pitch, spring crimp with set screw, black.	

The status of the LED indicator on the front of the mesh port is described as follows:

indicator light	function	color	state	significance
	A:Link/Act	yellow	☐	Extinguished: Not connected
			◨	Flashing: Connected and sending and receiving data
			◼	Always bright: connected
	B：Speed	Green/Orange	☐	Extinguished: Not connected
			◼	Always on: Equipment connected
			◼	Always on: 100Mbps connection

The following figure shows the status of the indicator lights when the three network ports are connected to the device. From left to right, they are connected to the computer, connected to the motor, and connected to the touch screen.
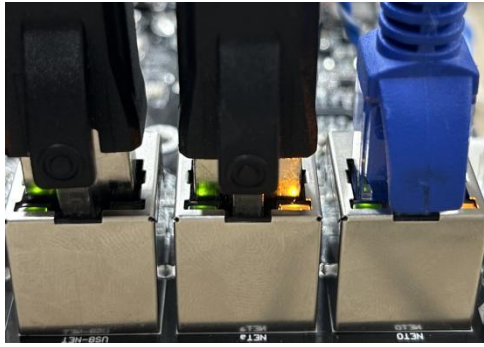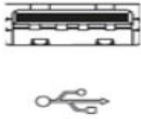
Figure 1-3 Controller Indicator Status

USB 2.0 pins are defined as follows:

	pin	signal name	function
	1	VCC	power supply
	2	DATA-	USB 2.0 differential data signal
	3	DATA+	
	4	GND	power ground

2 Product specifications

2.1 Basic specifications of controller

The TA-130seriesincludes the following controllers, whose basic specifications are shown in the table below:

projects		TA-133
Power supply		24VDC(-20%~20%)
CPU		A7@1.2GHz*4
Storage capacity		1G
built-inform		onboard
hard disk capacity		8G
hard disk format		EMMC
program		61131-3 Programming languages (LD, ST, SFC, CFC)
Program execution mode		Translation execution
User program storage space		128 M Byte
User data storage capacity		128 M Byte
EtherCAT communication		1 route (up to 64 slave stations per route)
Modbus TCP communication		3 routes (up to 63 slave stations per route)
Modbus(serial) communication	RS-485	1(max. 31 slave stations per route)
	RS-232	1 road
axle number		64
Overall size(mm)		Length 183* Width 127* Height 30.50
Net Weight (kg)		<1kg
heat dissipation mode		Natural cooling
battery life		3 years (25 ° C, 0% power-on time rate (no power))

2.2 Application Environment Specifications

The application environment specifications ofTA-130seriescontroller are shown in the table below:

projects	Parameter type	work	transport	storing
Environmental parameters (IEC60721 -3)	Environmental classification	IE33	IE22	IE12
	temperatures	-10-55℃	-40-70℃	-25-70℃
	Humidity of the	10- 95%, no condensation		

3 Installation and fixing

3.1 Installation space

In order to facilitate ventilation and easy module replacement, the distance between the upper and lower parts of the module and the installation environment and surrounding parts should be as shown below.

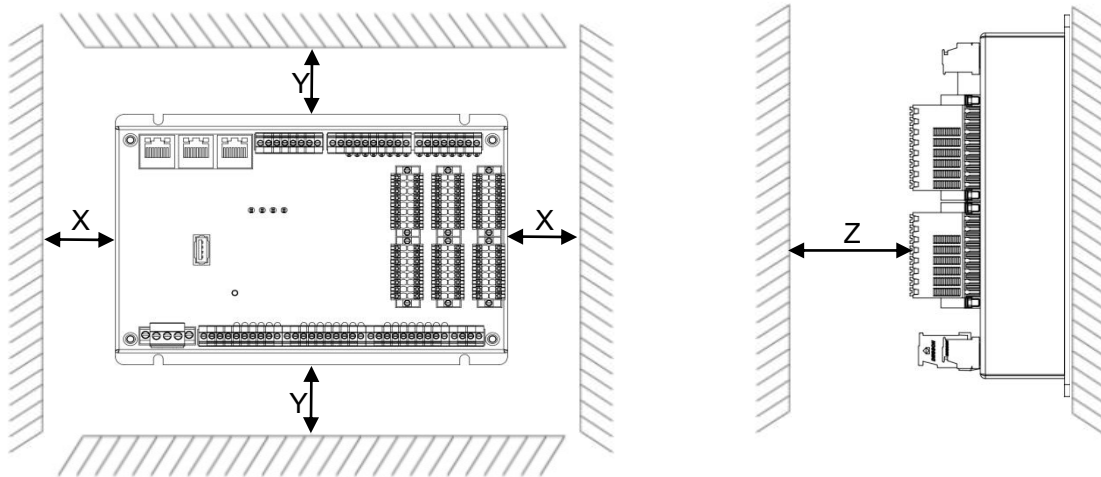Schematic diagram of installation mode:

Figure3- 1 Installation Space Requirements for Box Controller

The installation spacing size in the figure is shown in the table below:

direction	Minimum size requirement (mm)
X	50
Y	50
Z	100

3.2 Installation precautions

Precautions when installing the controller:

● Before installation, please ensure that the product is in a power-off state;

● Be sure to read the product manual and safety precautions carefully before installation.

● It is forbidden to disassemble and modify this product without authorization, otherwise it may damage the controller.

● Do not install this product in places where water splashes, direct sunlight, strong electric field, strong magnetic field and strong vibration occur.

● Do not tighten the machine with excessive torque to avoid damaging the controller.

3.3 installation guidance

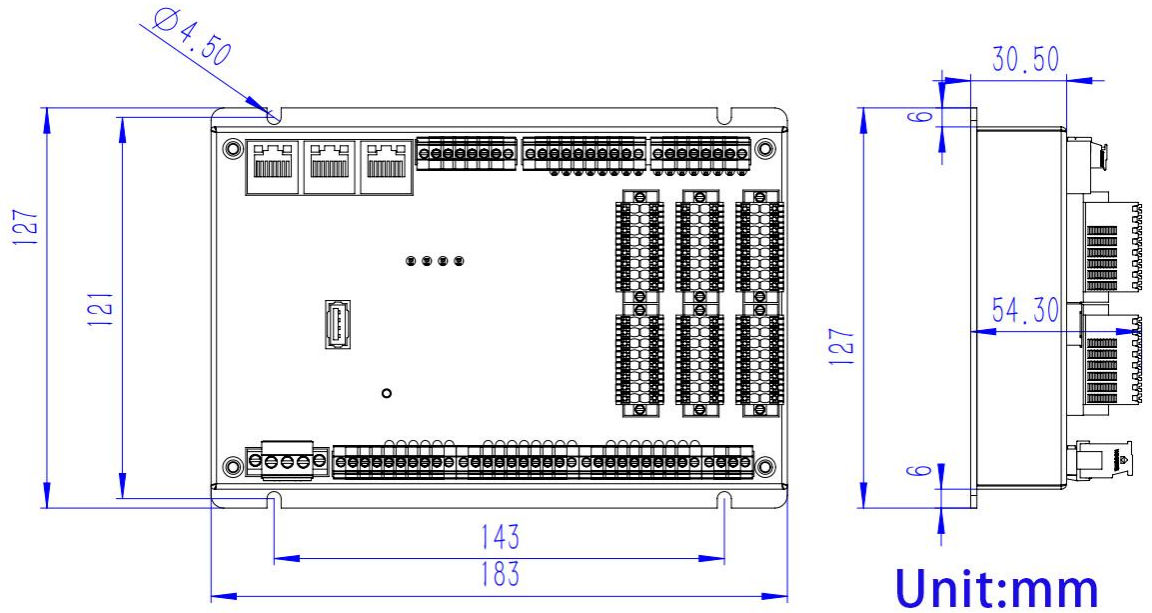The installation size of TA-133 series controller is shown in the figure below:

Figure 3-2 Controller mounting size

4. wiring

4.1 Wiring recommendations

Ground points are provided on the power terminals of the controller. Please ground the whole controller with a grounding wire as thick and short as possible (the wire length is less than 30 cm,and the thickness is more than 0.5 in the national standardmm^2).

If dedicated grounding is not possible, use "common grounding"(common grounding is strictly prohibited), as shown in Figure 4-1.
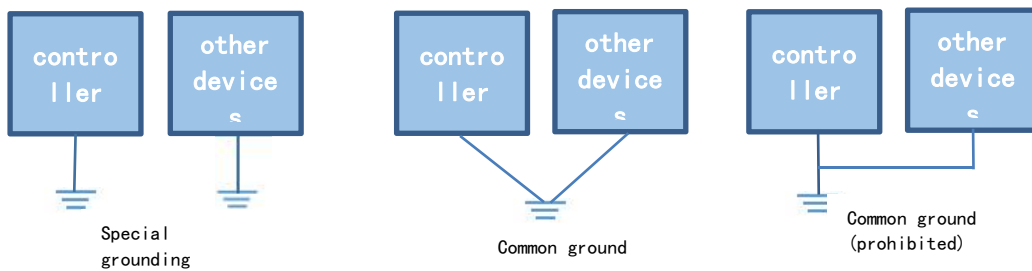

Figure 4-1 Power Grounding Requirements

4.2.Grounding requirements for communication signals

The cable for signal communication must use shielded cable, and the shielded wire needs to be grounded at both ends. Ground point should be as close as possible to the communication port, so that the cable after grounding will not be affected by the electromagnetic induction of the cable before grounding.

For the shielded cable after stripping part of the skin exposed shielding part should try to make its grounding point with a large area to ensure good contact.

4.3 Power input terminal wiring

The power input terminals are screw-fixed, plug,3-Pin terminals with 5.08mm spacing. The schematic diagram of the power plug connected to the power input interface is as follows:
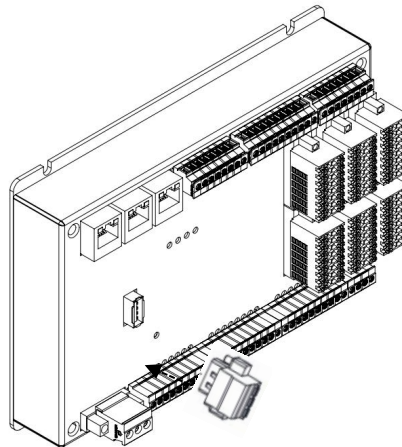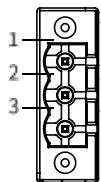

Figure4-1 Schematic diagram of power input terminal wiring

4.3.1. Power terminal definition

terminal	serial number	Terminal name	type	functions
	1	FG	grounding	enclosure protective ground
	2	EGND	input	DC input negative terminal
	3	E+24V	enter	DC input positive terminal

4.3.2. Input power specification

serial number	projects	specifications
1	Input voltage	24VDC(-20%~+20%)
2	Input current	1.5A (excluding digital output)
3	Reverse polarity	is
4	short-circuit protection	is

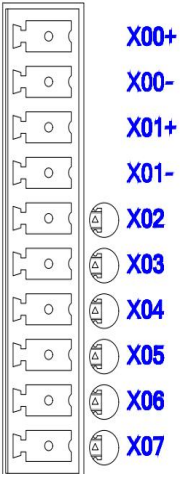# 4.4 IO/communication interface wiring

4.4.1 Introduction of interface

IO/communication interface adopts 3.81 mm spacing terminals,which includeRS-232 signal, RS-485 signal, CAN2.0 signal (reserved), IO port signal, etc. Pluggable terminals are used for convenient field installation and wiring, which is conducive to field replacement and maintenance.
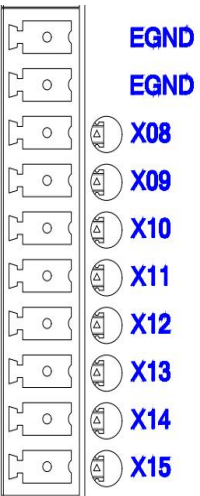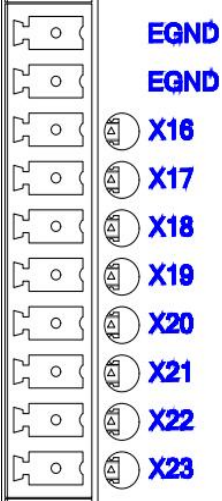
4.4.2. Serial communication definition

pin	name	function
1	485B	RS485B
2	485A	RS485A
3	SGND	signal ground
4	232-TX	RS232 transmission
5	232-RX	RS232 received
6	SGND	signal ground
7	CANL	reserve opening
8	CANH	reserve opening

4.4.3. I/O Interface Communication Definition

TA_130 series controller input port:

pin	name	type	functional description	defined
1	X00+	high-speed counting	differential signal	Support 24V and 5V
2	X00-	high-speed counting		
3	X01+	high-speed counting	differential signal	Support 24V and 5V
4	X01-	high-speed counting		
5	X02	input	digital input	digital input
6	X03	input	digital input	digital input
7	X04	input	digital input	digital input
8	X05	input	digital input	digital input
9	X06	input	digital input	digital input
10	X07	input	digital input	digital input

pin	name	type	functional description	defined
11	EGND	ground	ground	ground
12	EGND	ground	ground	ground
13	X08	input	digital input	digital input
14	X09	input	digital input	digital input
15	X10	input	digital input	digital input
16	X11	input	digital input	digital input
17	X12	input	digital input	digital input
18	X13	input	digital input	digital input
19	X14	input	digital input	digital input
20	X15	input	digital input	digital input

	pin	name	type	functional description	defined
	21	EGND	ground	ground	ground
	22	EGND	ground	ground	ground
	23	X16	input	digital input	digital input
	24	X17	input	digital input	digital input
	25	X18	input	digital input	digital input
	26	X19	input	digital input	digital input
	27	X20	input	digital input	digital input
	28	X21	input	digital input	digital input
	29	X22	input	digital input	digital input
	30	X23	input	digital input	digital input

	pin	name	type	functional description	defined
	31	AO-00	analog output	analog output	analog output
	32	AGND	ground	ground	ground
	33	AGND	ground	ground	ground
	34	AI-00	analog input	Analog Input 3	analog input
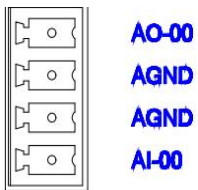
TA_130 series controller output port:

pin	name	type	functional description	defined
1	YGND	ground	Power the output	Connected to 0v input
2	Y24V	24V power interface	Power the output	Connected to 24V input
3	Y00	output	Digital Output/PWM	Digital Output/PWM
4	Y01	output	Digital Output/PWM	Digital Output/PWM
5	Y02	output	digital output	digital output
6	Y03	output	digital output	digital output
7	Y04	output	digital output	digital output
8	Y05	output	digital output	digital output
9	Y06	output	digital output	digital output
10	Y07	output	digital output	digital output

pin	name	type	functional description	defined
11	Y08	output	digital output	digital output
12	Y09	output	digital output	digital output
13	Y10	output	digital output	digital output
14	Y11	output	digital output	digital output
15	Y12	output	digital output	digital output
16	Y13	output	digital output	digital output
17	Y14	output	digital output	digital output
18	Y15	output	digital output	digital output

23

TA-130 series digital IO wiring details:

24V

| L | N | PE | -V | -V | +V | +V |

E+24V

EGND

external — FG

YGND
Y24V
Y00
Y01
Y02
Y03
Y04
Y05
Y06
Y07

X00+
X00-
X01+
X01-

24V-

normally open button — X02

X03
X04

normally closed — X05

X06
X07

EGND
EGND

X08
X09
X10
X11
X12
X13
X14
X15

Y08
Y09
Y10
Y11
Y12
Y13
Y14
Y15

a ⊗ + 24V+
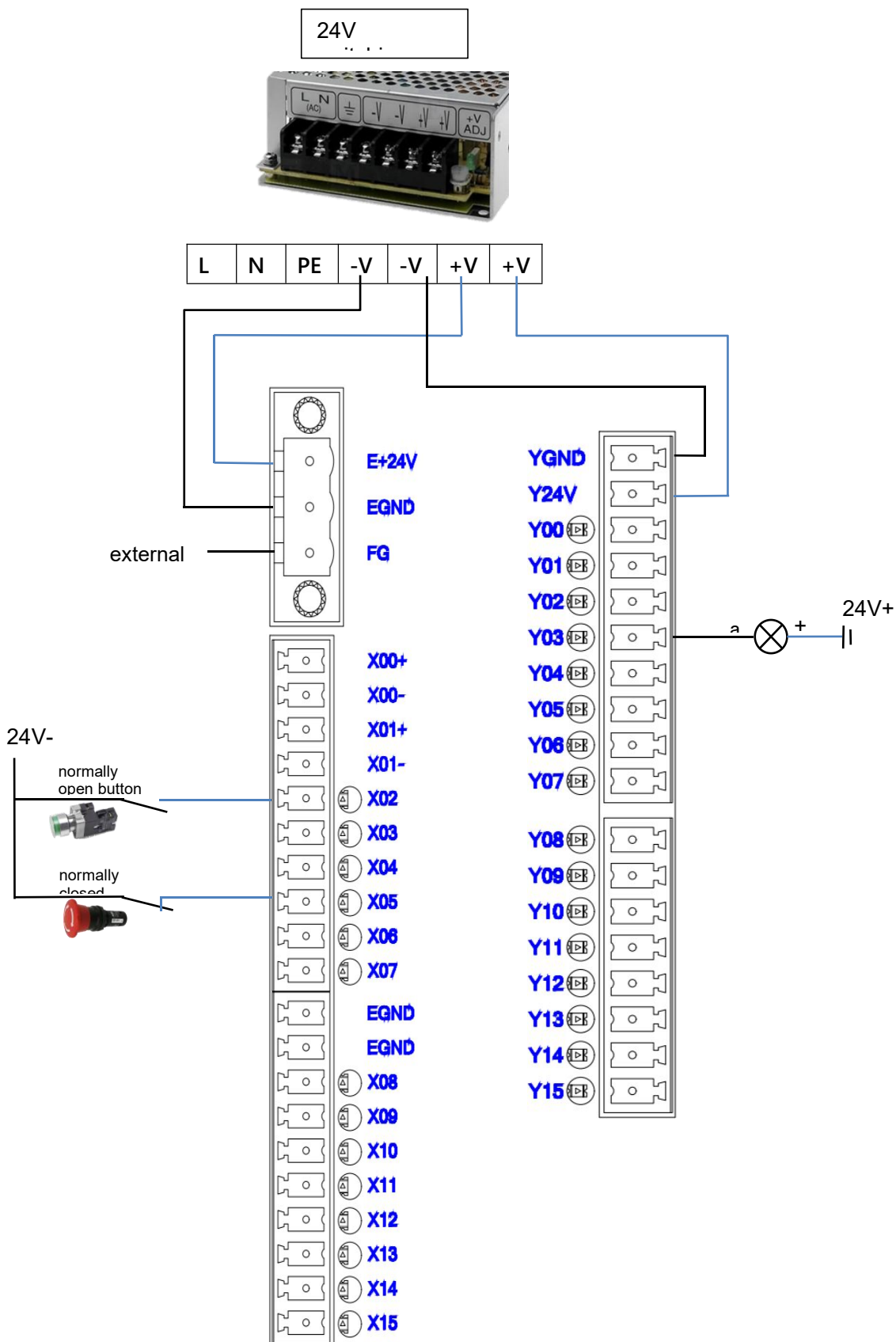
4.4.4 Status Control Signal Specifications

The detailed status control signal specifications of IO/communication interface are described in the following table:

projects	Input signal	output signal
Input/output type	DC digital input	Transistor, high level output
Input/output mode	the sink transistor	the sink transistor
Input/output voltage class	OFF Voltage: >5V ON voltage: 15V	low-level output
ON response time	10ms or less (hardware response time)	Less than 0.5ms(hardware response time)
OFF response time	10ms or less (hardware response time)	Less than 0.5ms(hardware response time)
isolation mode	optical coupling isolation	optical coupling isolation
frequency	1kHz	1kHz
protection	Not involve	Over current protection

4.4.5. Pulse shaft interface communication definition

AXIS n
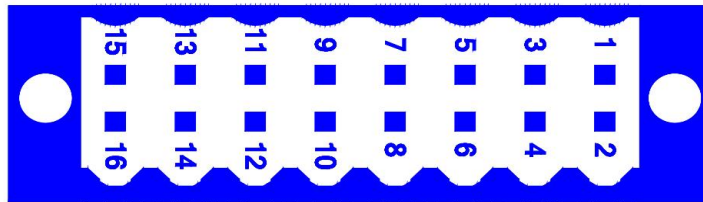
pin number	signal	function	pin number	signal	function
1	EGND	ground terminal	9	B+	Encoder B phase positive (5V)
2	E+24V	24 V output	10	B-	Encoder B phase negative (0V)
3	ALM	Alarm (24V)	11	A+	Encoder Phase A positive (5V)
4	ENA	Enable (24V)	12	A-	Encoder Phase A Negative (0V)
5	GND	ground terminal	13	DIR+	Direction Output Positive (5V)
6	+5V	5V output	14	DIR-	Direction Output Negative (0V)

| 7 | Z+ | Encoder Z-phase positive (5V) | 15 | CP+ | Pulse Output Positive (5V) |
| 8 | Z- | Encoder Z phase negative (0V) | 16 | CP- | Pulse Output Negative (0V) |

Pulse shaft wiring details:
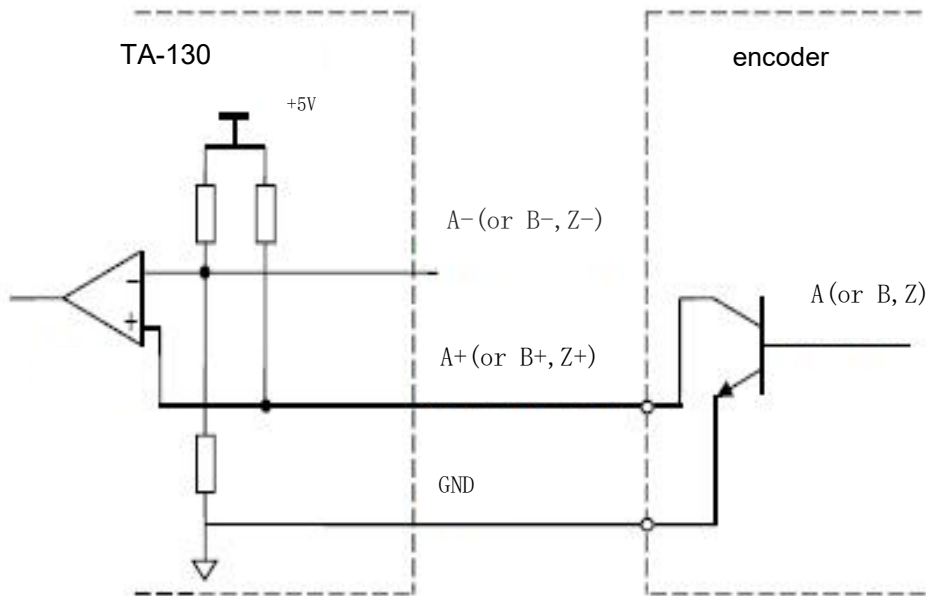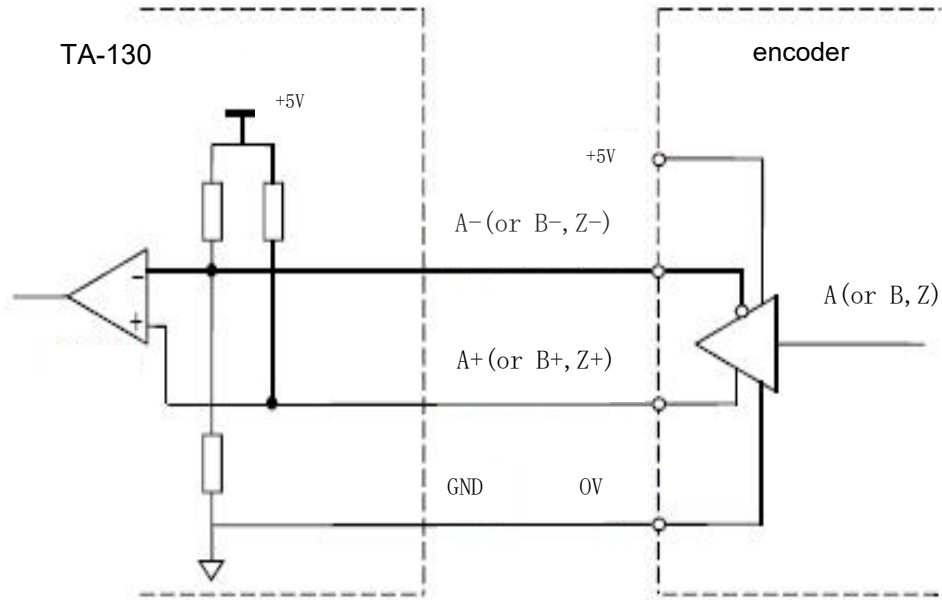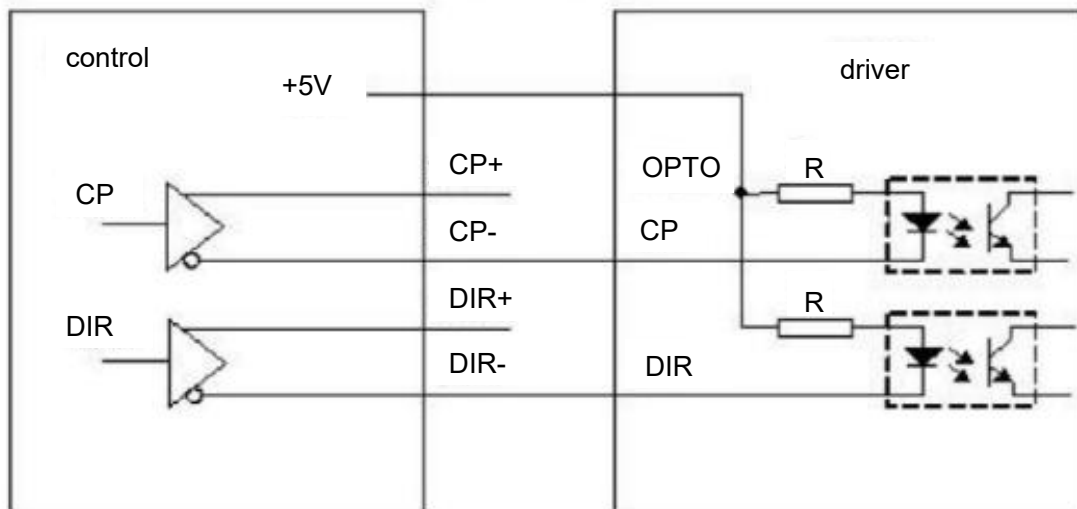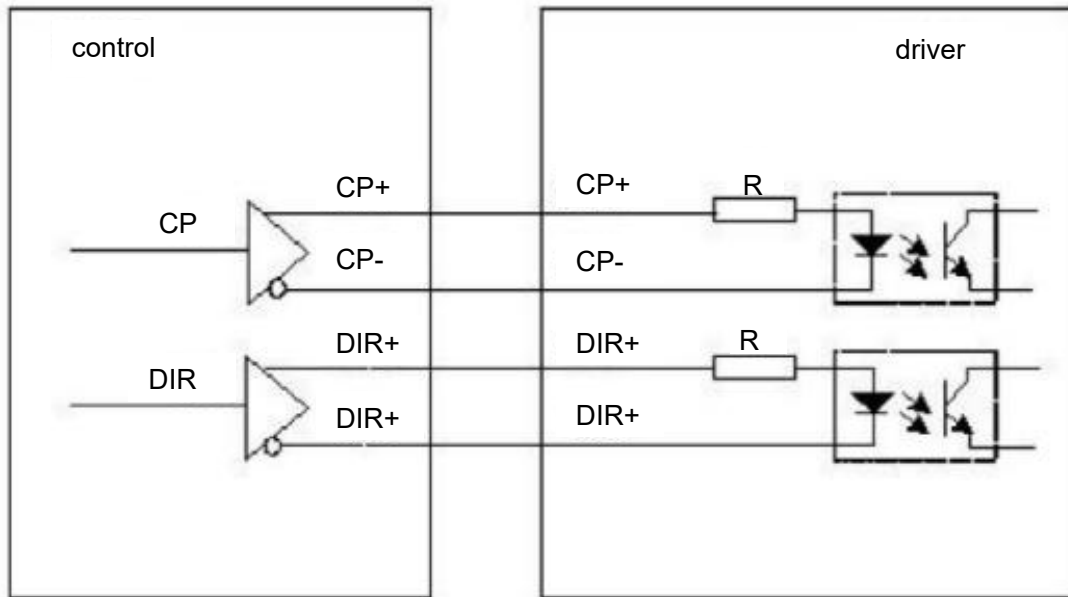
4.4.6. RS-485 Communication Specifications

RS485 communication supports MODBUS RTU protocol and freedom protocol, and the relevant specifications are as follows:

Serial No.	entry	specifications
1	station number	1~247
2	Communication rate (bps)	4.8K,9.6K,19.2K,38.4K,57.6K,115.2K
3	Data length	8-bit
4	Odd parity bit	None, odd,even
5	Stop position	1,2
6	Maximum number of sites	32

4.4.7. RS-232 Communication Specifications

RS232 bus supports the following communication specifications:

Serial No.	entry	specifications
1	Number of slave stations	1
2	Communication rate (bps)*	300,600,1.2K,2.4K,4.8K,9.6K,19.2K,38.4K,57.6K,115.2K

4.4.8 RS485 bus wiring description

RS485 bus connection topology as shown in the figure below, 485 bus recommended to use shielded twisted pair connection, 485A, 485B twisted pair connection; at both ends of the bus connected 120и terminal matching resistors to prevent signal reflection; all node 485 signal reference ground connected together; up to 32 nodes connected; if branch line connection is required, the shorter the distance of each node branch line, the better, recommended to be less than 3m.
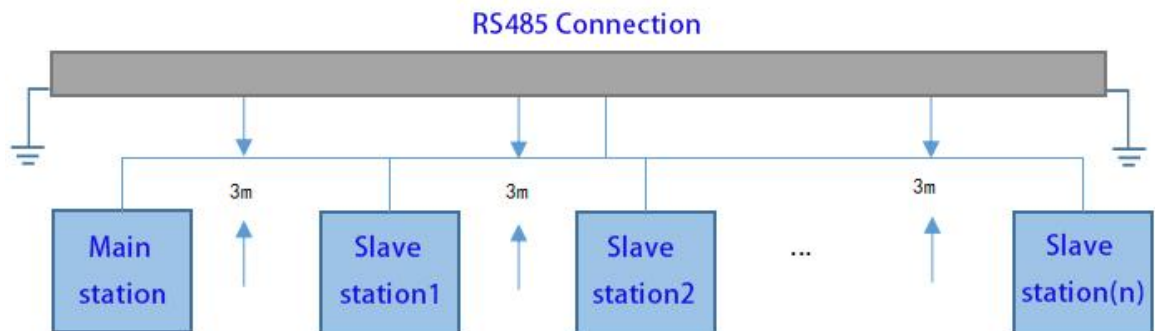

Figure 4-2 Schematic Diagram of RS485 Communication Connection

4.5 multi-node connection

When the number of nodes is large, the RS 485 bus must be daisy-chained (as shown in the figure below). Star connections are strictly prohibited.
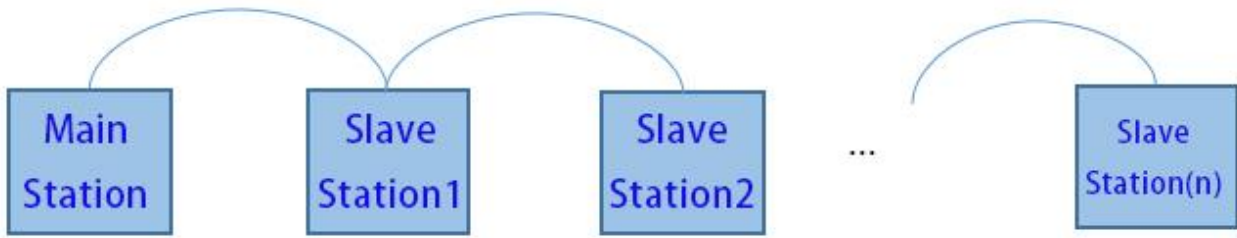
Figure 4-3. Daisy-chain connection structure

4.5.1. Terminal connection mode

TA-130 series programmable controller has A, B, G three terminals. After wiring is complete, check whether the field 485 bus contains three cables and make sure that the terminals are not connected incorrectly. If shielded cables are used, it is especially important to note that the shielding layer must also be connected to the G terminal. In any place, except for the G of the connection node, the shielding layer is prohibited from connecting to any other place (including the equipment chassis, equipment grounding terminals, etc.). Recommended cables are as follows:

- Recommended wiring cable 1: Multi-core cable with twisted pair cable, one pair of twisted pairs is used as the connecting wire of A and B, and the other redundant cables are twisted together as the connecting wire of G.
- Recommended wiring cable 2: twisted pair cable with shielding layer, twisted pair cable as A and B connection line, shielding layer as G connection line.

4.5.2. precautions

For the use of shielded wire as a connection cable occasion, there is one point in particular to note that the shielding layer can only be connected to G, can not be connected to the ground.

4.6 network port communication connection

4.6.1 Network port communication specification

TA-130 series intelligent mechanical programmable controller has three 100 Mega network ports, which are defined as follows:

Serial No.	Net work port	functions
1	ETH0	Network port configuration description: 3 * 100Mbps, where ETH2 is the programming port (for downloading and monitoring, etc.), IP address is 192.168.3.6, can not be modified.
2	ETH1	

3	ETH 2	ETH 0 is 192.168.4.6, modifiable. ETH 1 is 192.168.5.6, modifiable.

1. EtherCAT Communication Specifications

Support EtherCAT communication, the specific specifications are as follows:

projects	Specification description
Communication protocol	EtherCAT protocol
Maximum number of axes	64
Synchronous mode	Servo adopts DC-distributed clock, IO adopts input and output synchronization
Physical layer	100BASE-TX
rate	100 Mbit/s (100Base-TX)
Duplex mode	Full duplex
Topological structure	Ring topology
Transmission medium	Cable, see section below Cable specifications
Transmission distance	Less than 100M
Number of slave stations	64
EtherCAT Frame Length	44 bytes ~1498 bytes
Process data	Single Ethernet frame up to 1486bytes
refresh time	1000 switching inputs and outputs, about 150us 8servo axes approx. 425us
automatic scanning function	support

4.6.2　Wiring instructions via EtherCAT

1. System architecture diagram

Via the EtherCAT port, the TA-130 series controllers can be connected to various stepper or servo drives, slave modules or expansion module products that support EtherCAT communication.
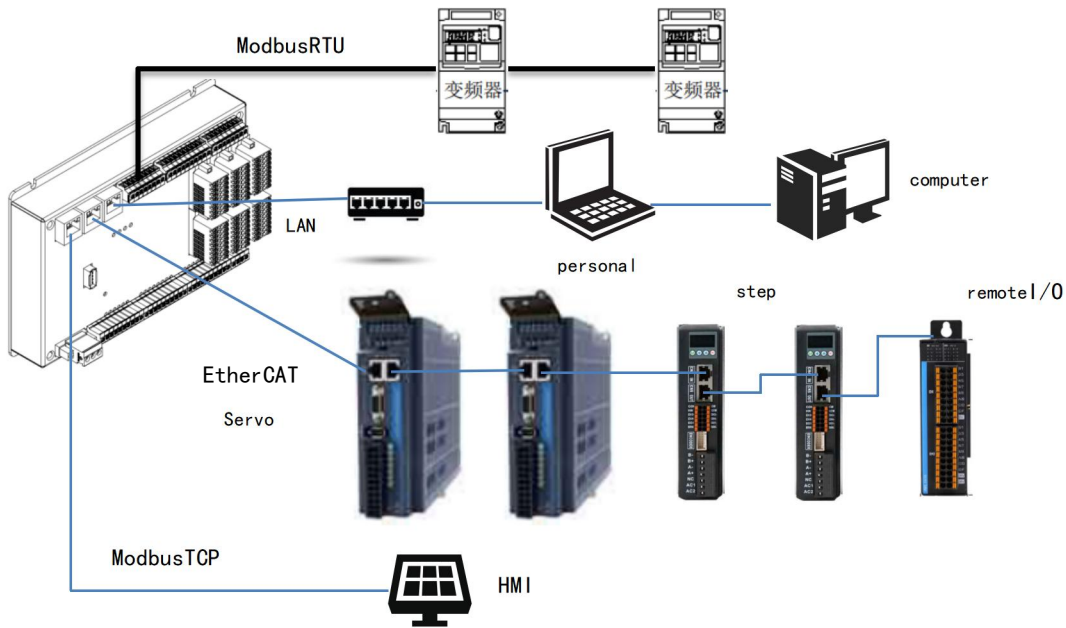
Figure 4-4 CPU module connected to other devices via EtherCAT port

4.7 Communication cable connection requirements

4.7.1. Ethernet requirements

Please use category 6 shielded twisted pair.

4.7.2 signal lead assignment

pins	signal	Signal direction	Signal description
1	TD+	The out put	Data transmission +
2	TD-	The out put	Data transmission-
3	RD+	enter	Data reception +
4	−(DC+)	- (bidirectional)	Not used (data C+)
5	−(DC-)	- (bidirectional)	Not used (data C+)
6	RD-	enter	Data reception-
7	−(DD+)	- (bidirectional)	Not used (data D+)
8	−(DD-)	- (bidirectional)	Not used (data D-)

Note:Length requirements:When using EtherCAT, the cable length between devices cannot exceed 100 meters, exceeding this length will cause signal attenuation and shadow.
Sound normal communication.

Technical requirements:

1. 100% conduction test, no short circuit, open circuit, dislocation and poor contact phenomenon;

2. Cable length is within allowable tolerance;

The EtherCAT shielded cables for network data transmission. The specific specifications are shown in the table below:

projects	specifications
cable type	Resilient crossover cable,S-FTP, category 6

Fulfillment criteria	EIA/TIA568A, EN50173, ISO/IEC11801
	EIA/TI A bulletin TSB, EIA/TIA SB40-A&TSB36
Traverse section	AWG26
Conductor type	twisted pair
line pair	4

4.8 USB interface

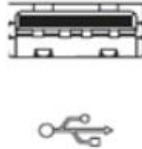The controller is equipped with oneUSB2.0 port, and the port form is as shown in the figure:

Figure 4-5 USB interface

USB interface specifications are described in the table below:

projects	USB2.0
highest communication rate	480Mbps
5Vmaximum output current	500mA
maximum communication distance	5m
Yes No Isolation	no

4.8.1. precautions

For industrial applications, please select industrial-grade USB devices to ensure the reliability of use;

USB equipment to avoid long-term connection, while paying attention to routing specifications, to prevent interference affecting communication performance;

When there is interference that cannot be eliminated, magnetic rings can be added at both ends of the communication cable to filter out and improve the anti-interference performance.

5 Operating instructions

5.1 power-up

5.1.1 Precautions for power-on

The following precautions apply when powering up the controller:

● When switching on the power supply, please confirm whether the output voltage of the power supply matches the supply voltage of the programmable controller, otherwise it may cause hardware damage.

● Do not touch the terminals during power-on, otherwise there may be risk of electric shock.

5.1.2 PLC startup and initialization

PLC startup

From the beginning of power, after 15~25s PLC will be in a state of operation. The RUN LED does not light up until the PLC enters the running state.

PLC initialization controller

When the Run light (green) and RA(yellow) flash and RF (yellow) flash slowly, press the initialization button for 3-5 seconds, the Run light (green) and ERR(red) will go out, release the reset button, and after about 3- 5 seconds, the Run light (green) and ERR(red) will always be on, which proves that the initialization of the controller is successful. It is necessary to power off and restart the controller. Factory reset clears user data, programs, and user program passwords.

precautions

● Some EtherCAT slave stations can set a maximum waiting time (1~200s), and the operational state of the PLC is represented by the EtherCAT master function module working, regardless of the waiting time.

● The EtherCAT Master function module considers slaves that do not start within the maximum waiting time as errors.

● After successful initialization, the controller needs to be powered off and restarted.

5.1.3 Actions when PLC enters operational state

If there is a user PLC program when the PLC enters the operational state, the PLC is immediately in the operational state.

5.2 power down

5.2.1 Power down precautions

The following precautions apply when the controller is powered off:

● At the moment of power failure, the controller will continue to operate normally for a period of time, and error signals from other equipment affected by power failure may be received.

● After power-off and then start need to wait for all indicators to go out, the controller will restart successfully

5.3 system upgrade

5.3.1. U disk

PLC system can be upgraded through USB, select the upgrade package provided by the manufacturer to copy to the U disk, insert the USB interface of the controller, power off and restart the controller, when the RUN light is on, the upgrade is completed.

6 Programming tools and downloads

6.1 Programming Tools Acquisition

The user programming software Codesys for the TA-130series of small and medium-sized programmable controllers, installation files and references for the TA-130 series are available through:

● Obtain software installation CDs from distributors at all levels;

● Download the product reference materials for the "Technical Support" and "Download Center" pages of the official website (https://www.szjmc.com/);

JMC is constantly improving its products and materials, it is recommended that users update the software version in time when they need it, consult the latest published reference materials,and design applications that are beneficial to users.

6.2 Programming environment and software installation

6.2.1 Environmental requirements

Desktop or portable PC with:

1. Windows7 and above (excluding Windows 7)operating system; 64-bit operating system recommended;
2. Memory: 4GBor higher;
3. Space: Available hard disk space is more than 5 GB.

PCandTA-130 seriescontroller are connected as follows:

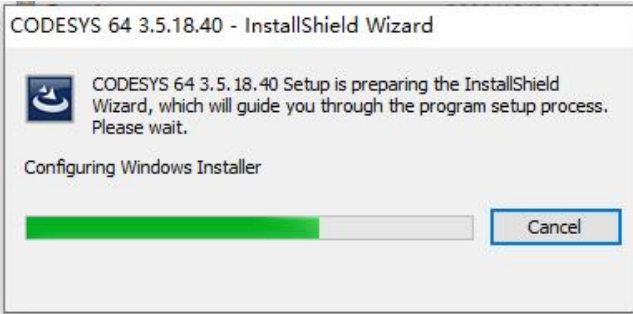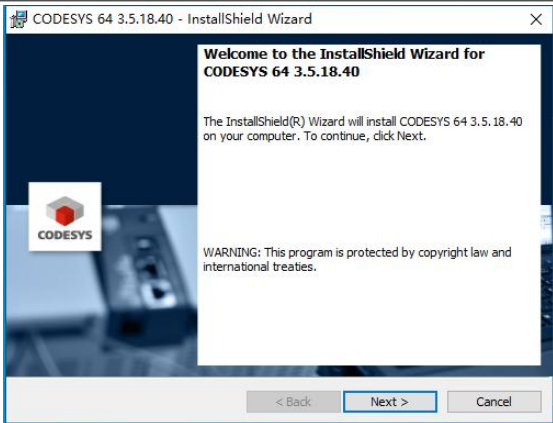| Connection formula	cables required	remark
Use LAN net work cable connections	You need 1 free LAN port and 1network cable in your local network.	Support long-distance connection between PC and TA-130 series controller,such as programming TA-130 series controller in workshop in office, etc.

6.2.2 Installation steps
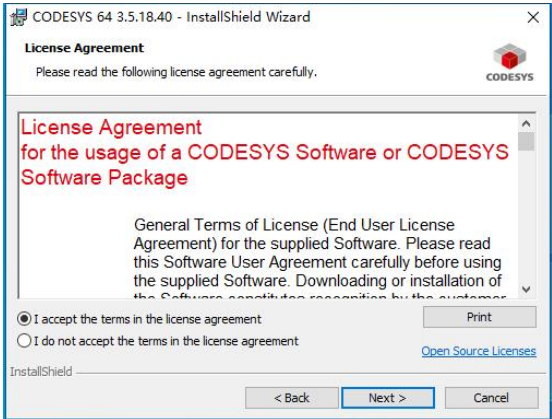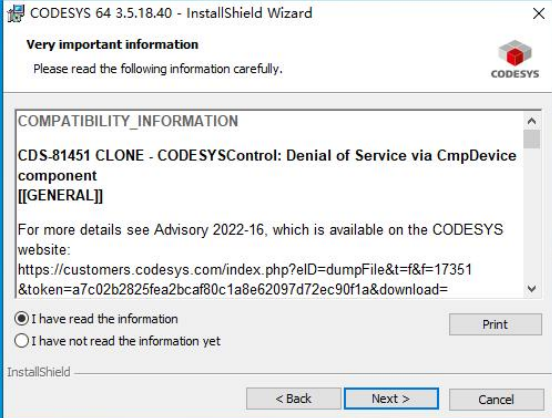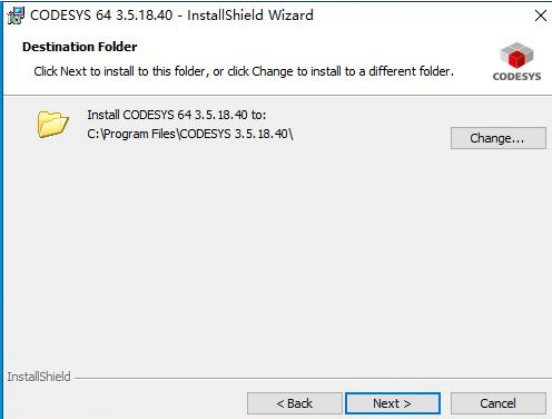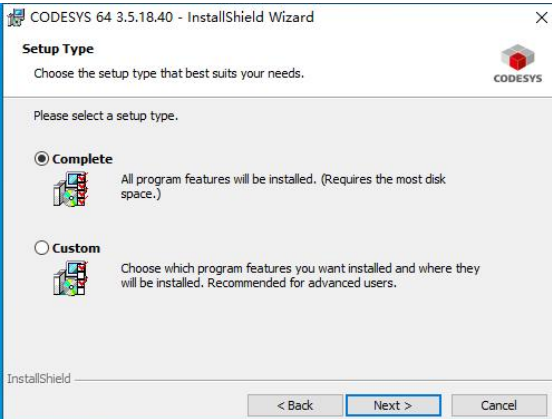
Preparation before installation

If you are installing Codesys for the first time, please check the remaining space of the computer hard disk, confirm that the target disk to be installed has more than 2 GB ofspace, and install it directly.
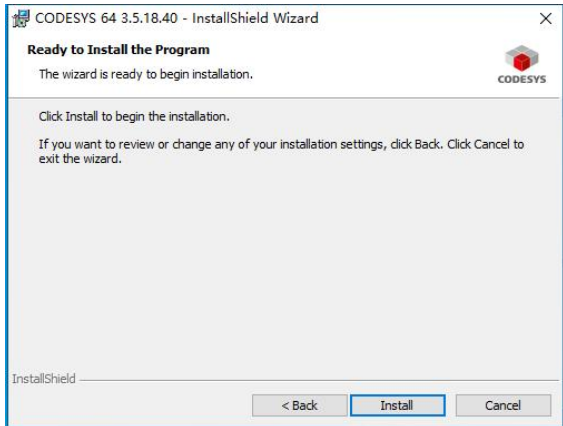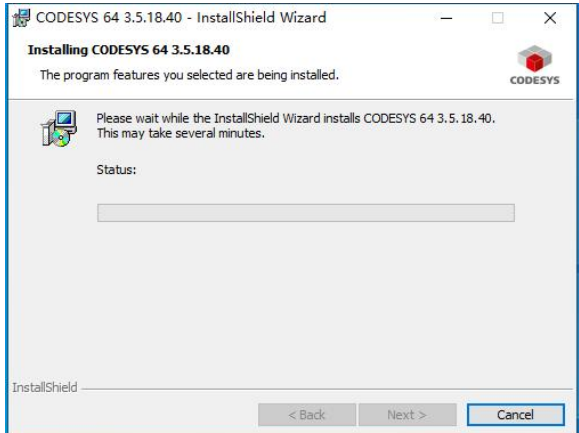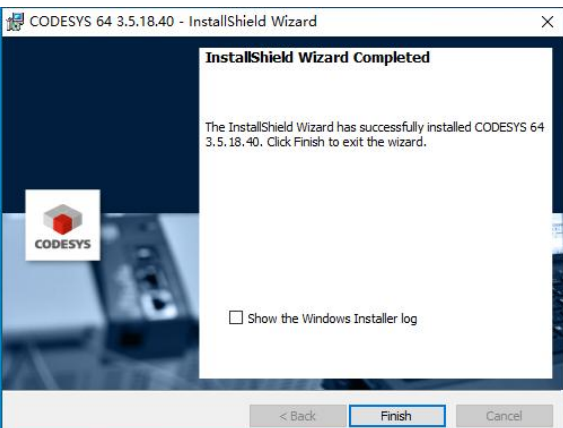
If you are upgrading Codesys, first backup your existing working files, uninstall the old version of Codesys, restart your computer, and then start installing the new version.

start the installation

Through Windows Explorer, double-click on the directory where the installation file is located to open Codesys (64 *. *.*) . exe file (64 *.*.*.* Software version for Codesys).

step	descriptions	interface
1	Double-click to open, start installation, you can see the following interface, enter the installation preparation phase	
2	Thefollowing prompt interface appears, click"Next" to start installation	

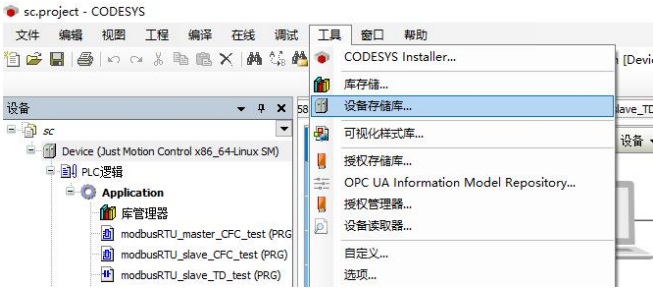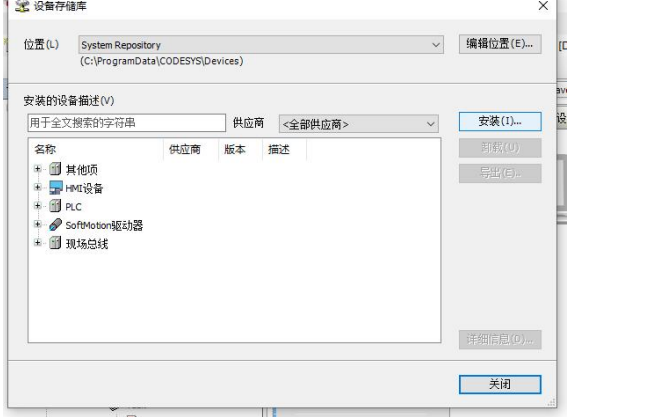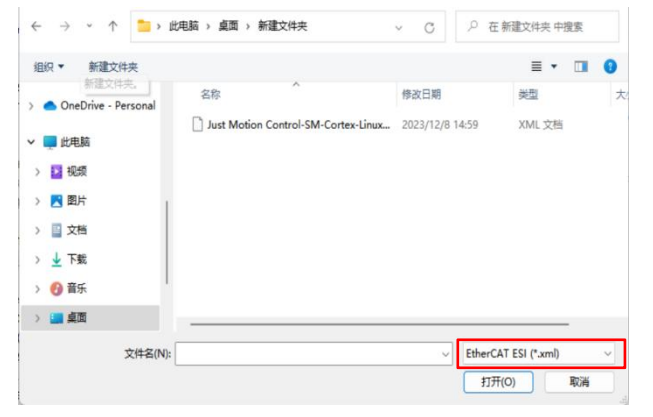|		
3	Select Receive,click"Next" and proceed to the next step.	
4	Select Read, click "Next" to proceed to the next step	
5	Set the installation path, preferably installed in C disk, click "Next"to proceed to the next step.	
6	Select Complete in the Install Content option to completely install the content included with the software. Of course, you can also select custom for selective installation, which can be checked individually. If there is no special need, press the silent check box (Complete) and click "Next".	

7	Click "Install".	
8	Start installation, which takes about 10 minutes.	
9	Click "Finish" and the installation is complete.	

language settings

After installation,the operating language of Codesys interface defaults to simplified Chinese. If you need to switch to other languages, click Tools,Options and Language Settings on the main interface of the software to select and set the language.

Add Device Files

Using the TA-130 series controller requires the addition of special equipment files.

step	descriptions	interface
1	Click "Tools""Device Memory" on the main interface of the software	
2	Click "Install"	
3	Select the format "EtherCAT ESI(*.xml)", select the description file"Just Motion Control-SM-Cortex-Linux.devdesc"provided by Gemecon, and click "Open".	

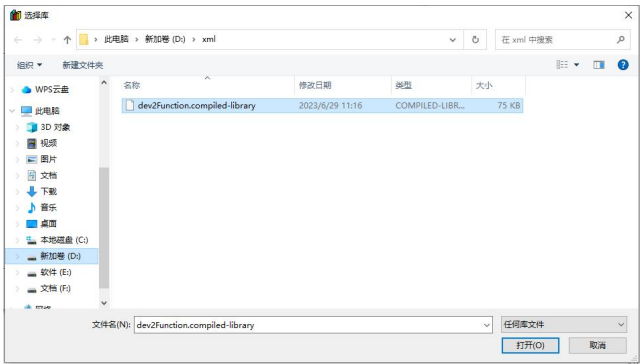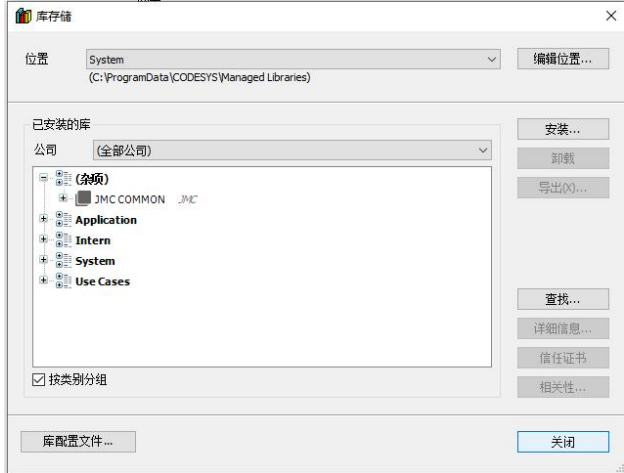| step	descriptions	interface
4	Click "Close"	

Add Library Files

To use the TA-130 series controller, you need to add the library files provided by JameCon.

step	descriptions	interface
1	Click "Library Storage" in "Tools" of the main interface of the software	
2	Click "Install" in the pop-up window	

3	Select the library file "dev2Function.compiled-library" provided by Jemicon and click "Open".	
4	You can see that there is an additional library file in "Miscellaneous", click "Close".	

6.2.3 Uninstalling Codesys

Codesys can be uninstalledusing the standard Windows system uninstall software method, as follows:

1. Exit Codesys software and confirm Gateway is closed. If the CodeSys icon exists in the OS taskbar, right-click on it and select Exit to close Gateway.

2. Select Start-> Settings-> Control Panel.

3. Click Uninstall Programs.

4. Select the software item that needs to be uninstalled and find "Codesys".

5. Right-click,click the "uninstall" button, and confirm the deletion.

7 Maintenance

7.1 periodic maintenance inspection

Regular inspection items

serial number	project	inspection contents	judgment standard	processing
1	supplying power	Measure through the power terminal block to check whether the voltage variation conforms to the standard voltage variation range.	DC 24V(+20%/-20%)	Please use multimeter to check and change between terminals, and control the power supply within the allowable voltage variation range.
2	surrounding environment	Whether the ambient temperature is moderate (when used in the cabinet, the temperature in the cabinet is the ambient temperature)	-10~ 55 ℃	Please use a thermometer to measure the ambient temperature, and control the ambient temperature within the range of-10 ~55 ℃.
		Whether the ambient humidity (humidity in the cabinet) is moderate (when used in the cabinet, humidity in the cabinet is ambient humidity)	10 ~ 90%RH, no dew condensation	Please use a hygrometer to measure the ambient humidity and rectify the surrounding environment. Control the ambient humidity within the range of 10 ~ 90%RH. The temperature changes drastically, so please check if there is dew condensation.
		Is it exposed to direct sunlight	should avoid direct sunlight	Please take shelter measures.
		Whether there is dust, oil smoke, conductive dust, corrosive gas	shall have no	Please remove and cover.
		Presence of corrosive gases, flammable gases	shall have no	Please check with odor or gas sensors.
		Does it cause vibration or shock directly to the main body	Whether it is within the specification range of vibration resistance and impact resistance	Please provide shock absorbing materials for vibration and impact resistance.
		Is there any interference source nearby	shall have no	Keep away from interference sources or take shielding measures.

3	Installation and wiring status	Is the connector connecting the cable fully inserted and locked	shall not get loose	Please insert completely and lock with screws.
		Are screws for external wiring loose?	shall not get loose	Use a Phillips screwdriver to tighten.
		Are the crimp terminals for external wiring too close together?	Proper spacing should be ensured	Please visually inspect and correct.
		Is the external wiring cable about to break	There shall be no abnormality in appearance	Visually inspect and replace cables.

tools needed

- Phillips screwdriver
- Multi-meter or digital