



GC-R6-S Hardware User Manual

深圳市华成工业控制股份有限公司

Shenzhen Huacheng Industrial Control Co., Ltd.

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This document is intended for users who have knowledge of:

Expertise in electrical technology

Technical knowledge of robot controllers

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Definition of security level

Indicates that failure to do so results in death or serious bodily injury.

Indicates that failure to do so could result in death or serious bodily injury.

Indicates that failure to operate as specified may result in minor bodily injury or damage to the device.

Unpacking and acceptance



warn

install it!

Please carefully check the packing list, and if you find that the packing list does not match the product name, do not install it!

Storage and transportation



note

Please store and transport the product according to the storage and transportation conditions, storage temperature The humidity meets the requirements.

Avoid storage and transportation in places such as water splashing and rain direct sunlight strong electric field strong magnetic field strong vibration, etc.

Avoid storing the product for more than 3 months, and when the storage time is too long, please carry out tighter protection and necessary inspection.

It is strictly forbidden to transport this product in mixed packages with equipment or items that may affect or damage this product.



warn

Be sure to use professional loading and unloading equipment to move large or heavy equipment and products!

When handling the product with bare hands, be sure to grasp the product shell firmly to avoid the product falling, otherwise there is a risk of injury!

When handling the product, please be sure to lift it gently, pay attention to the objects under your feet at all times, and prevent tripping or falling, otherwise there is a risk of injury or product damage!

When the equipment is lifted by a lifting tool, it is forbidden for personnel to stand or stay under the equipment.

At the time of installation



warn

Please be sure to read the product's instruction manual and safety precautions carefully before installation!

It is strictly forbidden to modify this product
 It is strictly forbidden to screw the fixing bolts and red marked bolts of product parts and components!
 Do not install this product in places with strong electric fields or strong magnetic interference!
 When this product is installed in the cabinet or terminal equipment, the cabinet or terminal equipment needs to provide corresponding fireproof shells electrical protective shells and mechanical protective shells and other protective devices, and the protection level shall meet the requirements of relevant IEC standards and local laws and regulations.



dangerous

It is strictly forbidden for non-professionals to install wiring maintain inspect or replace parts!

The installation wiring maintenance or replacement of components of this product can only be carried out by professionals who have been trained in electrical equipment and have sufficient knowledge of electrical equipment.
 The installer must be familiar with the product installation requirements and related technical information.
 When it is necessary to install equipment with strong electromagnetic interference such as transformers, please install shielding protection devices to avoid malfunction of this product!

When wiring



dangerous

It is strictly forbidden for non-professionals to install wiring maintain, inspect or replace parts!
 Do not wiring when the power is on, otherwise there will be a risk of electric shock.
 Before wiring, cut off the power to all devices. If there is a residual voltage in the capacitor of the device after the power is cut off, please wait for at least 10 minutes before wiring.
 Be sure to ensure that the equipment and product are well grounded, otherwise there will be a risk of electric shock.

Please follow the steps specified in the ESD precautions and wear an electrostatic bracelet for wiring and other operations to avoid damaging the equipment or the internal circuits of the product.



dangerous

It is strictly forbidden to connect the input power supply to the output of the device or product, otherwise it will cause damage to the equipment or even cause a fire.

When the drive equipment is connected to the motor, please ensure that the phase sequence of the drive and the motor terminal is accurate and consistent to avoid causing the motor to rotate in the opposite direction.

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

Once wiring is complete, make sure there are no fallen screws or exposed cables inside the device and product.

When powered on



dangerous

Before powering on, please confirm that the device and product are well installed, the wiring is secure, and the motor unit is allowed to restart.

Before powering on, please confirm that the power supply meets the requirements of the device to avoid damage to the device or cause fire!

When powering on, the mechanical device of the device or product may move suddenly, please take care to stay away from the mechanical device.

After powering on, do not open the equipment cabinet door or product protection cover, otherwise there is a risk of electric shock!

It is strictly forbidden to touch any terminal of the equipment in the energized state, otherwise there is a risk of electric shock!

It is strictly forbidden to disassemble any device or part of the equipment and product in the energized state, otherwise there is a risk of electric shock!

Runtime



dangerous

It is strictly forbidden to touch any terminal blocks of the equipment

in the operating state, otherwise there is a risk of electric shock!

It is strictly forbidden to disassemble any device or part of the equipment and product in the operating state, otherwise there is a risk of electric shock!

It is strictly forbidden to touch the device housing fan or resistor to test the temperature, otherwise it may cause burns!

It is strictly forbidden for non-professional technicians to detect the signal during operation, otherwise it may cause personal injury or equipment damage!

During operation, avoid other items or metal objects falling into the equipment,4(al)5(l) G3994(ca)4()4(i)4(to)3(t)-11(he)4(rwi)3(s)-3(e)4()4(i)4

otherwise there is a risk of electric shock!
After disconnecting the power to all devices, wait at least 10 minutes before performing operations such as device inspection maintenance.



dangerous

Please follow the product warranty agreement for the equipment warranty.
When the equipment fails or is damaged, professionals will troubleshoot and repair the equipment and products in accordance with the maintenance guidance, and make maintenance records.
Please follow the product wearing parts replacement instructions for replacement.
Do not continue to use a machine that is already damaged, as this will cause damage to a larger program.
After replacing the device, be sure to check the wiring and set the parameters of the device again.

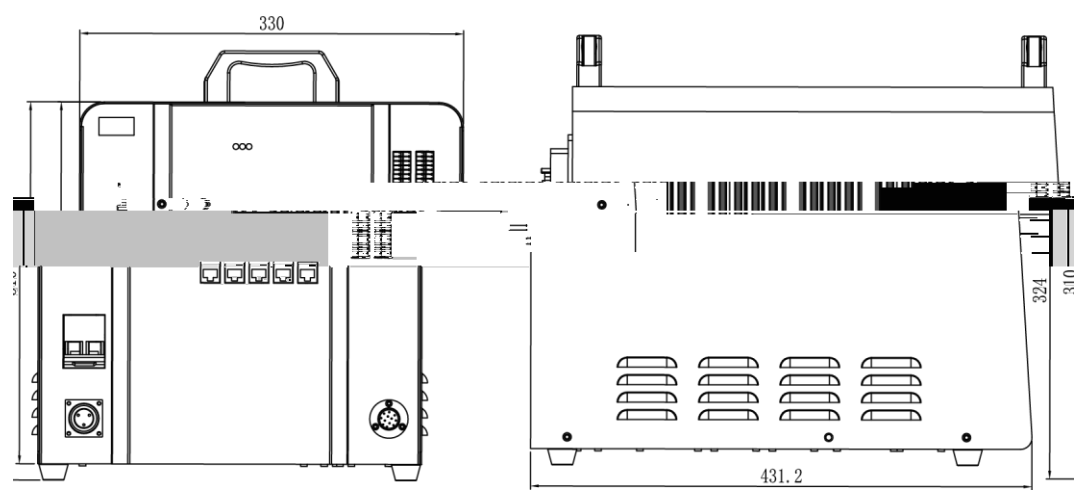
At the end of life



dangerous

Please follow the relevant national regulations and standards for equipment Obsolescence of the product so as not to cause property damage or casualties!
Scrapped equipment and products should be disposed of and recycled in accordance with industrial waste disposal standards to avoid environmental pollution.

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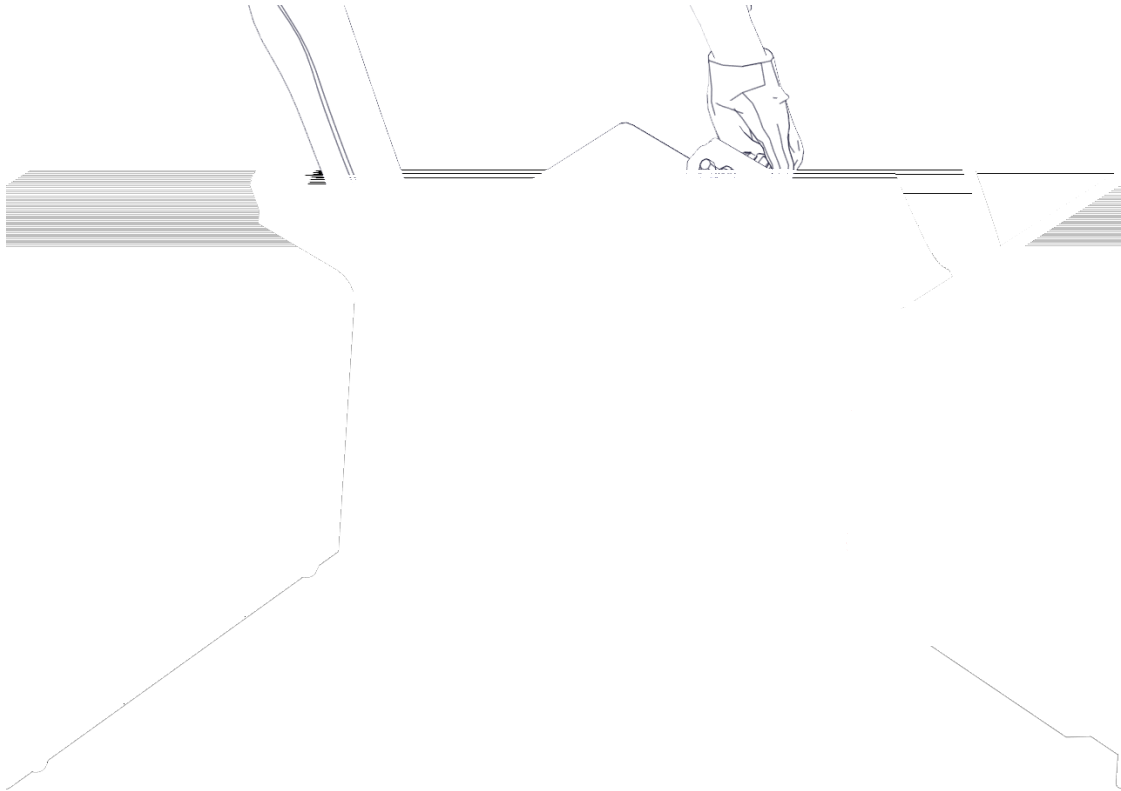
Preparation for handling: gloves, anti-smashing shoes.



note

Note: Please wear anti-smashing shoes gloves for handling.

The porter can carry it with both hands and with his bare hands



Please pay attention to grasp and carry it after handling to avoid the control cabinet slipping and damage.

Please install the robot system in an environment that meets the following conditions so that the performance of the machine can be used safely and while the performance of the machine is maintained.

Installed indoors.

Do not use this product near corrosive or flammable gases such as hydrogen sulfide, chlorine, ammonia, sulfur, chlorinated gases, acids, alkalis, salts, etc., or combustibles.

When using it in places where there is grinding fluid, oil mist, iron powder, cutting, etc., please take protective measures.

Keep away from heat sources such as stoves.

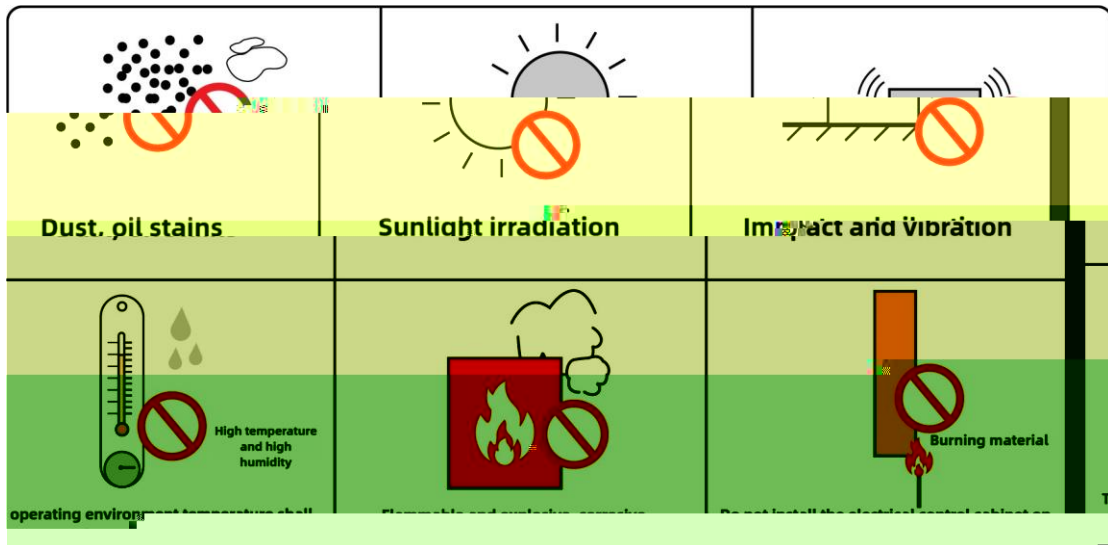
Do not use it in a closed environment, which can easily lead to high temperature of the electric control cabinet and shorten the service life.

Avoid sun exposure.

Avoid loading in places that contain salt, moisture and other places that are prone to rust.

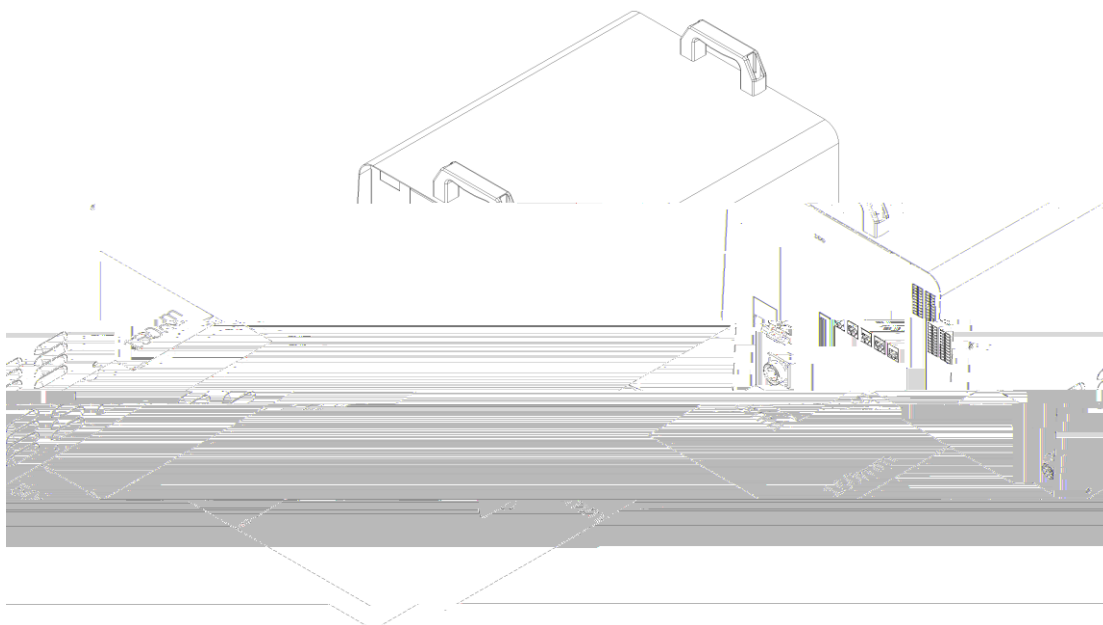
It does not transmit shock, vibration, etc.

There are no electrical interference sources such as large inverters, high-power high-frequency generators, large contactors, welding machines, etc. nearby.

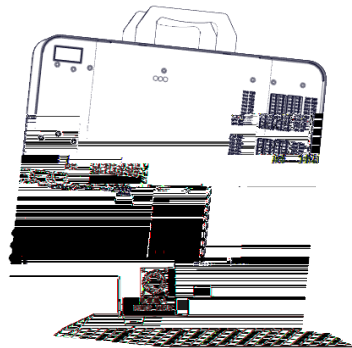
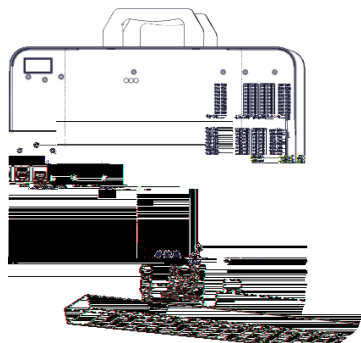


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The installation space requirements are shown in the figure below, and sufficient heat dissipation space should be ensured.



and



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The installation, wiring, maintenance, and inspection of this product can only be carried out by professional maintenance personnel who have received training in electrical equipment and have sufficient electrical knowledge.

It is strictly forbidden for non-professionals to carry out the operation, and it is operated by qualified personnel.

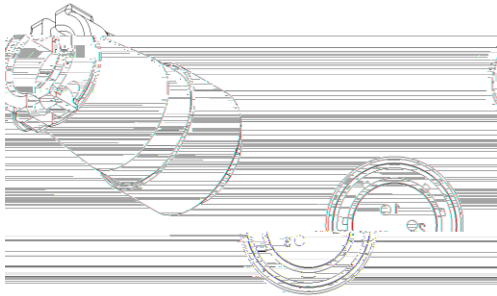
To prevent electric shock, be sure to properly ground the controller.

Be sure to use a plug or disconnected device that meets local safety standards for the cable for power connection, and do not connect directly to the factory power supply.

Perform grounding work after disconnecting the power supply to the controller.

This product uses a 220VAC power supply, please make the power cord according to the following diagram and wire it correctly.

The customer-selected cable needs to meet the corresponding safety specifications, and the cable is 3 cores, with a cross-sectional area of $\geq 1.5\text{mm}^2$. Recommended external power supply circuit breaker specifications: rated current $\geq 16\text{A}$, trip curve is C-curve.

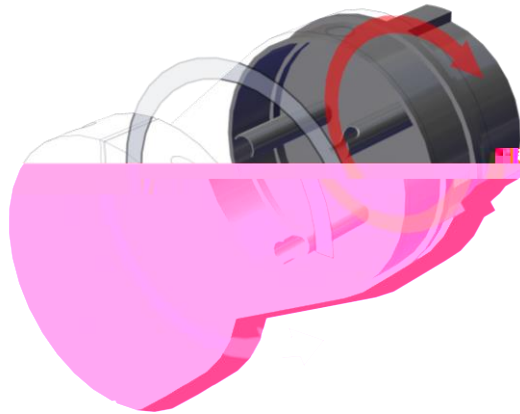


Power cord definition	
Line sequence	definition
1	L
2	N
3	PE

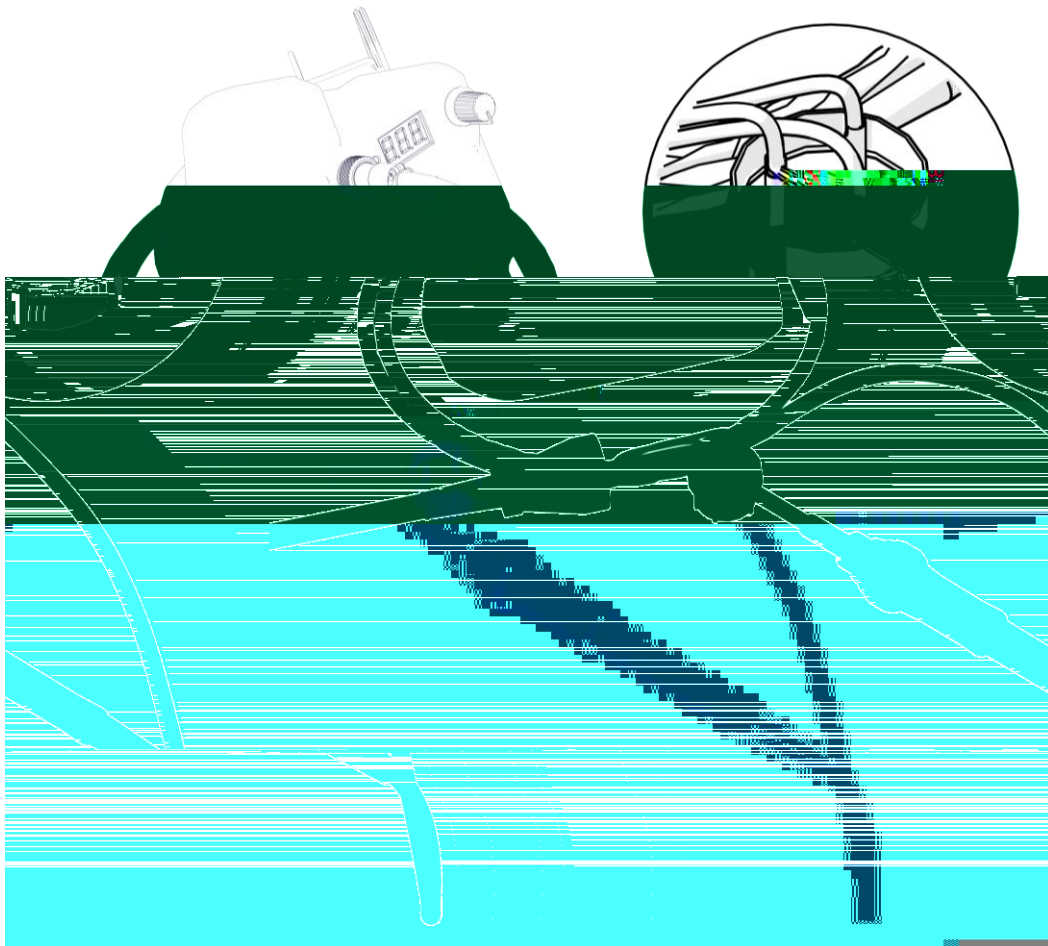
Unscrew the screws on the side of the aviation plug, LS2.0 flathead screwdriver is recommended



Rotate

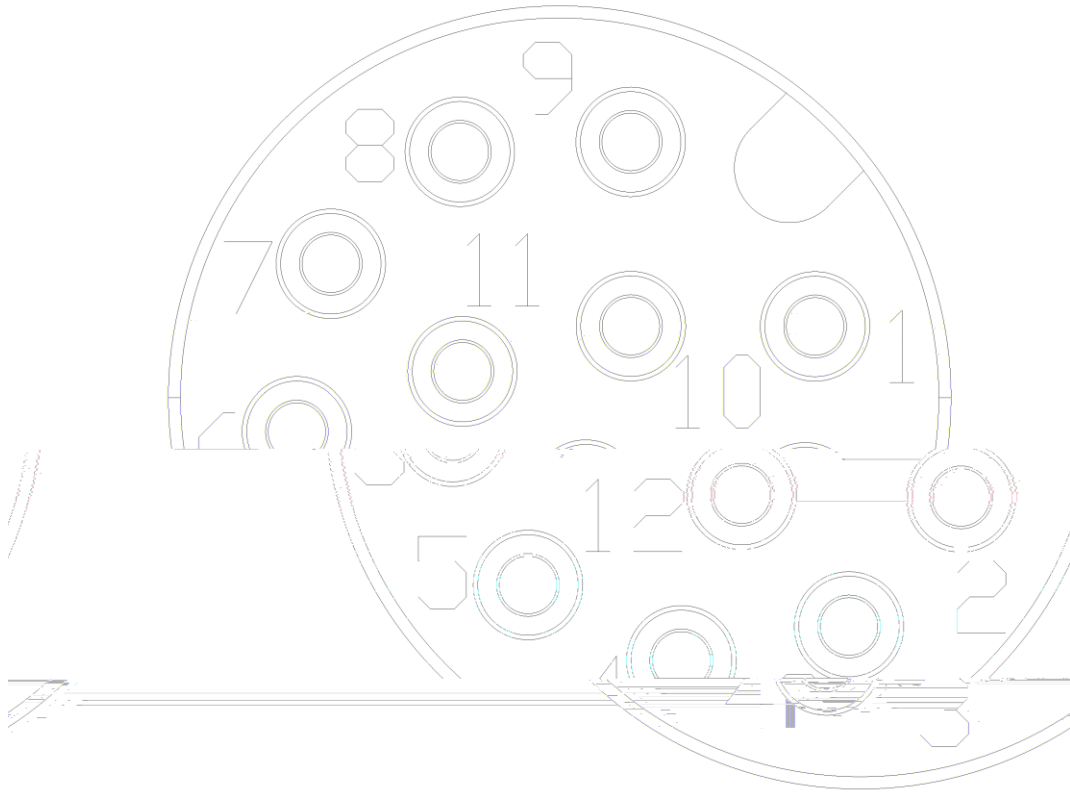


After removing it, thread the thread and weld it back on, and put it back on

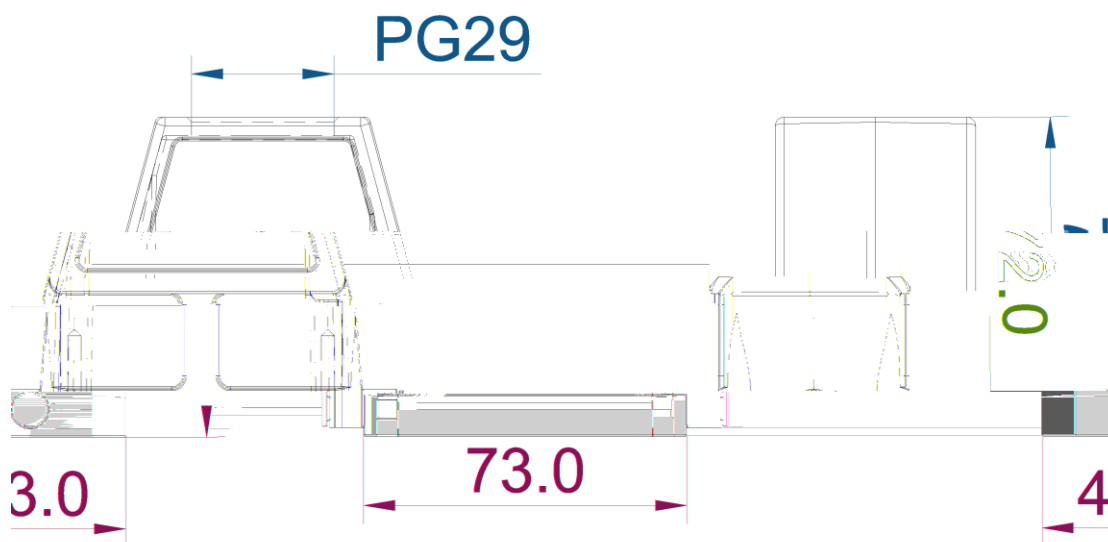
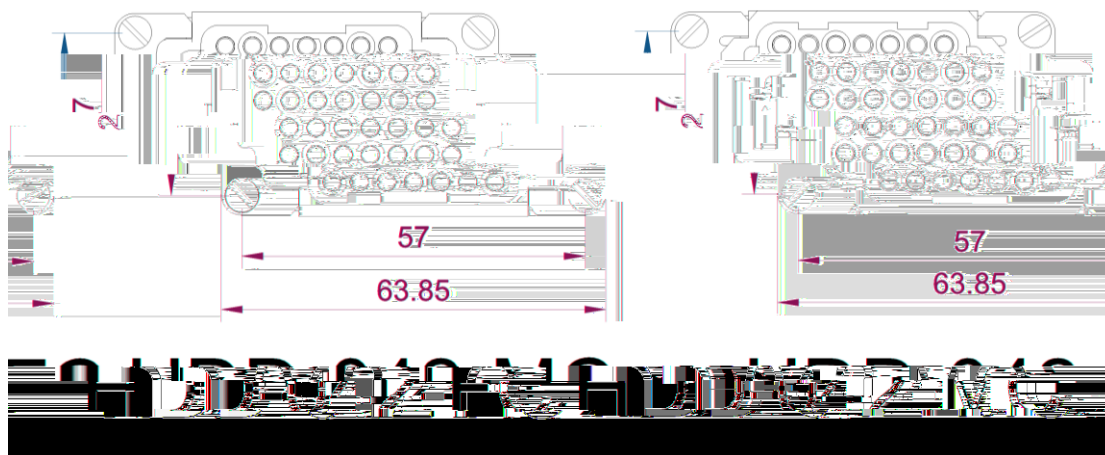


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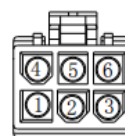
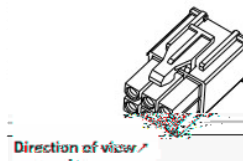
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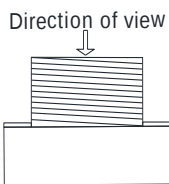
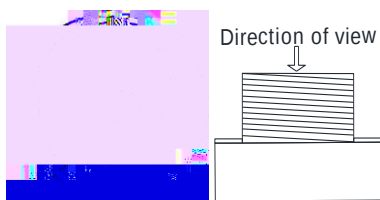
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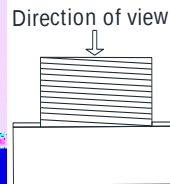
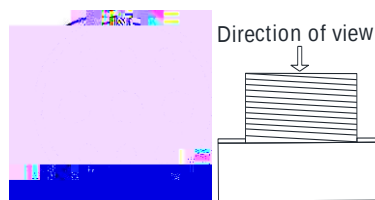
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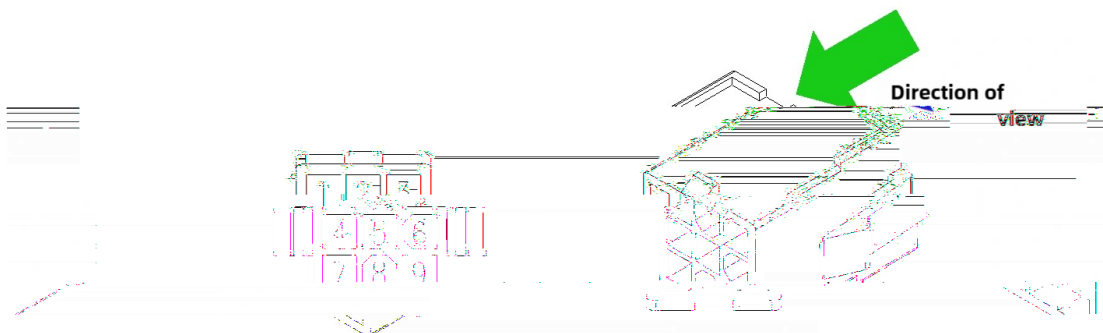
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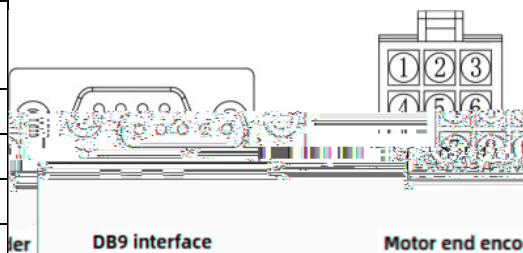


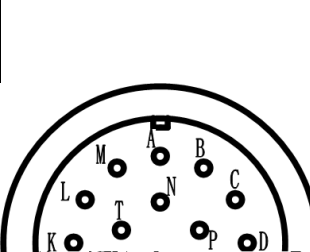
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code AMP-T5/female terminal/170261-1 Meter

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Host encoder DB9 interface		Motor encoder 15-core aviation head interface		
Pin number	Signal definition	Pin number	definition	
8	Signal +	A	SD+	
4	Signal-	B	SD-	
9	5V	E	Battery+	
5	0V	F	Battery-	
		G	5V	
		H	0V	
		J	FG	
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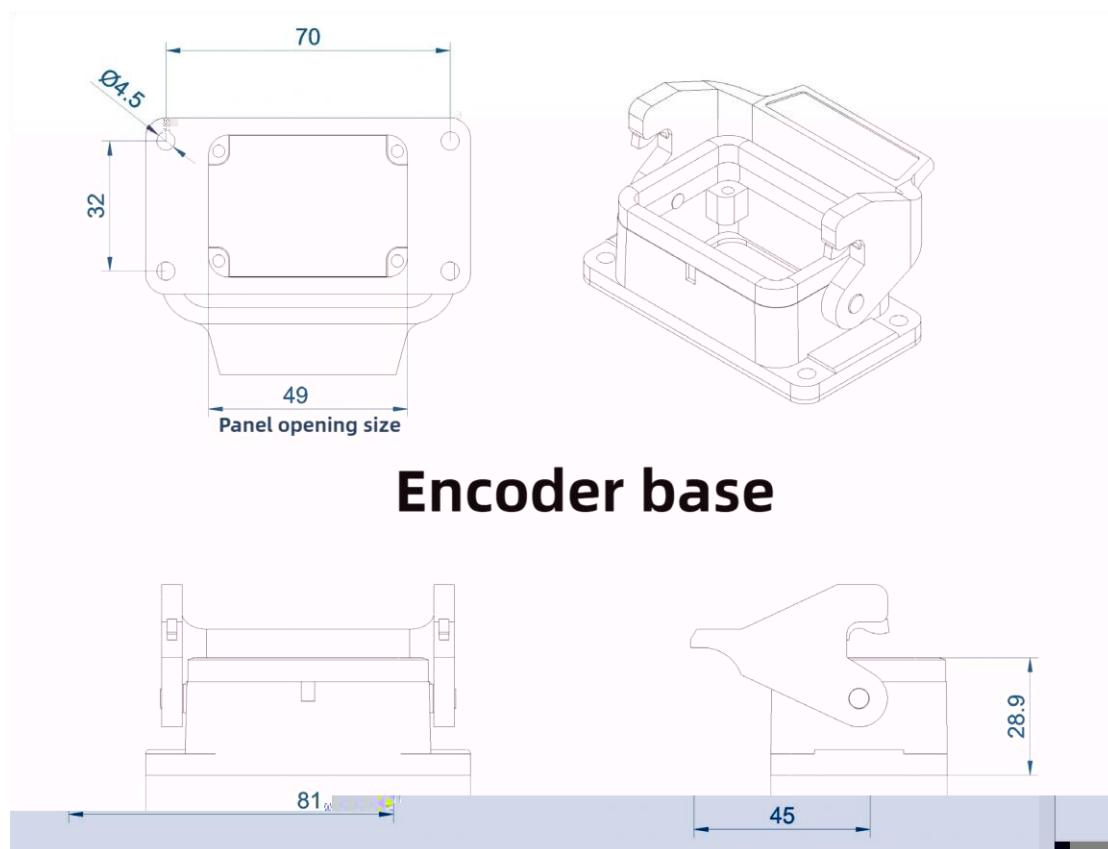
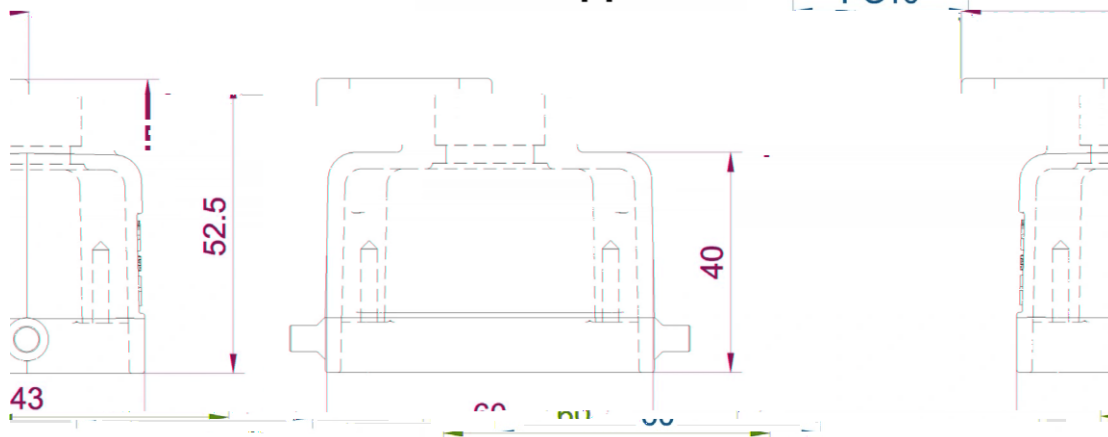
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Female insert

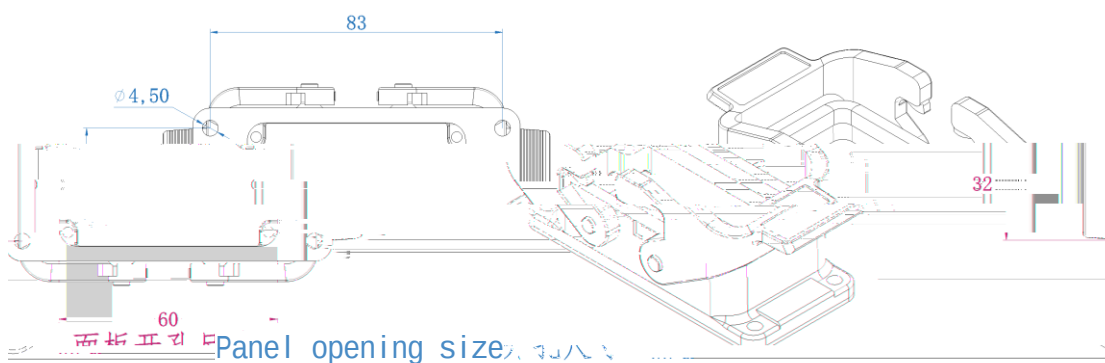
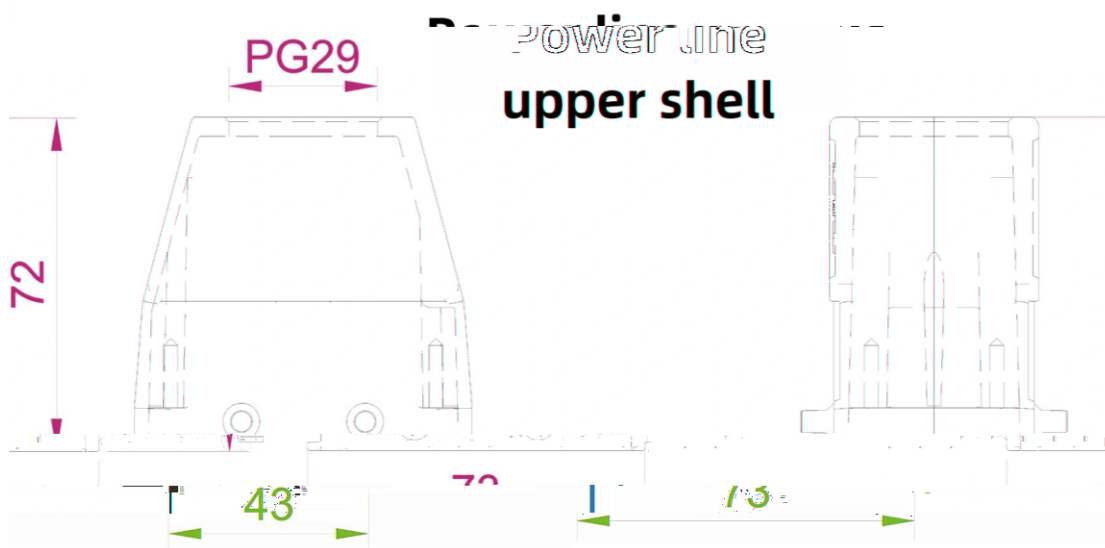
Male insert 插芯

Encoder upper shell

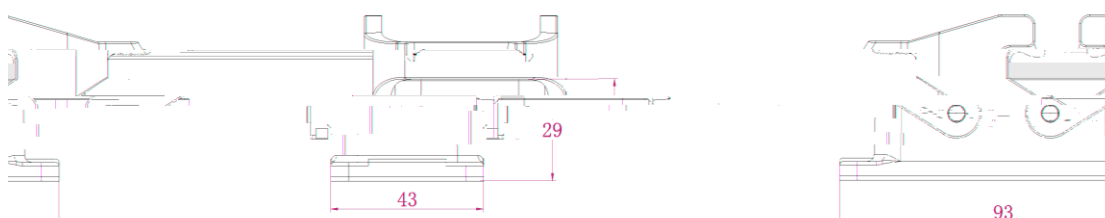
PG16



Encoder base



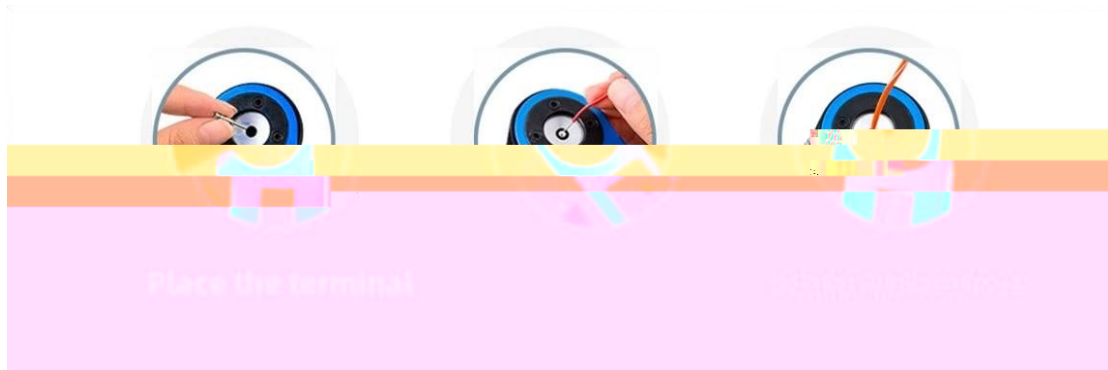
Power line base



Shielded and twisted pair to meet signal transmission requirements



How to use:



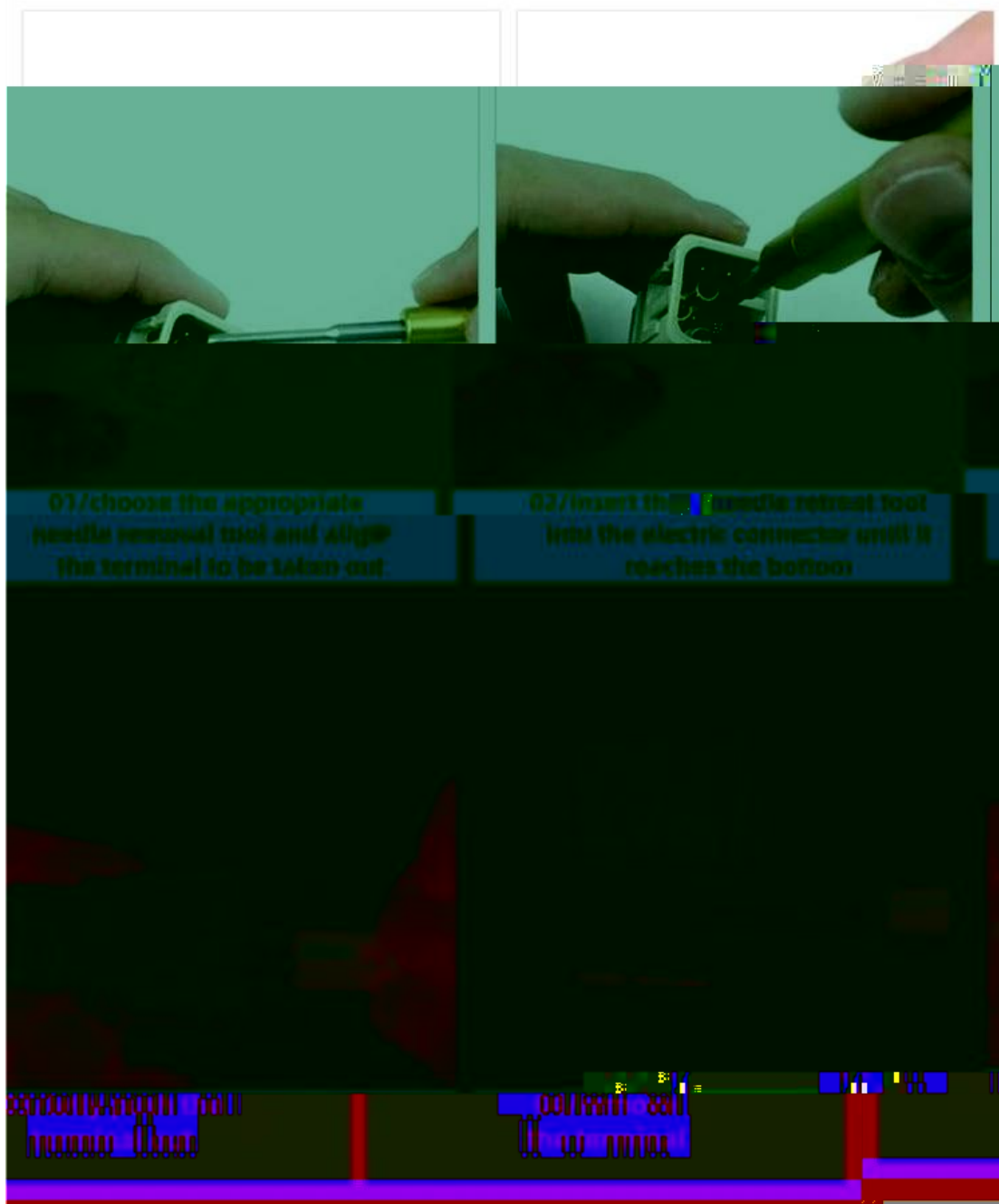


Technical drawing of the TL00 probe. The drawing shows the probe with a support tube. Dimensions are indicated: $\phi 11.02$ mm for the main body diameter, and 3.0 mm for the support tube outer diameter. The total length is 127.38 mm. The probe is labeled "JR ready TL00".

Model	TL00	Support tube outer diameter	3.0mm	
Material	Mold steel	The inner diameter of the support tube	2.6mm	
Weight	37.6g	Support tube length	22.5mm	
Size	Length 127.38 11.02(mm)			

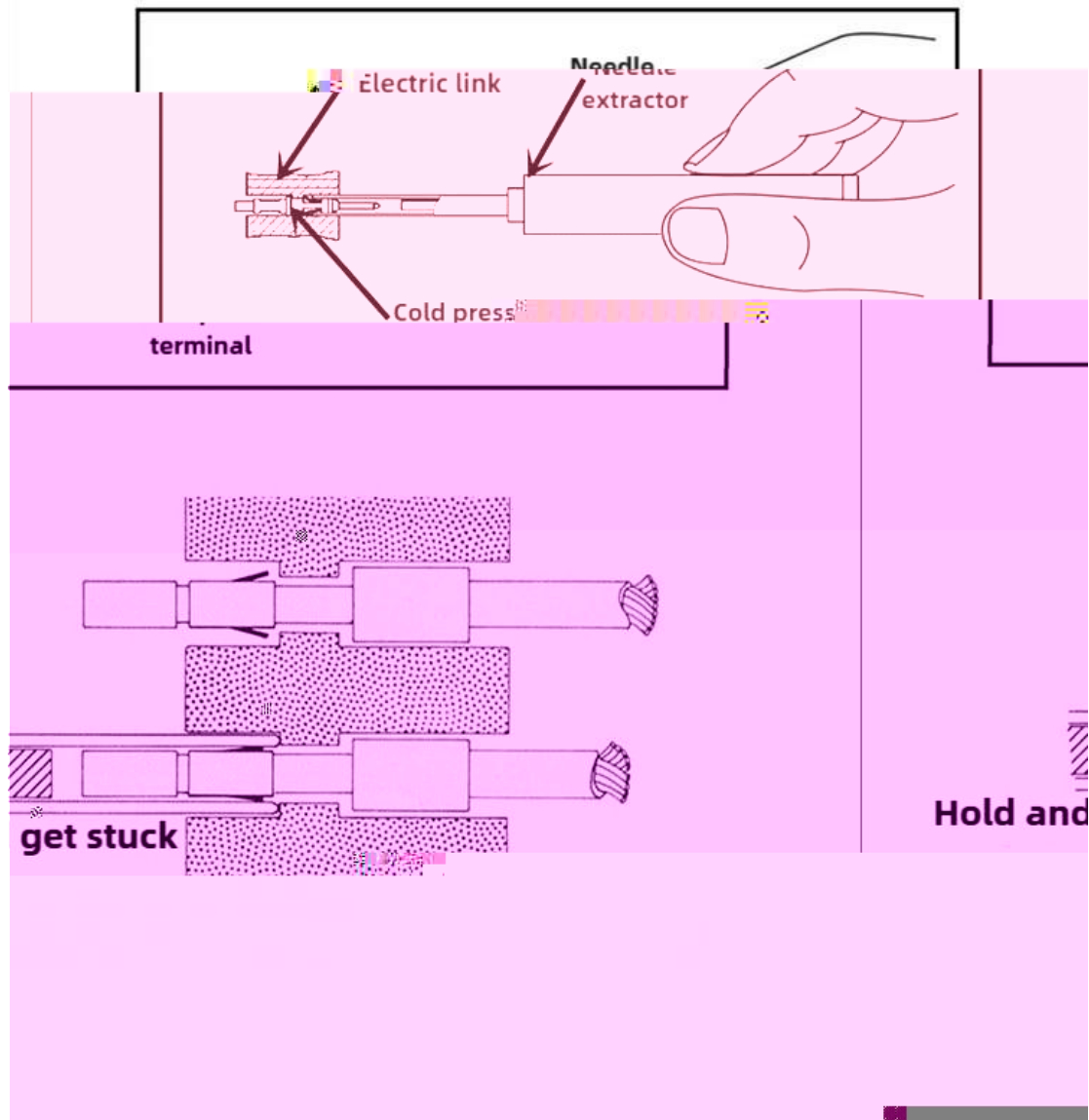
Adaptable terminal: suitable for 10A cold pressing pin
HARTING (Hao Ting, Ha Ding) connectors: HAN D, HAN DD, HAN Q series
Wei En connector: HD HDS

Steps to use the needle extractor

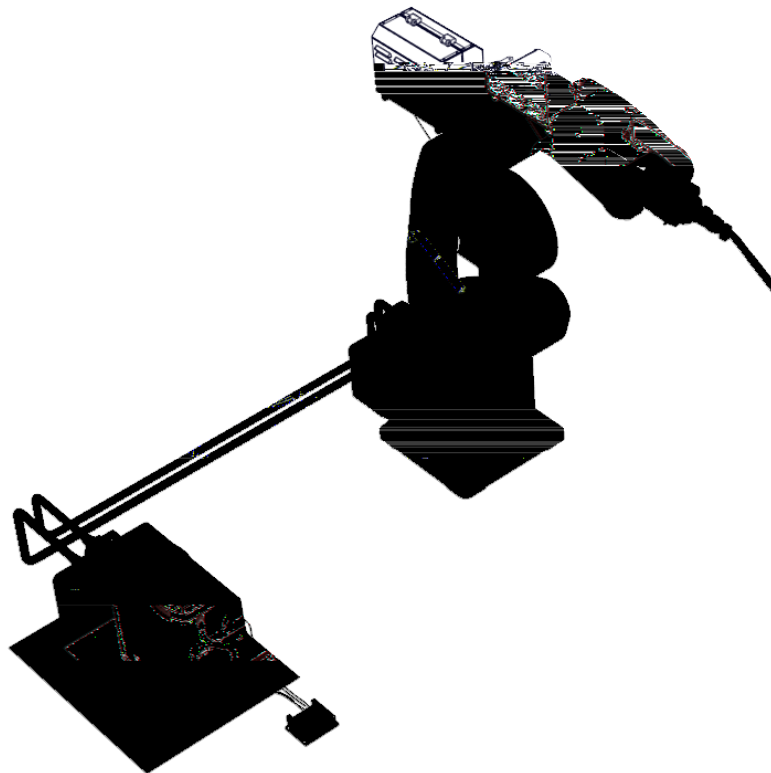


Principle of needle extractor

Principles of needle extractor



The encoder and power line connecting the mechanical body and the electric control cabinet have a connection mark, please connect the cable according to the identification, do not connect the wrong one, so as not to cause damage, resulting in the robot system can not work normally, and may also cause serious safety problems.

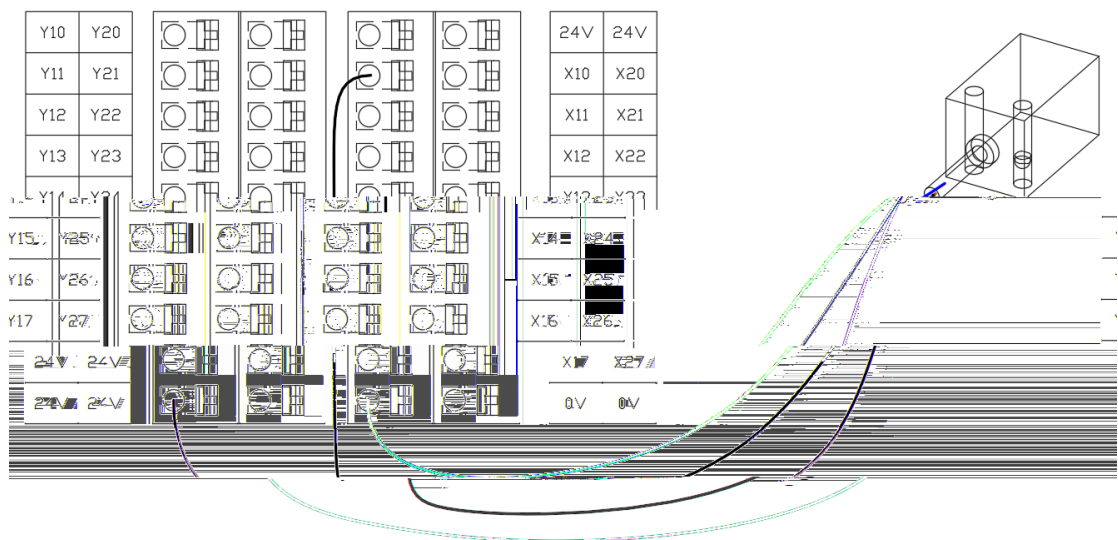
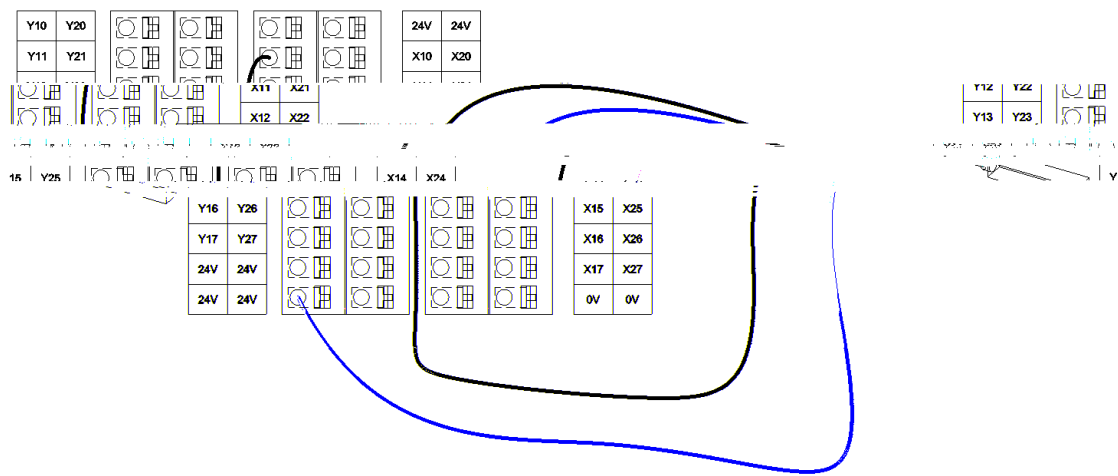
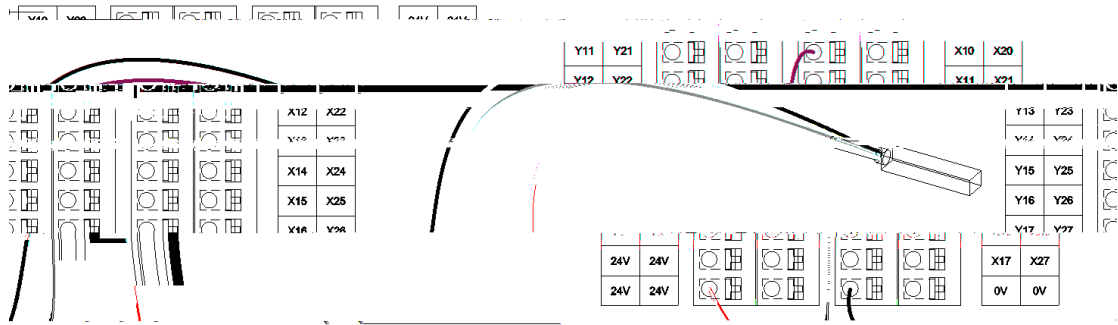


The robot is connected to the control cabinet

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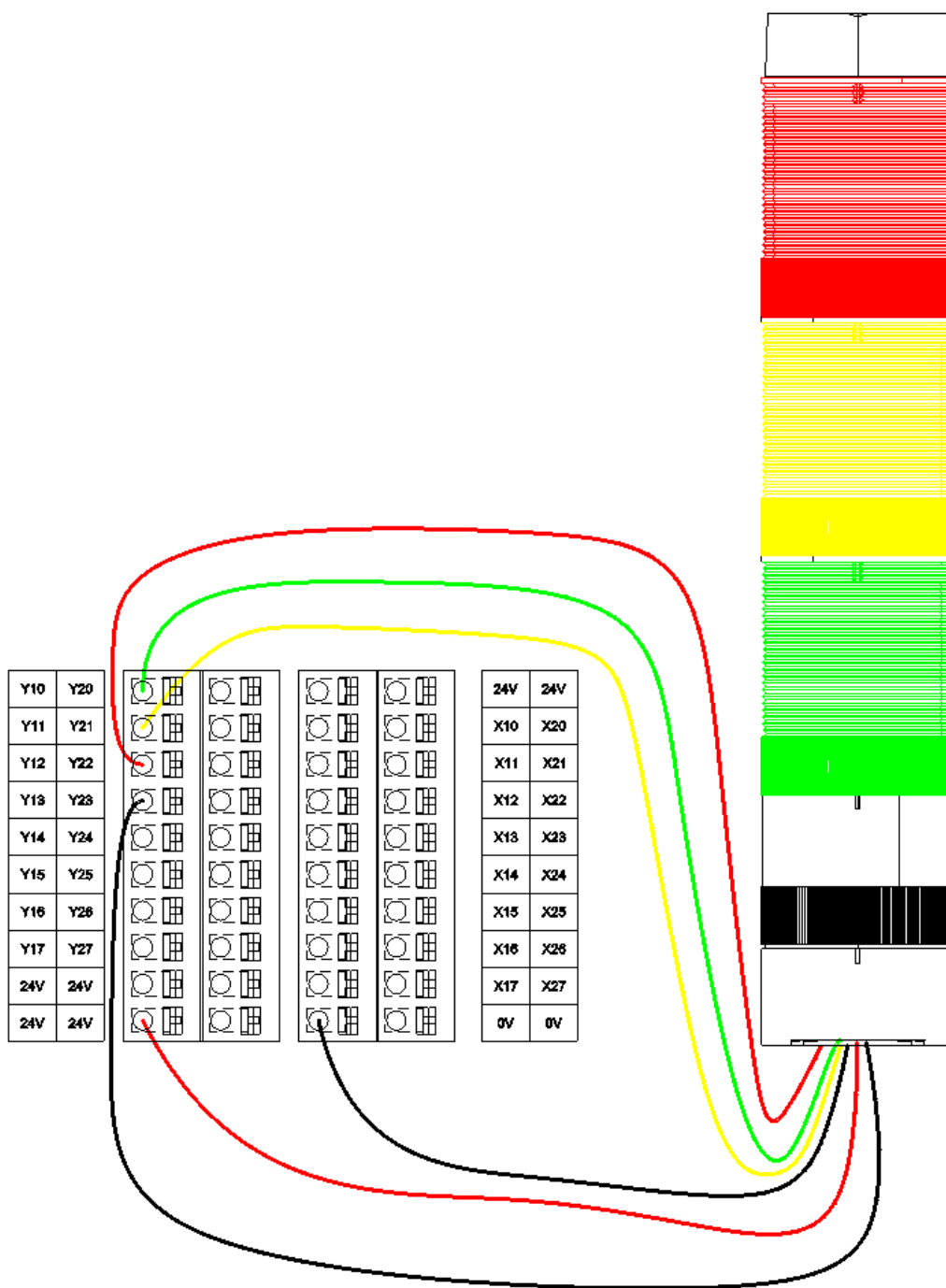
project	specification
Enter the number of channels	32
Enter the connection method	Crimp-type terminal blocks
Enter the type	Optoelectronic coupling
Maximum input voltage	30VDC
Input current	10mA
Input impedance	>2K
ON voltage range	>9.8V
OFF voltage range	<9.8
Enter the maximum signal frequency	

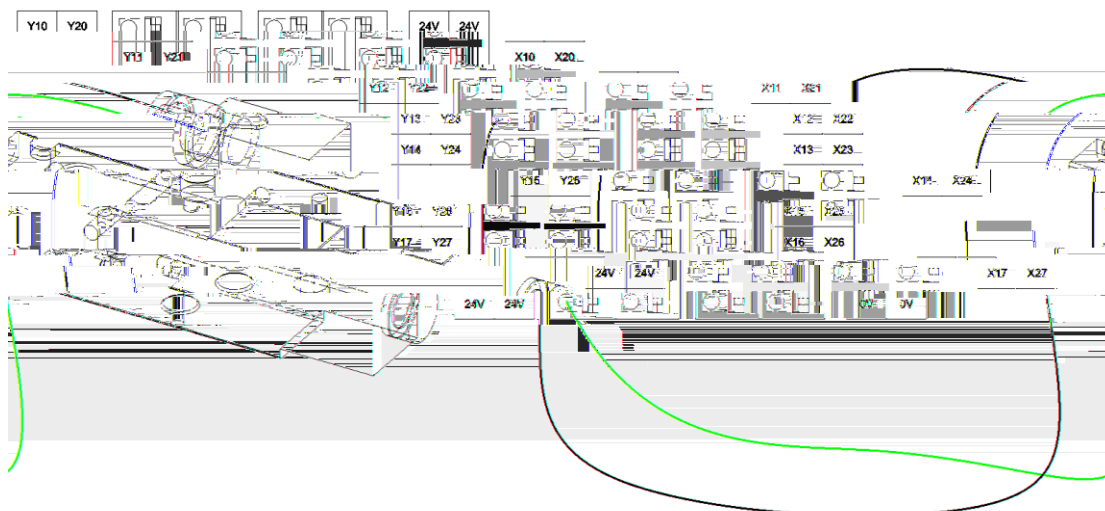
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24V power supply in the cabinet





Connect the solenoid valve

When this product uses an inductive load, the inductive load will generate a large reverse electromotive force between the contacts when it stops, and produce arc discharge, which may lead to contact failure or contact sagging, resulting in a significant shortening of the contact life.

The diode needs to meet:

Reverse voltage: 5~10 times of load voltage;

Forward current: greater than the load current.



note

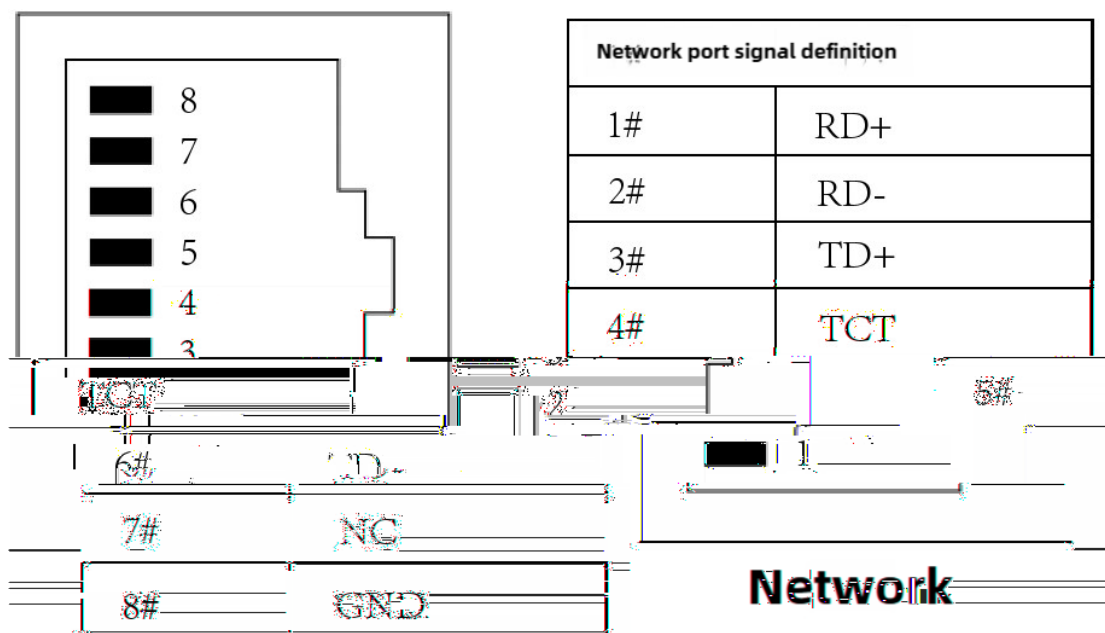
In the normal operation of the robot, the use of the emergency stop function should be minimized, the emergency stop may cause the robot shutdown trajectory to deviate from the normal operation trajectory, and the emergency stop impact will reduce the life of the robot reducer and increase the wear of the motor brake pads.

In daily use, if you want the robot to enter the emergency stop state, please press the emergency stop button when the robot is not moving.

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The EtherCAT interface is used to connect to the external axis, and the Ethernet interface allows the user to connect to the visual network port, where the Ethernet supports TCP/IP protocol.



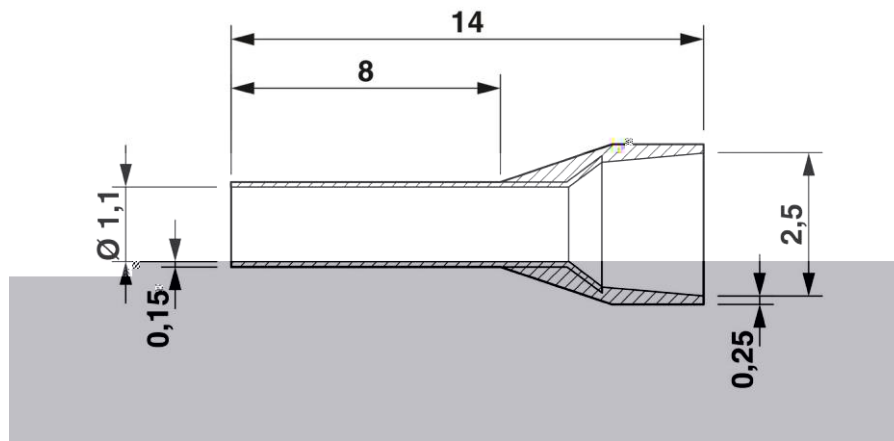
Servo communication protocol (inside the system).	EtherCAT protocol
Support Services	CoE PDO SDO
Synchronization mode	DC - Distributed Clock
Physical layer	100 BASE-TX
baud rate	100 Mbit/s (100 Base-TX)
Duplex mode	Full-duplex
Topology	Linear
Transmission medium	Shielded Category 5A or better network cable
EtherCAT frame length	44 bytes ~ 1498 bytes
Process data	A single Ethernet frame has a maximum of 1486 bytes

Category5 shielded twisted pair cables are recommended for communication cables (suitable for EtherCAT and Ethernet connections), and highly flexible shielded Category 6 network cables are recommended for harsh EMC environments.



RS485 communication is recommended to use shielded twisted pair connection. RS485+ RS485- are connected by twisted pair cables.

The structure of the thread needle is shown in the following figure:



project	Specifications
factory	Phoenix
Model	AI 0,5 - 8 WH - ferrule
Maximum cross-section of flexible wire	0.5 mm ²
color	white
material	Silicone- and halogen-free
Surface treatment	Tin plating (galvanizing)

Recommended crimping tool, recommended model: CRIMPFOX 6H - Crimping pliers (Phoenix).



Cable Fabrication Steps:

1. Strip off the wire insulation skin, remove the length of the outer insulation skin 8mm.
2. Thread the cable through the wire size sleeve.
3. Thread the conductor part of the cable through the round hole of the needle and crimp it with the crimping pliers recommended by the needle manufacturer.
4. Insert the wire pin into the corresponding hole of the terminal strip at the IO port, and pull back to confirm that the wire pin is locked with the shrapnel inside the terminal strip.

Before maintenance, please carefully read the "Maintenance Precautions", this manual, and related manuals, and perform maintenance on the basis of a full understanding of the safety maintenance method.

It is important that the maintenance of the robotic system is carried out by personnel trained in safety.

Those who have undergone safety training refer to those who have received safety training for workers engaged in industrial robot-related business as stipulated by the laws and regulations of each country (knowledge of industrial robots, knowledge of operation, teaching, etc., and knowledge related to business operations such as inspections). , relevant laws and regulations, etc.).

It is important that the maintenance of the robotic system is carried out by personnel trained in safety. Before maintenance, be sure to read the "Maintenance Precautions" described in the user manual. If the robot system is operated without understanding the safety observances, it can cause serious injury or significant damage, which is very dangerous.

Do not disassemble parts not described in this manual, or maintain them in a different way than those described. If disassembly or maintenance is carried out incorrectly, not only will the robot system not function

Also, please refrain from entering the operating area. Even if you see that the manipulator seems to have stopped moving, the manipulator in the energized state may still perform unexpectedly and may cause serious safety problems.

Be sure to check the operation of the robot after replacing the part outside the safety fence. Otherwise, the manipulator before the action confirmation may perform unexpected movements and may cause serious safety problems.

Before entering normal operation, please confirm that the emergency stop switch and safety door switch are operating normally. If the switch is operated in a state where it cannot operate properly, it will not be able to perform its safety function in the event of an emergency, and it may cause serious injury or serious damage, which is very dangerous.



note

Do not open the lid of the control cabinet except during maintenance work. There is a high-voltage charging area inside the control cabinet, and there is a risk of electric shock even when the power supply is off.

Be sure to turn off the power supply to the control cabinet and related devices and unplug the power supply before replacing it. If the operation is carried out in a power-on state, it may cause electric shock or malfunction.

Do not attach or remove the servo motor connector while keeping the power on. Otherwise, it may cause the manipulator to perform abnormal movements, which is very dangerous. In addition, if the operation is carried out with the power on, it may cause electric shock or malfunction. Ensure safety by unplugging the mains. Be sure to connect the AC power cable to the power plug and not directly to the factory power supply, etc.

Overhaul maintenance operations must be carried out in the state of power. At this point, work in pairs. One of them is in a position where he can immediately press the emergency stop button, while the other is within the robot's range of movement, keeping his vigilance and moving quickly to work. In addition, it is necessary to confirm the evacuation route before proceeding.



warn

It is forbidden to disassemble and work on parts not covered by the maintenance manual.

Maintenance personnel must keep the robot key, and it is strictly forbidden for unauthorized personnel to enter the robot software system in manual mode and read or modify the program and parameters at will.

Due to the influence of environmental temperature, humidity, dust and vibration, it will cause the device to deteriorate and reduce the service life of the product. Therefore, it is necessary to carry out daily and regular maintenance and maintenance, especially for high-temperature environments, frequent start-stop occasions, environments with AC power supply and load fluctuations, environments with large vibrations or shocks, and dustIn corrosive environments with hydrochloric acid, the interval between periodic inspections should be shortened. In order to ensure that the product functions properly and that the product is not damaged, please check the following items every day, make a copy of the inspection confirmation form for use, and sign the "confirm" seal on the confirmation column after each confirmation.

Check the items	Check the contents	Countermeasures in case of malfunction	Confirmation bar
Installation environment	Whether the control cabinet and surrounding cables are abnormal	Confirm whether there is vibration in the installation of the fixing bracket; Verify that the connecting cable terminals are not loose or corroded.	
Input voltage	Enter the supply voltage	Confirm whether the input voltage is within the allowable range; Confirm that there is no heavy load around to start.	
Terminal	Control cabinet connection terminals	Confirm that the screws on both sides of the input and output terminals are tightened.	

Please regularly inspect the places that are difficult to inspect during operation, and always keep the control cabinet in a clean state to effectively remove dust on the surface of the product and prevent dust from entering the product, especially metal dust.

Check the items	Check the contents	Countermeasures in case of malfunction	1 month check-up
Cable	whether the power line and the connection are discolored; Whether the insulation is aged or cracked.	Replace cracked cables; Replace the connection terminal that has been damaged.	
Air duct vents	whether the air duct heat sink are blocked; The fan is	Cleaning air ducts; Replace the fan.	

	damaged		
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工业控制领域核心供应商

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