

【User Guide】 SRC-880



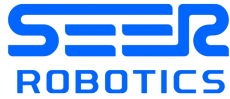
Thank you for your purchase.

Only qualified personnel who have received corresponding operation training and obtained qualifications are allowed to use this product.

Please refer to EN-1525:1997 specification for suggestions on using this product to manufacture mobile robots.

The use and maintenance behavior of mobile robots manufactured by this product shall comply with GB/T 36507-2018 safety specifications for the use, operation and maintenance of industrial vehicles.

Disclaimer



we have checked the content of this document. However, it cannot be guaranteed that the description is completely consistent with the product. We will often check the content of the description and make necessary corrections in subsequent editing.

Technical data are subject to change without prior notice.

Tips

- Please read the product description carefully before using the product.
- Do not disassemble the controller for unauthorized maintenance personnel.
- Before use, please fix the controller on a stable plane.
- Please keep the controller dry to avoid overheating of components in the case, and do not cover or block the heat dissipation port.
- Before connecting the controller to the power supply, please confirm the power supply voltage value and the connection mode of the power supply terminals meet the requirements.
- Please place the power cord where it will not be trampled, and do not pile up anything on the power cord.
- Before you need to connect or unplug any device, make sure that all power cables have been unplugged in advance.
- Please pay attention to all the precautions and warnings mentioned in the manual.
- If an exception occurs during the use of the device, contact a professional.
- Please do not place or store the equipment in an environment with an ambient temperature higher than 70°C, otherwise it will cause irreversible damage to the equipment.
- This document cannot replace the technical agreement. If the content in this document conflicts with the technical agreement, please refer to the technical agreement or contract description.

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Version	Release Date	Description
V1.0	2023.08.28	First edition
V1.1	2024.3.21	<ol style="list-style-type: none">1. Add power on indicator at 16pin of A port2. USB2.0 upgrade to USB3.03. Adjust the interface sequence of the side panel



1. Overview

1.1 Product Introduction

This product is a general controller designed for mobile robots (AGV, AMR, etc.), providing mobile robots with core map construction, positioning and navigation, model editing and other functions. The controller is adapted to a variety of mainstream laser radars, and provides rich I/O, CAN, RS485 and other interfaces for connecting various sensors and driver equipment. This product integrates the core components of mobile robots into one, and with powerful client software, it can help users to quickly complete the manufacture and application of mobile robots.

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1.2 Feature overview

Boot mode	Provide one-key system power ON/OFF interface
Digital input	Provides 10 digital input interfaces
Digital Output	Provide 10 controllable power supply output interfaces
Power supply monitoring	Monitoring system power supply voltage, battery power status
Battery Management	For batteries with output switches, provide corresponding battery switch management ports.
Emergency stop	Provides the function of one emergency stop input and two emergency stop output
Communication bus	Provide RS485, CAN, Ethernet, USB and other communication bus interfaces
Posture sensing	The built-in six-axis acceleration sensor can accurately sense the posture of the controller.
Temperature & humidity environment	Built-in temperature and humidity sensors can effectively sense the environment inside the controller.
Network interface	Integrated two-port Gigabit network switch and 2.4/5GHz Dual-

	frequency Wifi (industrial WiFi6)
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Table 1-1

1.3 Product Size and environment

Overall size: 171*118.5 * 38mm

Operating temperature:-30°C ~ 55°C

Working humidity: 10 ~ 90% relative humidity, no condensation

Storage Temperature:-30°C ~ 70°C

Protection level: IP20

1.4 External power supply requirements

Overall specifications	The whole machine is powered by battery, and the battery has two commonly used specifications, 24V and 48v. The controller needs to provide stable 24V power supply through stabilized power supply or stabilized module.
Voltage	24V (± 10%)
Ripple and noise	150mVpp
Overall Power	12W (Excluding Power DO load)

Table 1-2

1.5 Size and installation

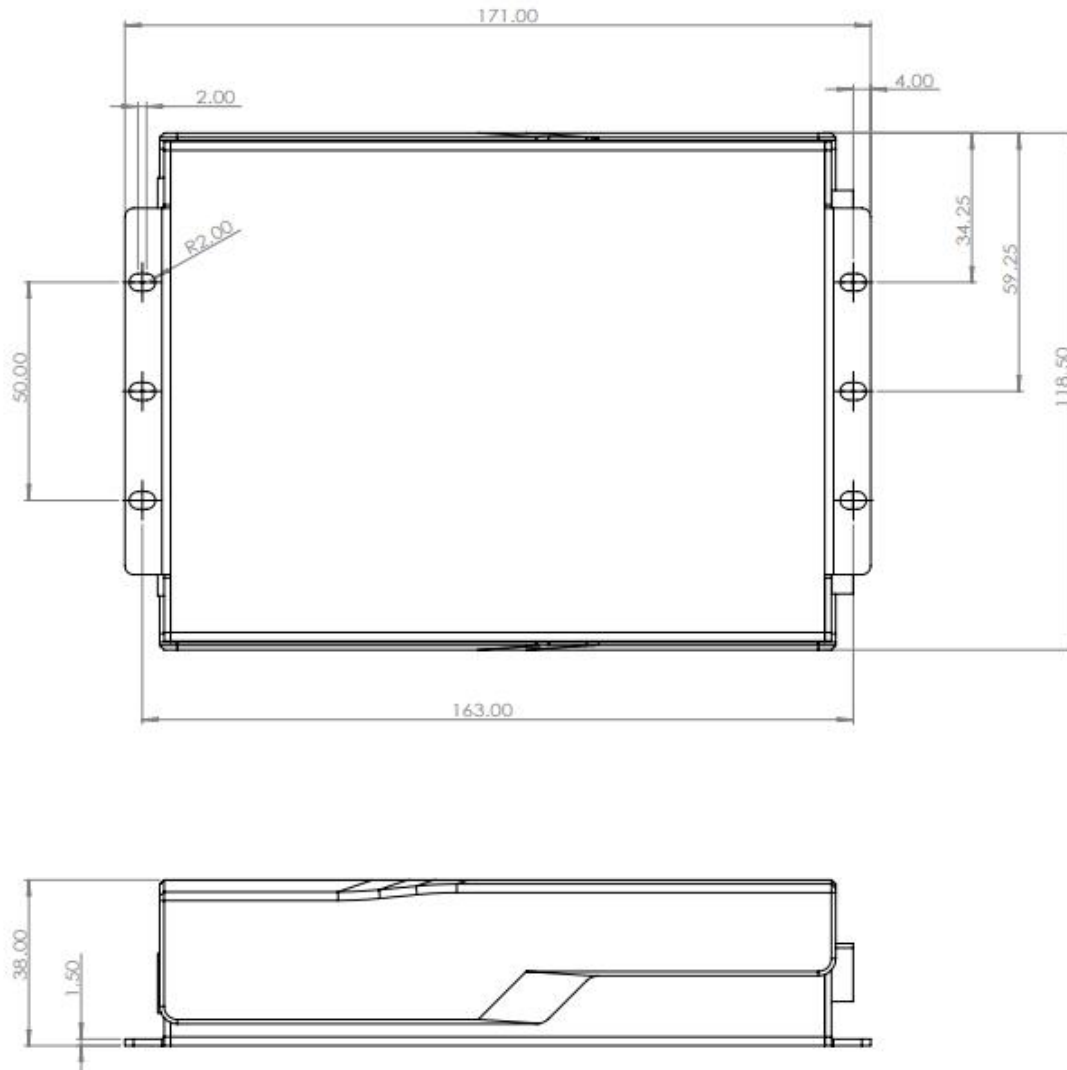


Figure 1-1

1.6 Goordinat Direction of Gyroscope

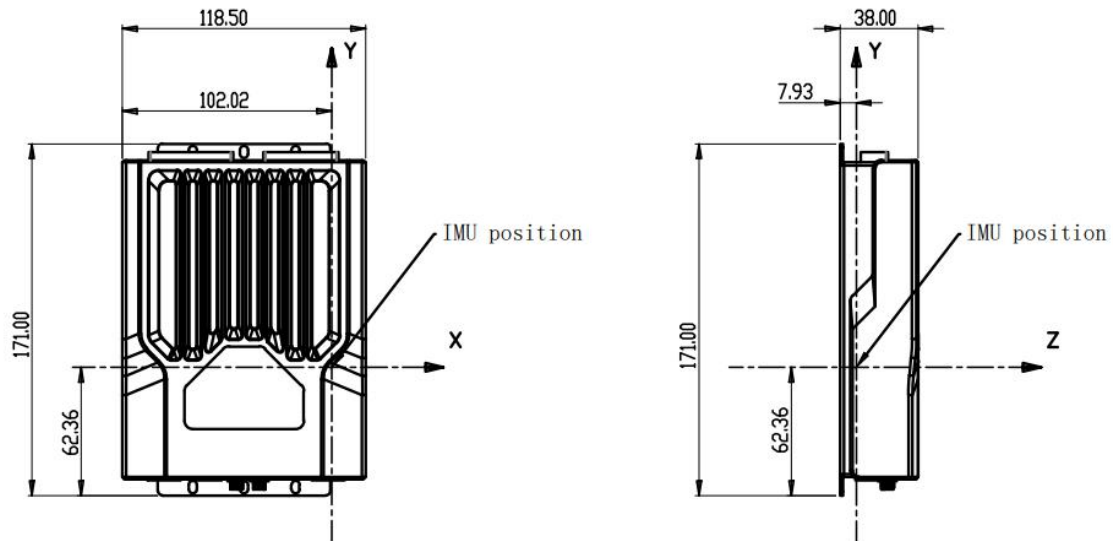


Figure 1-2

2. Operation instruction

2.1 Interface Definition

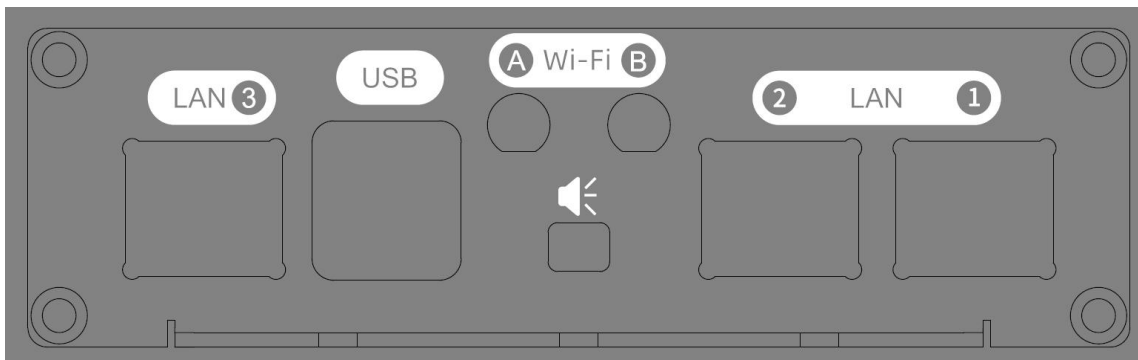


Figure 2-1

From left to right: network port 3, USB, WiFi-A,WiFi-B, audio interface, network port 2, network port 3

network ports 1 and 2 are equipped with switching function, which are usually connected to external sensors or used as debugging ports, and cannot be used to extend WiFi.

Network port 3 can be used to extend WiFi or as a debugging port.

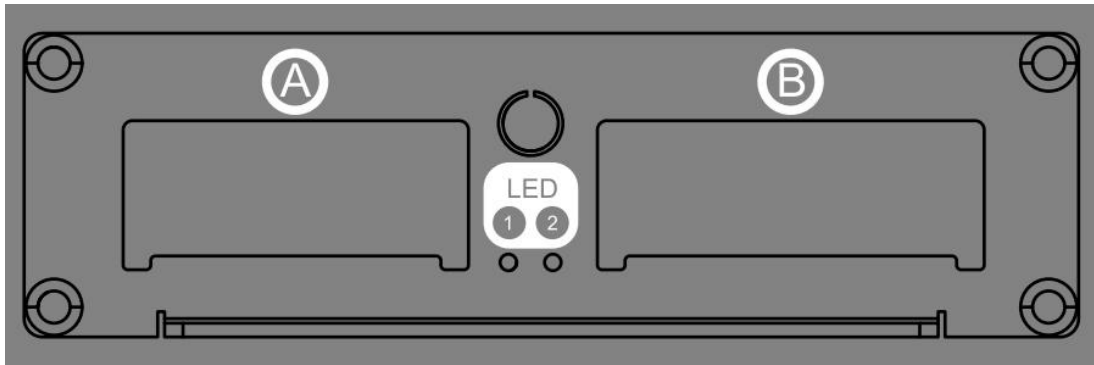


Figure 2-2

Indicator status	System state
LED1/2 is on simultaneously	MCU is in the BootLoader state, which requires burning firmware.
LED1 is always on, LED2 is flashing	The MCU is in the burning app (firmware) state, this process will last about half a minute, and then enter state 3.
LED1 / 2 alternating flashing	MCU is in app (firmware) running state.

Table 2-1

A: J2

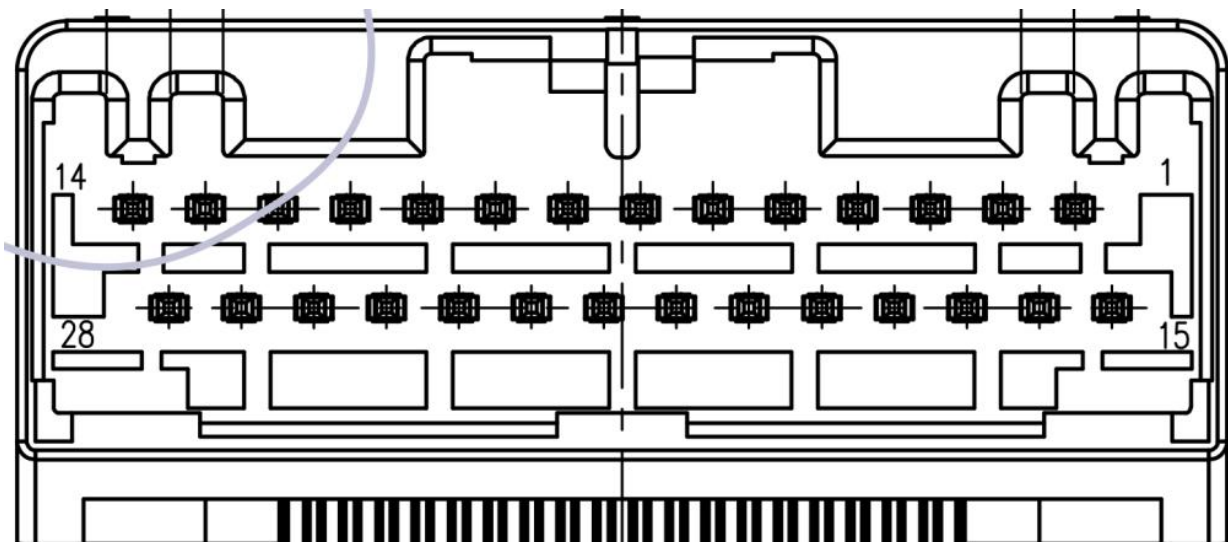


Figure 2-3

B:J1

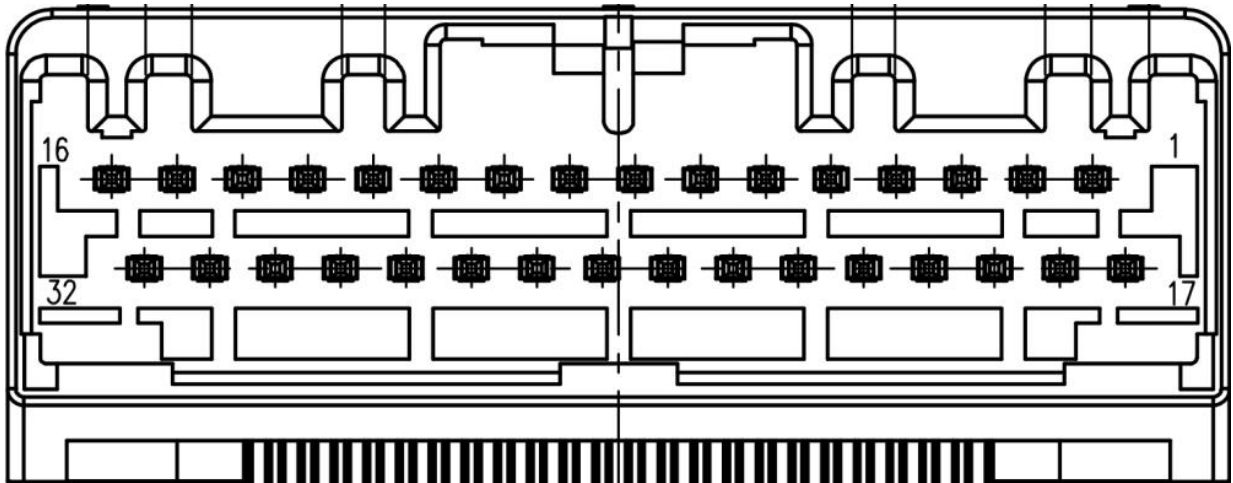


Figure 2-4

2.2 Connector Pin definition

A:28Pin connector J2

[1]RS485_A0 (Fill in model /dev/ttyS8)	[15]GND08
[2]RS485_B0 (Fill in model /dev/ttyS8)	[16]Power on indicator
[3]RS485_A1 (Fill in model /dev/ttyS3)	[17]N.C
[4]RS485_B1 (Fill in model /dev/ttyS3)	[18]N.C
[5]RS485_B6 (Fill in model /dev/ttyS4)	[19]N.C
[6]RS485_A6 (Fill in model /dev/ttyS4)	[20] RS485_GND (Isolated RS485 ground, matching with pin 1 and 2)
[7]CAN_H1 (Isolated type)	[21]CAN_H2 (Isolated type)

(Choose port1)	(Choose port2)
[7]CAN_L1 (Isolated type) (Choose port1)	[21]CAN_L2 (Isolated type) (Choose port2)
[9]GND07	[23]CAN_GND (Isolation CAN ground, matching with pin 7, 8, 21, 22)
[10] VBAT_DET (Battery voltage detection, used as a controller for charging piles)	[24]DO_04
[11]N.C (CAN_L3, For maintainmence)	[25]BAT_SWITCH_O
[12]]N.C (CAN_H3, For maintainmence)	[26]BAT_SWITCH_N
[13]EM_OUT1-	[27]BOOT_KEY
[14]EM_OUT1+	[28]EMC_KEY

Table 2-1

B:32Pin connector J1

[1]GND01	[17]24V input +
[2]GND02	[18]24V input +
[3]DO_03	[19]DO_07
[4]DO_02	[20]DO_06
[5]DO_01	[21]DO_05
[6]DO_00	[22]GND03
[7]DO_09	[23]GND04
[8]DO_08	[24]GND05

[9]DI_09	[25]DI_08
[10]DI_00	[26]DI_04
[11]DI_01	[27]DI_05
[12]DI_02	[28]DI_06
[13]DI_03	[29]DI_07
[14]DI_CHG_IN (Manual charging signal input)	[30] RS485_A4 (Fill in model /dev/ttyS7)
[15] RS485_A3 (Fill in model /dev/ttyS5)	[31]RS485_B4 (Fill in model /dev/ttyS7)
[16] RS485_B3 (Fill in model /dev/ttyS5)	[32]GND06

Table 2-2

2.3 Emergency stop interface

- SRC-880 provides an emergency stop switch of one normally closed logic .
- SRC-880 emergency stop input signal foot J2-28, emergency stop switch uses normally closed logic switch. Controller internal pull up by default, external only need to connect the signal to normally closed emergency stop button and then pull the ground.
- See Figure 2-5 for the logic diagram of emergency stop input.

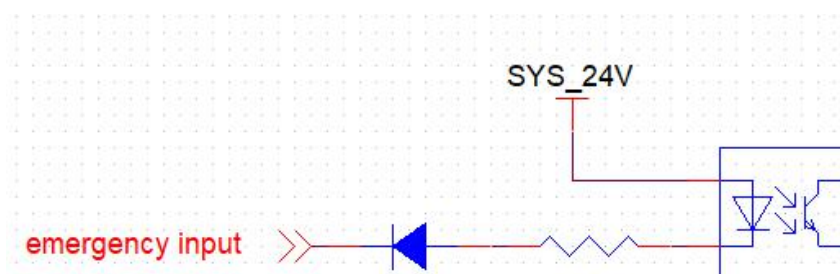


Figure 2-5

- The SRC-880 has a set of independent dry contact switches, which are used as emergency stop output signals. The output signal pins are distributed at 13/14 pins of J2 connector, and the maximum output is 120mA. Emergency stop output logic shows opinion "Figure 2-6".

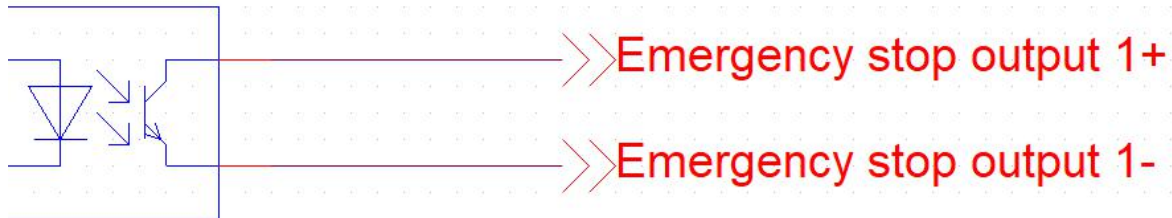


Figure 2-6

2.4 DI interface

SRC-880 DI supports NPN output sensor detection, when DI input signal foot is low level (GND), it is the trigger state, floating or 24V high level, it is the off state

- SRC-880 has 10 DI input interfaces.
- It has an independent detection manual charger connection detection port.
- Please use the DI interface function after wiring according to the correct wiring definition.
- The logic of the interface is shown in Figure 2-7 "

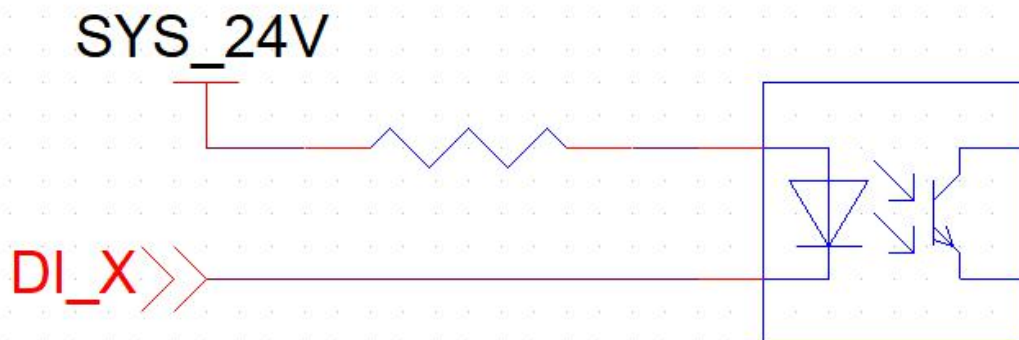


Figure 2-7

2.5 One-click Power On/Off interface

We recommend that you choose the self-reset button of 1NC + 1NO + LED first for the selection of boot buttons. The two ends of the normally open contact on the power-on key are respectively

connected with J2-25 and 26, the signal pin is J2-27 connected with the normally closed end of the self-reset button, and the other end of the switch is connected with GND. The logic of starting up shows opinions "Figure 2-8".

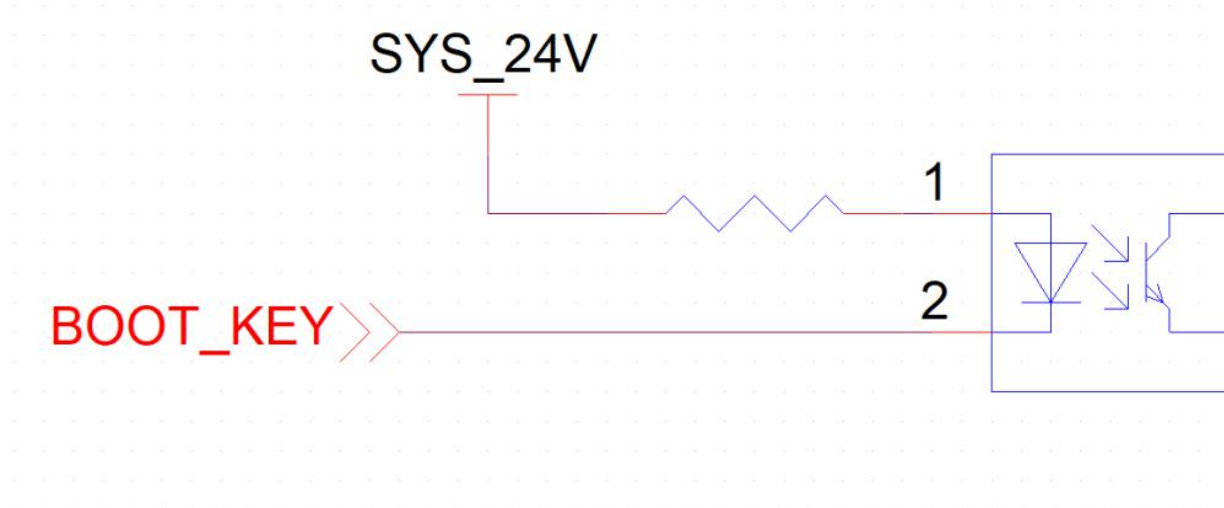


Figure 2-8

After pressing the power button, the NO switch closes, causing the connected battery switch to close,there by providing power from the battery. At the same time, when the power button is pressed, the NC switch disconnects, and the system detects the power-on signal. The controller's internal electronic self-clock switch will lock the NO contact's battery switch to maintain the battery switch closed. The schematic diagram of the internal logic of battery switch control is shown in "Figure 2-9". .

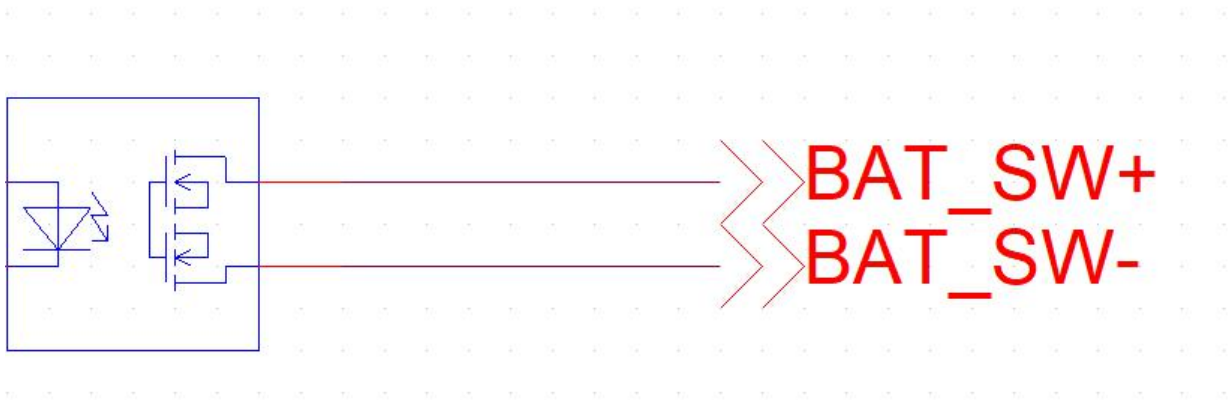


Figure 2-9

2.7 Communication Interface

- SRC-880 controller provides 3 standard CAN interfaces. Among the three CAN interfaces, two are isolated CAN interfaces(CAN 1,CAN 2), and one is non-isolated CAN interface(CAN3).
- Please connect the corresponding isolated ground for the isolated bus.

- Please connect the motor driver to CAN 1 and CAN 2.
- CAN3 is used for controller upgrade maintenance and is not normally used.
- To accommodate different devices, the controller CAN interface defaults to a 120 ohm terminal resistance. The CAN interface is generally used to connect motor drivers.
- The SRC-880 controller provides 5 RS485 interfaces, all controlled by the main chip(RS485_0/RS485_1/RS485_3/RS485_4/RS485_6).
- The RS 485 interface is generally used to connect ambient lights, QR code cameras,and batteries, etc.
- RS485_0 is an isolated RS485, which can be used to connect battery communication.
- Please use the communication function after correctly wiring according to the wiring definition.

2.8 DO interface

- The SRC-880 controller provides 10 channels of digital output interface. The device outputs are all PNP type outputs,externally outputting 24V.
- Each DO interface can be independently controlled through software.
- When the actuator is an inductive load, such as relays, contactors, solenoid valves, etc., a freewheeling diode needs to be added to the actuator to eliminate the back electromotive force generated when the inductive load is disconnected, which interferes with the system circuit. See [appendix 2](#) for the connection method of the freewheeling diode.
- please use the DO output function after connecting correctly according to the wiring definition.
- The DO8-DO9 load supports A maximum of 24V/1A, and the rest supports A maximum of 24V/0.4A. (Current accuracy $\pm 15\%$)

2.9 Power Interface

- The power supply voltage of the SRC-880 is 24VDC, and the external DCDC is used to supply power. The Ripple requirement is $\leq 150\text{mvpp}$, and the minimum working current of the system is 500mA (excluding the power supply requirement of DO).
- There is an external DO output,please match it with a suitable DCDC.
- It is prohibited for motor drivers or other large power devices to share a DCDC with the controller.
- Please connect the SRC-880 power line correctly according to the wiring definition before turning on the controller. Make sure that the wiring is correct before opening. Please do not reverse the positive and negative poles.

2.10 Other External interface

- In addition to J1 and J2, the controller also provides three RJ45 Ethernet interfaces, two SMA antenna interfaces, two USB3.0 interfaces and one audio interface.
- Network ports 1 and 2 are gigabit network ports with the switching function. They are usually connected to external sensors or used as debugging ports and cannot be used to expand WiFi.
- Network port 3 is a 100 Mbps network port, which is an independent network port and does not have a fixed network segment configured. It can be defined according to user needs and used to expand WiFi, debug ports, external devices, etc.

3. Reference electrical schematic diagram

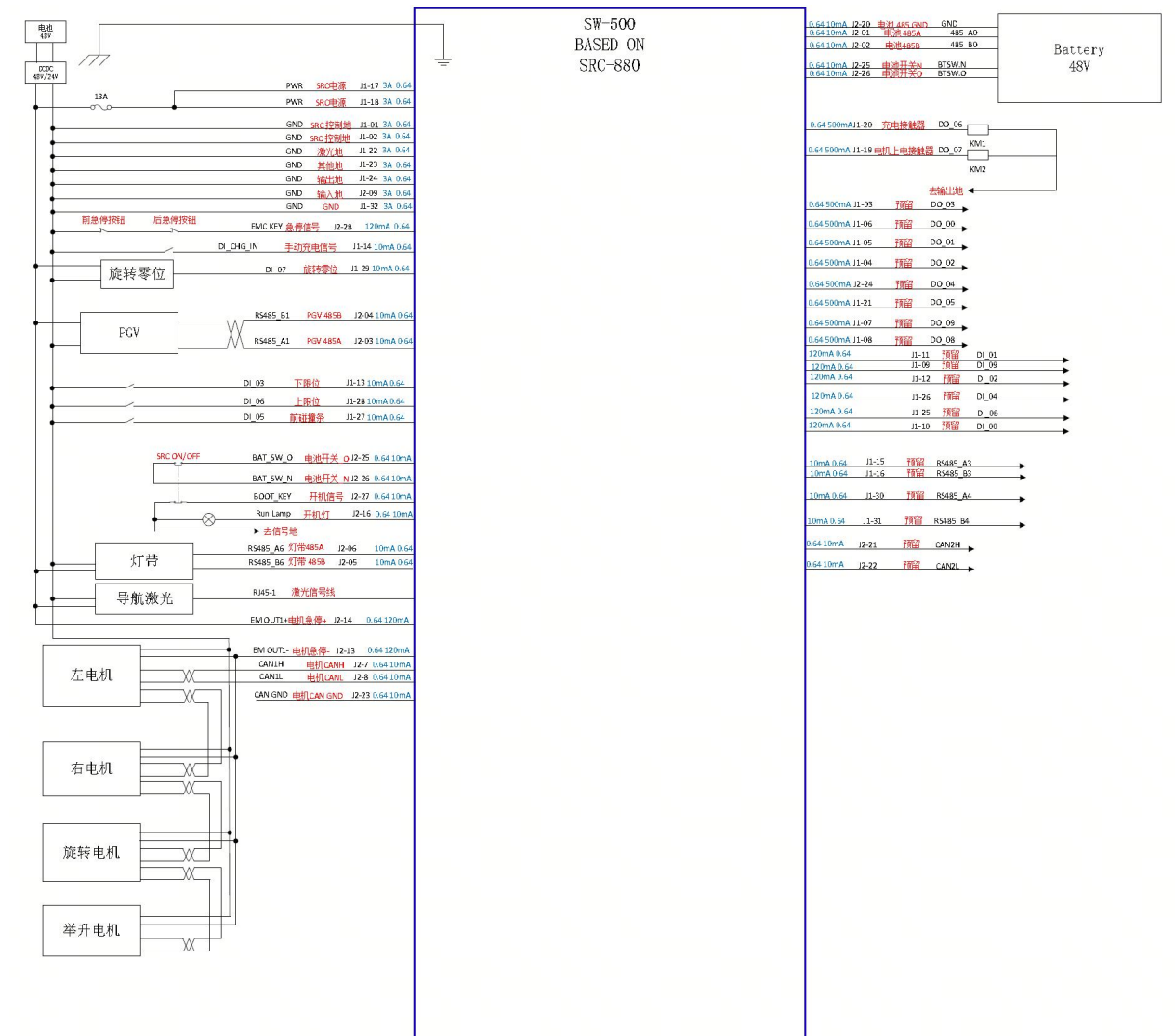


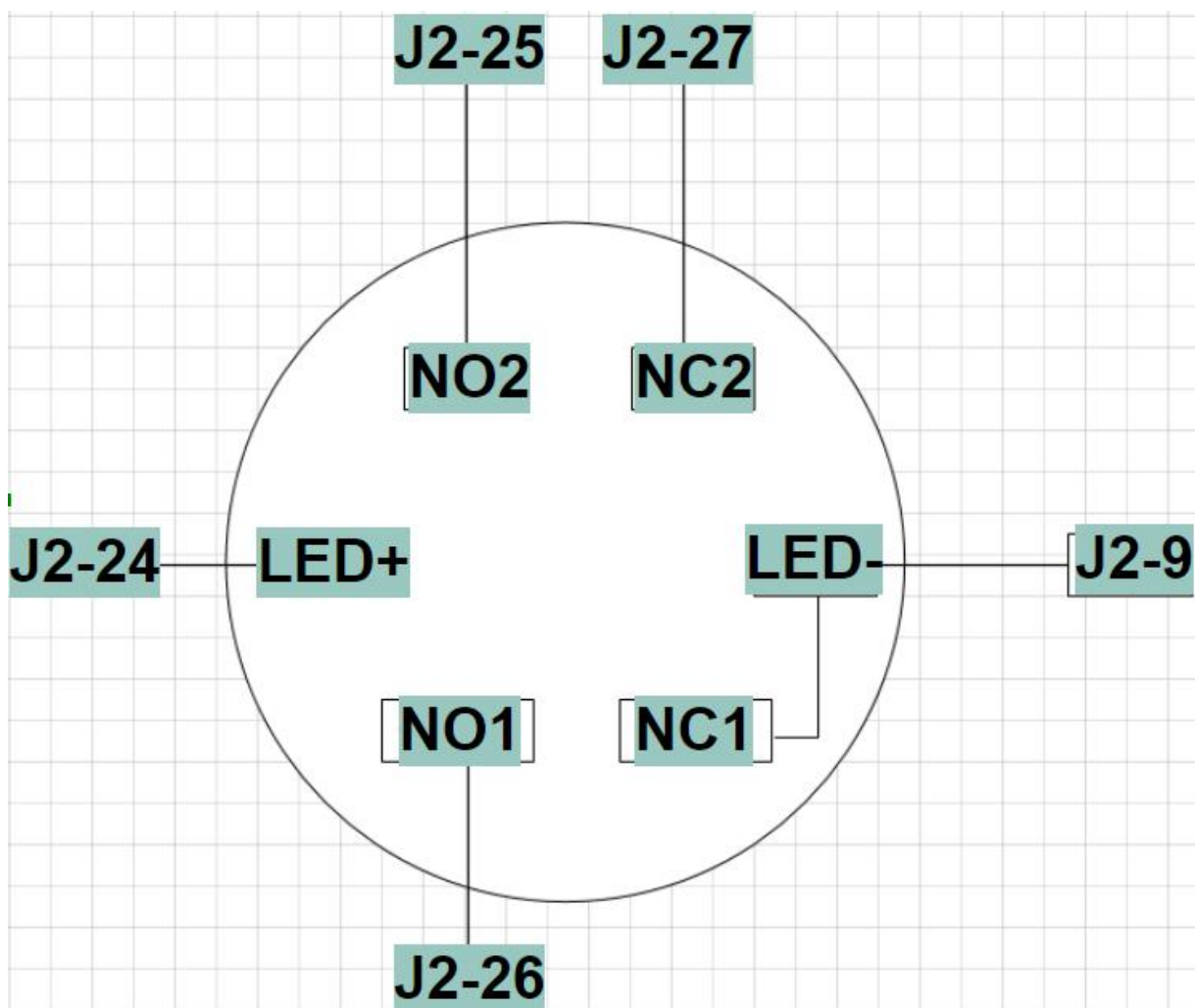
Figure 3-1

The first power-on test is recommended as follows:

1. Check if the terminal block is properly grounded.
2. Check if the positive and negative terminals on the terminal block are mixed up.
3. Check if the controller is properly grounded.
4. Check if the positive pole of the DCDC input terminal is short-circuited to the ground.
5. Check whether the positive electrode of the motor power supply is short circuit to the ground.
6. Check whether the positive and negative poles of the motor power supply are reversed.
7. Check whether the positive electrode of the laser power supply is short-circuited to the ground.
8. Check whether the positive and negative electrodes of the laser power supply are reversed.
9. Before the first power on, disconnect the laser power supply, disconnect the motor driver power supply.
10. If there is no abnormal power supply, connect the motor driver power supply after shutdown.
11. If there is no abnormal power supply, power on the laser power supply after shutdown.
12. Start debugging test.

Appendix 1 Frequently Asked Question

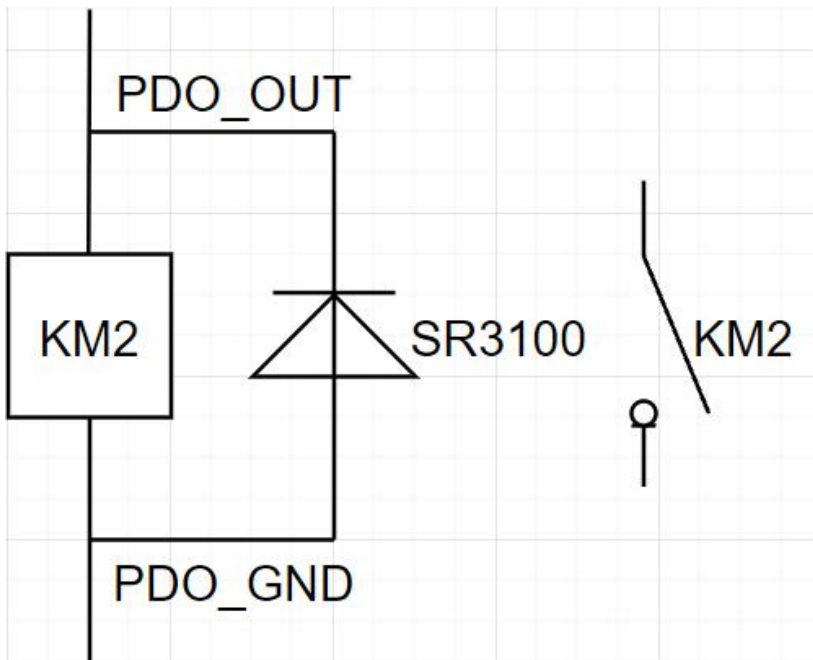
1. power-on key connection method



2. perceptual load connection mode

How are inductive loads such as relays and contactors connected to the DO?

Relays, contactors, solenoid valves and other inductive loads must be connected to the current diode to eliminate the back electromotive force generated when the inductive load is disconnected to the system circuit interference, the continuous current diode cathode is connected to the DO output, the anode is connected to the DO ground.



Interference hazards that may occur if the current diode is not added:

- The laser communication is interrupted, and a laser connection failure alarm may be generated on the controller.
- The Linux operating system of the controller crashes. The network port 192.168.192.5 cannot communicate and Roboshop cannot be connected.
- 192.168.192.5 cannot communicate.

When connecting the contactor, please determine the internal resistance of the contactor coil and the take-off current, do not exceed the output current of the PDO(1A).

Recommended diode model: SR3100

Maximum Ratings and Electrical Characteristics @T_A=25°C unless otherwise specified

Single Phase, half wave, 60Hz, resistive or inductive load.
For capacitive load, derate current by 20%.

Characteristic	Symbol	SR320	SR330	SR340	SR350	SR360	SR380	SR3100	SR3150	SR3200	Unit
Peak Repetitive Reverse Voltage	V _{RRM}	20	30	40	50	60	80	100	150	200	V
Working Peak Reverse Voltage	V _{RWM}										
DC Blocking Voltage	V _R										
RMS Reverse Voltage	V _{R(RMS)}	14	21	28	35	42	56	70	105	140	V
Average Rectified Output Current (Note 1)	I _O	3.0									A
Non-Repetitive Peak Forward Surge Current 8.3ms Single half sine-wave superimposed on rated load (JEDEC Method)	I _{FSM}	80									A
Forward Voltage @I _F = 3.0A	V _{FM}	0.5		0.75		0.85		0.92			V
Peak Reverse Current @T _A = 25°C	I _{RM}	0.5						0.02			mA
At Rated DC Blocking Voltage @T _A = 100°C		20						10			
Typical Junction Capacitance (Note 2)	C _J	250									pF
Typical Thermal Resistance (Note 1)	R _{θJA}	20									°C/W

3.After The Battery Switch Is Closed, How Does The Output Delayed Battery Affect The Startup?

If the battery switch of the controller is used to control the external power supply of the battery and disconnect the external power supply, and there is a delay in the power output after the battery switch is closed, press the power button for a longer time than the battery delayed output time, and release the power button immediately after the power light is on.

Appendix 2 Glossary

English abbreviation	Chinese name
SRC	Seer Robotics Controller
DI	Digital Input
DO	Digital Output
RS232	Standard Asynchronous Transmission Interface
RS485	Standard API for differential asynchronous transmission
CAN	Controller local area network
RJ45	Eight-core Ethernet twisted pair socket
DCDC	DC-DC stabilized power supply