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Operating Manual

Plasma Freezing System
with Full Temperature Control
BSSD-II-01/BSSD-III-01

Before using device, please carefully read this operating manual for its efficient operation and safety.

Contents

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Application and Contraindications

Intended purpose

The product is mainly used for quick freezing treatment of plasma products by blood stations or medical institutions.

Intended use environment

The device is used in blood stations or medical institutions.

The device is stationary type device and must not be used outdoors.

The devices are designed to operate at an ambient temperature range of 5°C~40°C with a maximum relative humidity of 80%.

Additional environmental requirements for the safe operation of the devices are documented in the operating instructions and must be observed.

During transport and storage, the ambient temperature must be maintained between -40°C and 55°C, with a humidity level below 95%.

Intended patient population

Patients do not come into direct contact with the devices.

Indications

Plasma infusion or treatment with plasma products, such as coagulation disorders treatment, supplement coagulation factors.

Contraindications

There are no known contraindications.

Intended users

● Pharmacists, doctors, laboratory staff or other staff who are trained and/or experienced in dealing with whole blood and blood components

● Service technicians with a recognized license or certificate as required by local authorities for installation, servicing and repair of refrigeration systems and equipment, and properly trained in the use of the contact shock freezer models.

Note: The device must be operated by individuals in organizations with knowledge of applicable regulations and guidelines governing the storage and distribution of blood and blood components. The organization must implement and validate procedures in accordance with these regulations and guidelines. These procedures should address the required storage temperature and a appropriate storage duration for blood and blood components.

Clinical benefit

Plasma quality assurance: Rapid freezing reduces ice crystal formation and protects the activity of coagulation factors.

Efficiency optimization: Shorten the freezing time.

Chapter One: Safety First

1. General safety instructions

Please read the following safety precautions carefully for a thorough understanding.

- ✓ Follow the instructions and procedures described in this manual to operate the plasma freezing system safely.
- ✓ Please read all safety messages in this manual and on the device carefully.
- ✓ Do not operate this device in any manner not described in this user manual. If you are in doubt or encounter any issues, please contact BASO or an authorized distributor.
- ✓ The precautions described in this user manual have been carefully developed to address all potential risks. However, it is also important that you remain alert for any unexpected incidents. Please operate this device carefully at all times.

1.1 Ensure the freezing system is properly grounded during installation.

1.2 Do not handle the power cord or operate the POWER switch with wet hands to avoid electrical shock.

1.3 Do not touch the touch screen with sharp objects to avoid damage.

1.4 If any abnormal condition occurs (such as unusual sounds or smells), stop operation immediately by pressing the Emergency Stop button or disconnecting the power supply, and contact BASO or an authorized distributor.

1.5 Wear protective gloves during operation to prevent frostbite.

1.6 Do not move or relocate the freezer while it is in operation.

1.7 To ensure equipment safety and reliability, only use parts supplied by BASO or an authorized distributor.

1.8 Turn off the freezer before performing any maintenance work.

1.9 The freezer should be turned off when the maintenance work is to be carried out.

1.10 Keep this operating manual with the device, so that all users can refer to it for safe operation and proper usage.

1.11 Unauthorized repairs, disassembly, or servicing of the freezer—except by BASO or an authorized distributor—are strictly prohibited.

1.12 Refer to Attachment 1 for the minimum anti-interference requirements for medical equipment.

1.13. Instructions are subject to change without prior notice.

1.2 Safety Warning Symbols and Label Instruction

1.2.1 Safety Warning Symbols

	General Warning Warning notes indicate conditions or practices that, if not strictly observed, could result in personal injury. ✧ Danger of crushing injury! ✧ Danger of frostbite! ✧ Danger of scalding! ✧ Do not touch or place any objects on the moving cold plate to avoid damage or malfunction. ✧ Do not forcefully lift the cold plate. ✧ Do not touch the cold plate during defrosting to avoid scalding.
	Warning: Risk of hand-crushing hazard! ✧ Keep hands away from the cold plate while it is in motion.
	Always wear protective gloves during operation! ✧ The cold plate is extremely cold and may cause frostbite. ✧ Do not push or remove the frozen tray without wearing protective gloves. ✧ Wear protective gloves and keep sleeves secure to prevent frostbite while operating the freezer. ✧ Wear protective gloves when cleaning melted water to avoid scalding.
	Warning: Risk of electric shock Hazard! ✧ Do not handle the power cord or operate the POWER switch with wet hands to void electrical shocks. ✧ Do not extend the power cord.
	Warning: Moderate frostbite hazard due to low temperatures and freezing conditions.
	Caution: Operational Guidance ✧ Do not keep the freezing chamber open for extended periods during freezing, as it may affect system performance. ✧ Ensure an interval of more than 3 minutes between compressor shutdown and restart.

1.2.2 Device tagging

	Warning: Risk of hand-crushing hazard! ✧ Keep hands away from the cold plate while it is in motion.
	Always wear protective gloves during operation! ✧ The cold plate is extremely cold and may cause frostbite. ✧ Do not push or remove the frozen tray without wearing protective gloves. ✧ Wear protective gloves and keep sleeves secure to prevent frostbite while operating the freezer.

	✧ Wear protective gloves when cleaning melted water to avoid scalding.
	Warning: Risk of electric shock Hazard! ✧ Do not handle the power cord or operate the POWER switch with wet hands to void electrical shocks. ✧ Do not extend the power cord.
	Warning: Moderate frostbite hazard due to low temperatures and freezing conditions.

1.2.2 Label Instruction

	Manufacturer
	Authorized representative in the European Community/European Union
	Date of manufacture
	Use-by date
	Batch code
	Serial number
	DISPOSAL: Do not dispose this product as unsorted municipal waste. It must be collected separately for special treatment.
	Consult instructions for use
	Medical device
	Unique device identifier
	CE Mark: conforms to the essential requirements of the Regulation (EU) 2017/745 (2797: BSI Group The Netherlands B.V.)

Chapter Two: Structure and Operating Panel

2.1 Structure

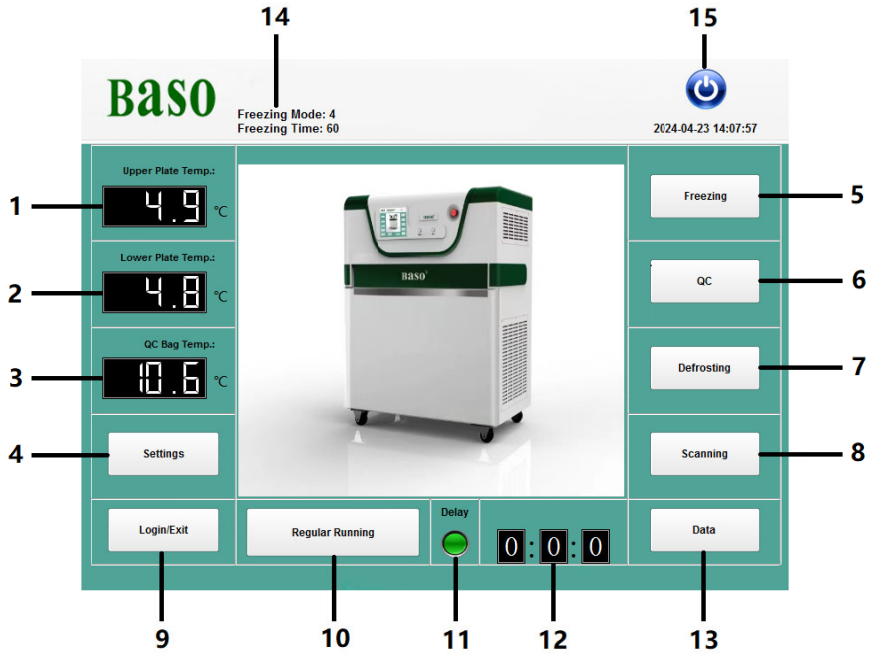
Caution:

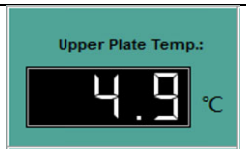
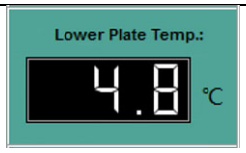
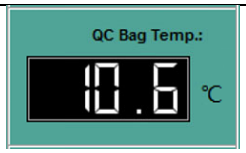
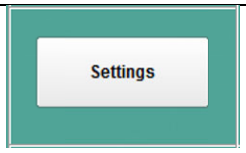
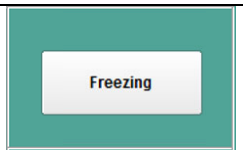
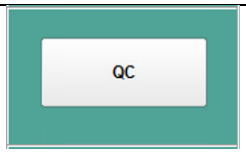
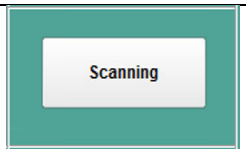
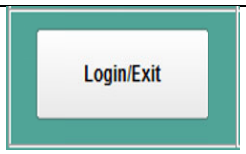
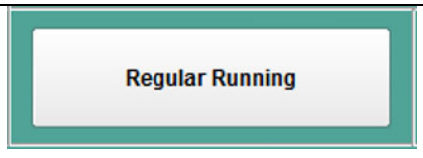
1. Close Button
2. Touch Screen
3. Open Button
4. Emergency Stop Button
5. Freezing Chamber
6. Caster

Table 1: Specification list

Product Name	Plasma Freezing System with Full Temperature Control	
Model	BSSD-II-01	BSSD-III-01
Catalogue number	BX7003	BX7004
Enclosure	ABS	Inside machine ABS/Outside machine metal plate
Type	Integrated Type	Separated Type
Dimensions of Cold Plate	1100x 630mm	
Min. Temp of Operating	≤-60℃	
Pre-cooling	No-load: From normal temperature to -60℃ for 15min or less	
Min. Temp of Cold Plate	No-load: -68℃	
Freezing Time (To reach Core Temp. of -30℃)	≤30min (40 bags 200ml)	
Compressor	Two-stage reciprocal compressor	
Refrigerant	R507/R507A	
Freezing Capacity (plasma bags)	60 at 100ml; 40 at 200ml; 20 at 600ml	
Power Supply	3Ph~; AC380-415V 50/60Hz 6000VA	
Defrosting time	≤8min	
Operation Condition	5℃~40℃, ≤80%RH	
Storage Condition	-40℃~55℃, ≤95%RH	
Weight of inside machine	640KG	410KG
Weight of outside machine	/	275KG
Dimensions of inside machine	1410*780*1720 (L*W*H)	1410*780*1680 (L* W* H)
Dimensions of outside machine	/	1300*520*1245 (L* W* H)

2.2 Operating Panel (Main Interface)



Item	Symbol	Function
1		To display the temperature of the upper plate.
2		To display the temperature of the lower plate.
3		To display the temperature of the QC bag.
4		Settings function.
5		Freezing function.
		Stop Freezing Function.
6		QC function. The device is automatically started "QC" for self-inspection.
7		Defrosting function.
8		Scanning function.
9		Manages user login or logout.
10		Displays the current running mode.

11		Delay indicator of the compressor.
12		Countdown function.
13		For checking the history data.
14	Freezing Mode: 4 Freezing Time: 60	Shows the freezing mode and time.
15		Shutdown button.

Chapter Three: Installation

3.1 Basic operational Conditions

- ✓ Power Supply: AC 380~415V 50Hz.
- ✓ Air Switch: 40A with leakage protector.
- ✓ Power Cord: Three-phase five-wire and the copper core is 4 square millimeters or above.
- ✓ The freezer must be grounded properly.
- ✓ Ambient Temperature: +5℃～+40℃ (+5℃～+30℃ recommended).
- ✓ Relative Humidity: ≤80%.
- ✓ The electrical hook-up operations must be performed by a qualified electrician.
- ✓ For the BSSD-III-01 model, the standard filling amount of the refrigerant R507/507A is 12kg for pipelines up to 10 meters in length, adding 400g for each additional meter of pipeline.

3.2 Storage Condition and Transport

- ✓ Storage temperature: -40℃~55℃.
- ✓ Relative humidity: ≤80%
- ✓ Packaged devices should be transported in covered vehicles of any kind of transport in accordance with the rules for transportation of cargo which are applicable for this kind of transport.
- ✓ The device must be transported and handled exclusively in a vertical position, in observance of the instructions printed on the packing. This precaution is necessary in order to avoid contamination of the refrigerant circuit with compressor lube oil with resulting valve and heat exchanger coil failure and problems starting the electric motor.

The manufacturer accepts no responsibility for problems due to transport executed in conditions other than those specified above.

- ✓ Storage and transportation conditions are indicated on the labels on the outside of the outer packaging.
- ✓ The device must be handled using a fork lift truck with suitable forks (forks length at least equal to 2/3 length of unit).

3.3 Positioning and Cleaning

- ✓ Remove packing material.
- ✓ Remove accessories from the inside of the device.
- ✓ Remove the wooden base.
- ✓ Remove the protective PVC film from the external surfaces of the device
- ✓ The freezer must be placed in a dry, well-ventilated room, avoiding direct exposure to sunlight or positioning close to a source of heat.
- ✓ No vibration, electric dust, explosive and corrosive gases around.
- ✓ Locate on one firm and level ground (the ground of the 25 kg/cm2 under pressure) and make sure that it is horizontal before running.
- ✓ 50cm all around the device must be remained.
- ✓ The device is thoroughly cleaned in our factory before delivery, in any case, we recommend, before using it, to clean the interior and exterior with a soft cloth with alcohol.

3.4 Initial checking before operation

- ✓ Check the condition of the power cord (no cuts or chaffing).
- ✓ Check that the feet are stable.
- ✓ Check the condition of internal and external components (pipelines, heat exchanger elements, fans, electrical components, etc.); check that all parts are firmly fixed into position as well.
- ✓ The user must also observe the following instructions to obtain the best operation from the device.

Chapter Four: Operation

The freezer adopts directly contact method, the plasma bag is placed in the freezing chamber between the upper and lower plate through heat transfer. Then, the plasma bag will be quickly frozen within a specified time.

- ◆ Before initial operation and after every disconnection from the power supply (or air switch closed), the freezer must be connected to current for about 6 hours to reach the compressor's operating ability (pre-heating).

- The power cord temperature will be reached to +50°C when the freezer is in use continuously at an ambient temperature of 40°C.
- If the freezer will be in use every day, do not close the air switch of the device. Only press "  " (Shutdown Button) on the touch screen.
- If the freezer will not be in use for a long time (2 days or above), the EMERGENCY STOP button should be released.
- The interval time must be more than 3mins between start-up and stop of compressor.
- Defrosting; every 4 times freezing for once defrosting or it also could be executed when the last freezing was finished every day.
- The data will be automatically saved and reviewed in the data interface by user.
- The touch screen of freezer is equipped with solid state hard disk and its capacity is 128GB. It can save about 60000 sets of freezing data.
- Equip with USB communication module for barcode reader connection and data transfer.
- Adopt automatically temperature control program, the control accuracy is ±0.5℃ during the freezing process.
- The freezer automatically starts "QC" before operation every day and it will detect the temperature difference between the upper and lower cold plates. The unit will alarm when the temperature difference exceeds ±1°C.

4.1 Normal Operation

a) Turn on the freezer.

- Open the air switch of the Power Supply at site.
- Open the air switch on the back of the freezer.
- Rotate the EMERGENCY STOP button clockwise (if need).
- System is loaded and entered the main interface (Fig 4.1).
- Self-inspection automatically. "QC End" shows at the bottom of the touch screen when QC finished.

Fig 4.1 Main Interface

b) User Login.

- Press “Login/Exit” in the main interface.
- Initial login to choose “Admin” and enter the password (999999).
- Login finished to back to the main interface.

c) Pre-cooling (It will take 15min).

- Press “CLOSE button of the unit.
- Press “Freezing” in the main interface when the freezing chamber closed.
- Then, Press “OK”
- Pre-cooling Countdown started.
- When the Pre-cooling is finished, the freezer will start beeping to alert and “Freezing temperature is reached!” shows at the bottom of the touch screen (Fig 4.2).

Fig 4.2 Pre-cooling Finished Interface

d) Freezing.

- Press “Stop Freezing”.
- Place the tray on the cart.
- Load the plasma bag one by one into the tray.
- Press “Scanning” in the main interface and scan barcode of plasma bag one by one.
- Press “OPEN” button of the unit and place the Anti-adhesion pad on the plasma bags.
- Push the tray with the plasma bags and Anti-adhesion pad into the freezing chamber.
- Press “CLOSE” button of the unit. When the freezing chamber was closed, the freezer will start beeping to alert and “System Prompt: Loading is finished, the freezing the freezing chamber closed!” shows at the bottom of the touch screen.
- Press “Freezing” in the main interface, and then choose the “Mode” (Fig 4.3) according to the Bag Capacity or Total Capacity in the Table 1: List of Freezing Mode (The mode time refer to the section 4.2.1.), then click “OK” to freezing (Fig 4.4).
- Freezing finished. The freezer will be started beeping to alert and “Freezing time is reached, the freezing chamber can be opened!” shows at the bottom of the touch screen.
- Press “Stop Freezing” on the touch screen and “OPEN” button of the device.
- Take out the tray with the plasma bags and Anti-adhesion pad when the freezing chamber is open.

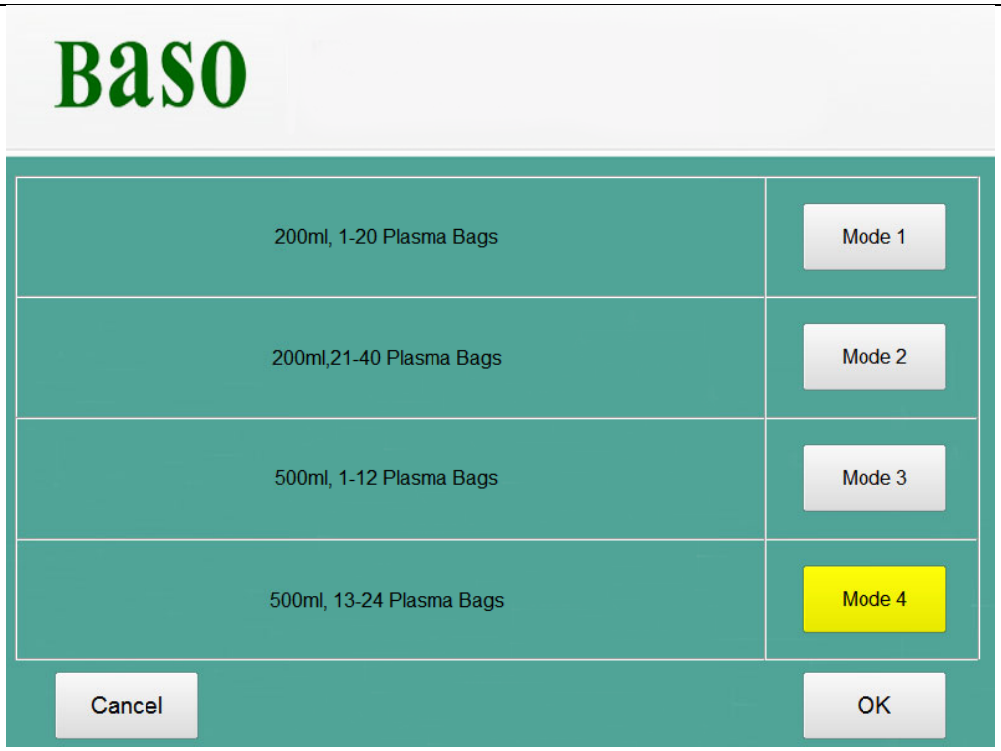


Fig 4.3 Freezing Mode Interface

Table 1: List of Freezing Mode

Mode	Bag Capacity	Quantity of Plasma Bag	Total Capacity
Mode 1	200ml	1-20	200-2000ml
Mode 2	200ml	21-40	2100-4000ml
Mode 3	500ml	1-12	500-6000ml
Mode 4	500ml	13-24	6500-12000ml

Fig 4.4 Freezing Interface

e) Defrosting (It will take about 8min).

- Keep the freezing chamber open.
- Press “Defrosting”, then click “OK”.
- Defrosting finished. The freezer will start beeping to alert and “System Prompt: Defrost End!” shows at the bottom of the touch screen (Fig 4.5).
- If the cold plate needs cleaning (such as water etc.), clean it with a cloth when defrosting finished.

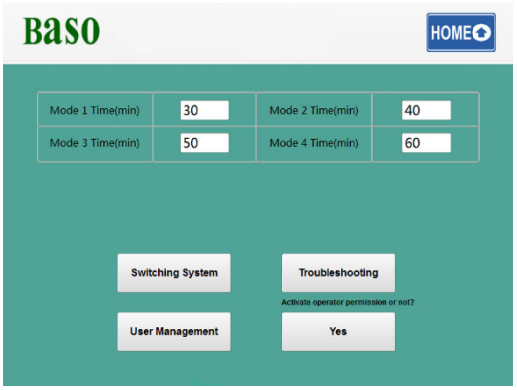
Fig 4.5 Defrost End Interface

f) Turn off the freezer.

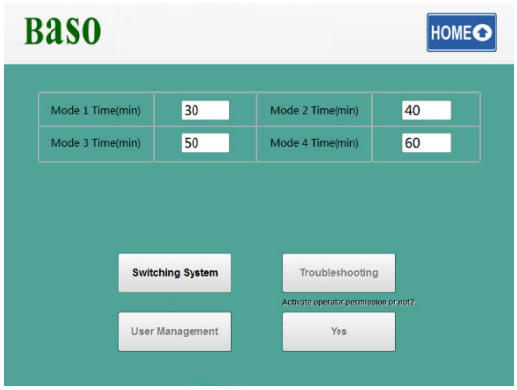
- Press “  ” (Shutdown button) in the main interface, then click “Yes”.
- The touch screen will be power off.
- Close the air switch on the behind of the device (If the freezer will be in use every day, no need to close the air switch of the device).
- The Freezer will be power off.
- At last, press the EMERGENCY STOP button (If the freezer will not be in use for a long time (2 days or above), the EMERGENCY STOP button should be pressed to close).

4.2 Settings Function

Click "Settings" in the main interface to enter the settings menu (Fig 4.6).



Admin



Operator

Fig 4.6 Settings Interface

4.2.1 Mode Time

- The mode time could be revised by the user according to the freezing Requirements. Different size of plasma bag, the mode time will be different.
- Detailed mode, please refer to the Table 1: List of Freezing Mode.

4.2.2 Switching System

- Switch to the Windows system.
- Under the Windows system, the printer can be directly connected to print the data.

4.2.3 User Management (Admin available)

- The operator will be authorized and managed by Admin.
- Press it to enter the user management interface (Fig 4.7)

1) How to add new user

   a) Input the user's name by press 

   b) Choose the user type

   c) Input the password by press 

   d) Input the user code by press 

   e) Press "New" and the user information will be shown in the User List.

2) How to delete
   a) Choose the user in the User List.
   b) Press "Delete".

3) How to modify
   a) Choose the user in the User List.
   b) Press "Modify".
   c) Modify in the User Information.

4) How to reset
   a) Input in the user information or choose the user in the User List.
   b) Press "Reset".

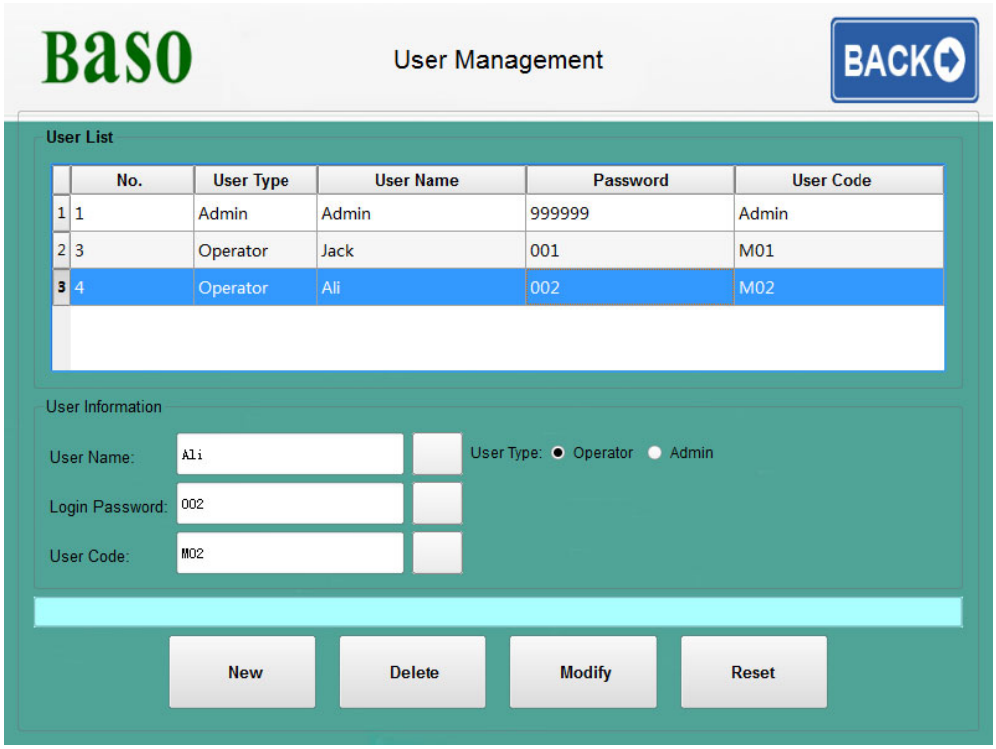


Fig 4.7 User Management Interface

4.2.4 Troubleshooting (Admin available)

- The Current Fault and History Fault (Fig 4.8) can be viewed by Admin.

4.2.5 Activate operator permission (Admin available)

- Click “Yes” to release the authorization of operator.

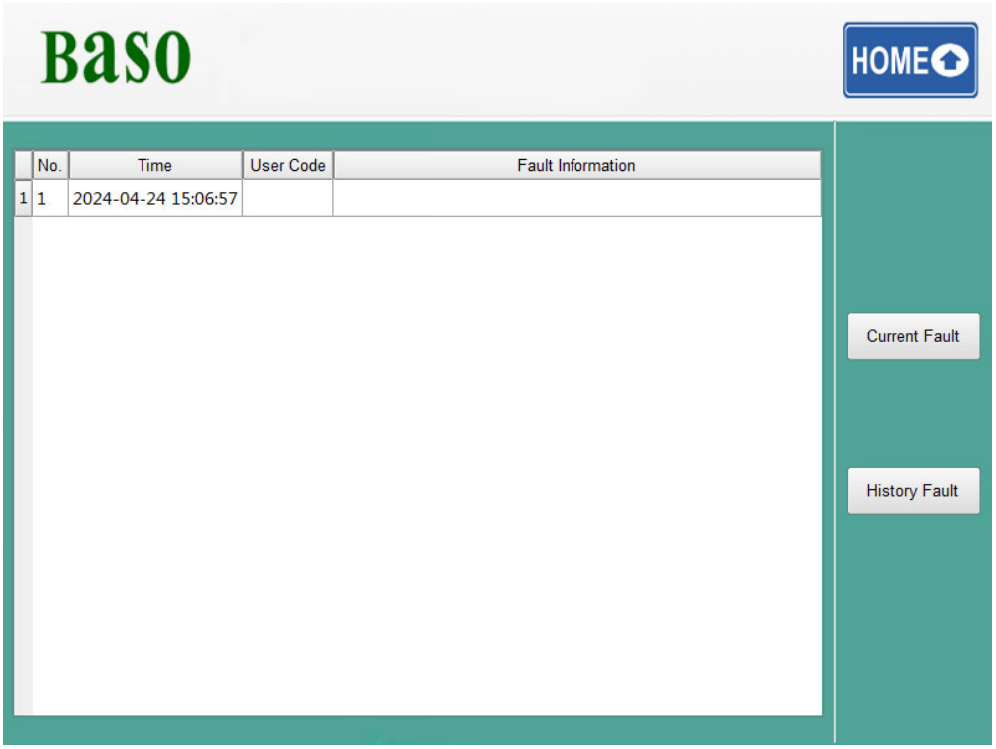


Fig 4.8 Troubleshooting Interface

4.3 Login/Exit Function

- Click "Login/Exit" in the main interface to enter the user login interface (Fig 4.9).
- Operator is common user and will be authorized and managed by Admin.
- The password of default admin is 999999.

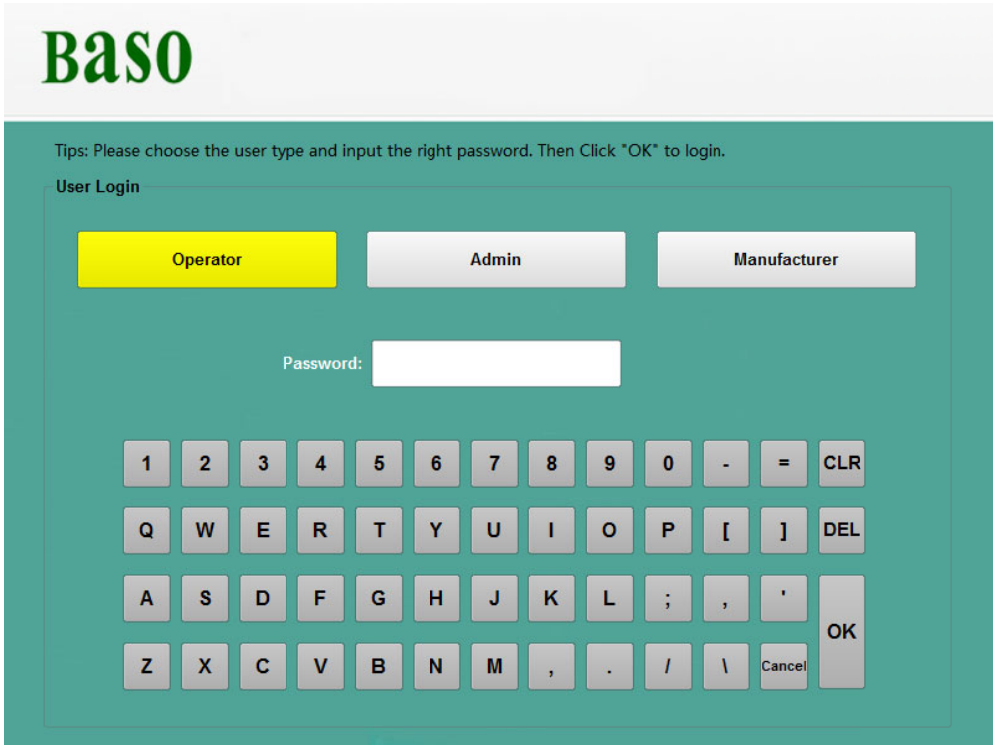


Fig 4.9 User Login Interface

4.4 Scanning Function

- ✧ Click "Scanning" in the main interface to enter the scanning interface (Fig 4.10).
- ✧ Scan the barcode on the plasma bag with the barcode reader.
- ✧ The data will be automatically recorded in the database and it will be reviewed in the data interface (History Data of Freezing).

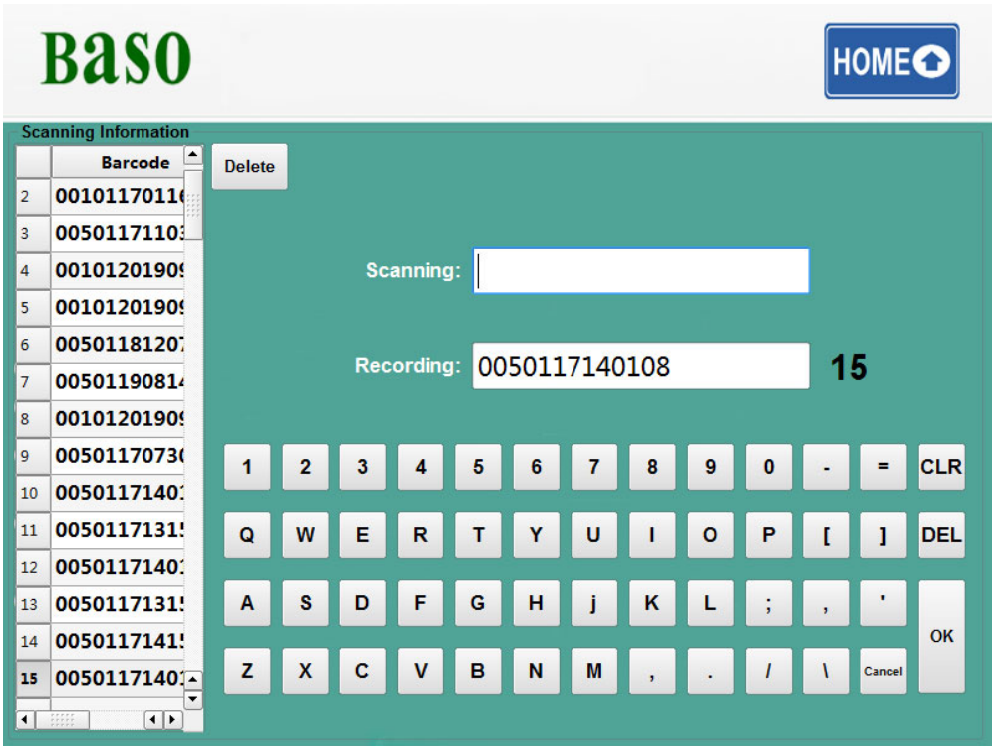


Fig 4.10 Scanning Interface

4.5 Data Function

- ✧ Click "Data" in the main interface to enter the data interface (Fig 4.11).

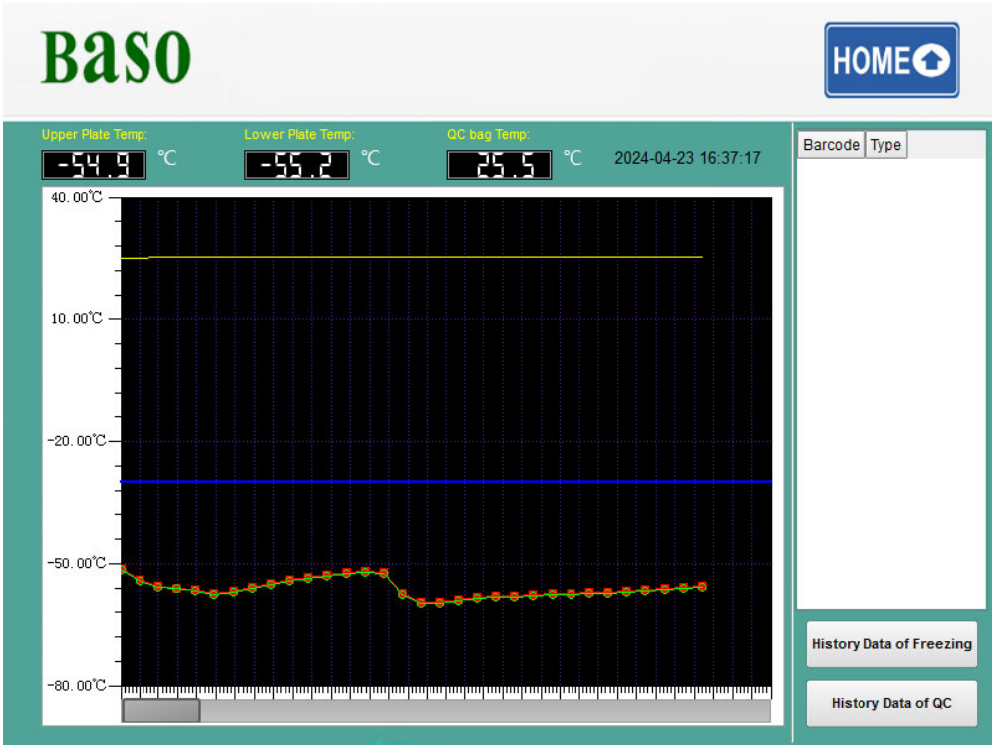


Fig 4.11 Data Interface

✧ The History Data of Freezing and History Data of QC can be reviewed by user.

1) History Data of Freezing (Fig 4.12). The data could be exported to PDF and printed.

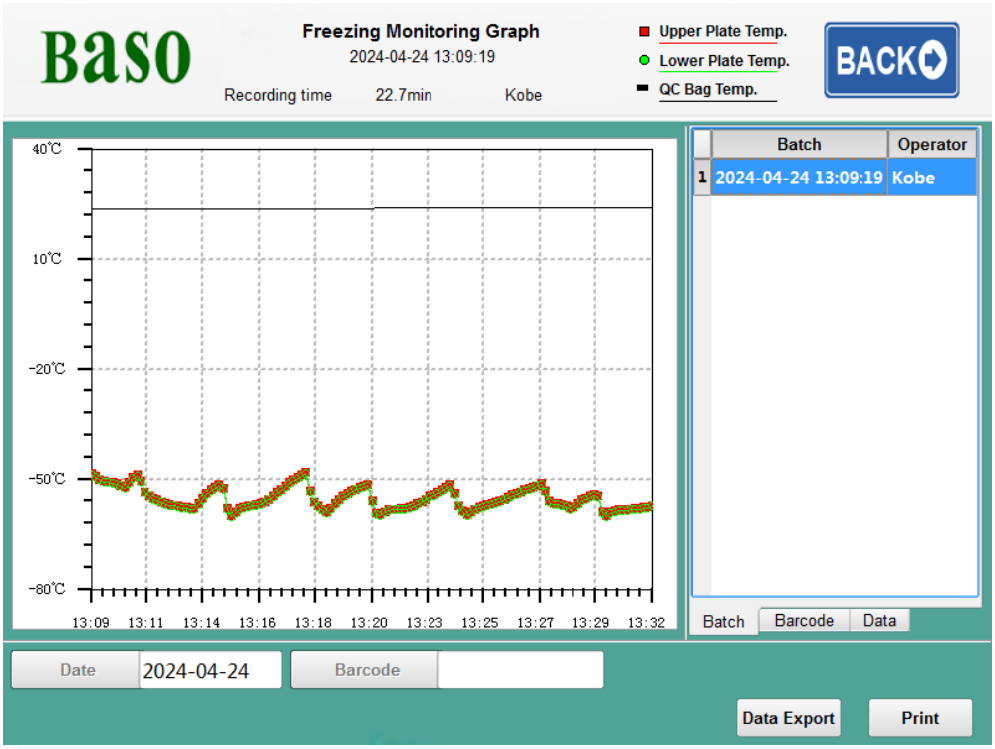


Fig 4.12 History Data of Freezing

2) History Data of QC (Fig 4.13). The data could be printed.

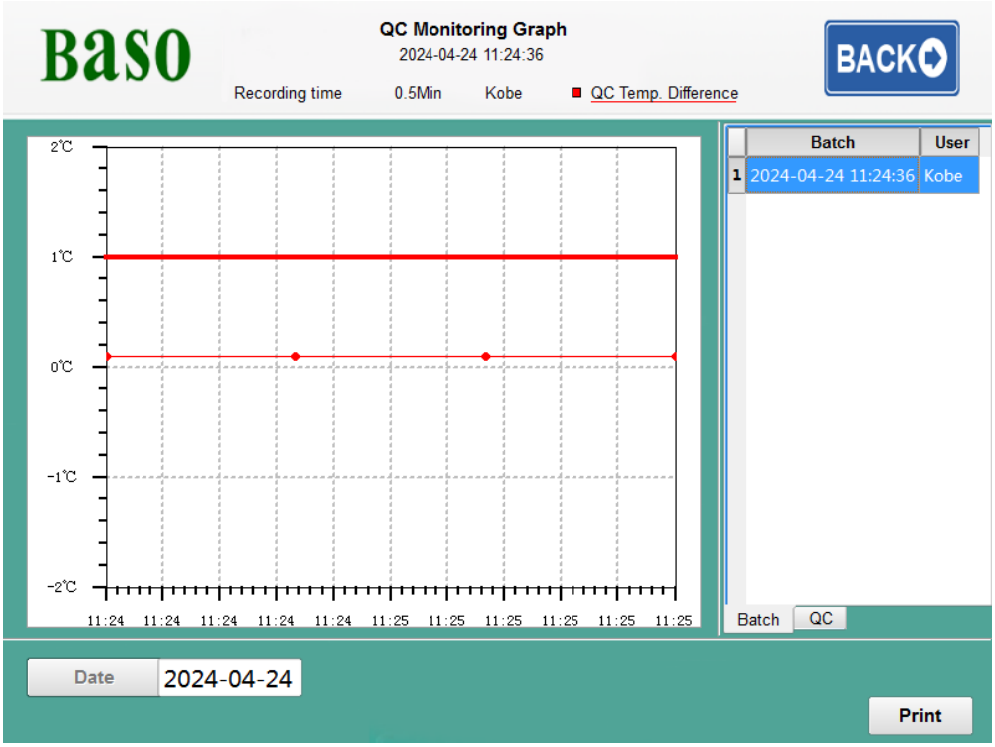


Fig 4.13 History Data of QC

Chapter Five: Supplementary Instruction

Instruction of simulated plasma bag (QC Bag)

The simulated plasma bag (QC bag) is one of our patents which is used in the freezer to monitor the temperature of plasma freezing process. Its heat capacity ratio is similar to that of plasma, and it can effectively simulate the process of plasma temperature in the same environment.

During freezing, QC bag is placed in the freezer together with plasma bag to be frozen. The temperature probe of the freezer is inserted into a probe tube and its depth is limited by the plastic sleeve.

Following the above steps, the temperature monitoring interface of QC bag will be displayed during the freezing process, the data will be recorded at solid-state hard disk for future traceability and management.

If the plasma bag temperature probe is not used, the probe can be placed in a designated position in the freezer.

The simulated plasma bag shall be filled by the user. The simulated load package shall be filled with 0.9% sodium chloride (normal saline) solution, and the filling volume shall correspond to the maximum filling capacity specified for the respective plasma bag type. The deviation of the actual filling volume from the nominal capacity shall not exceed ±3%.

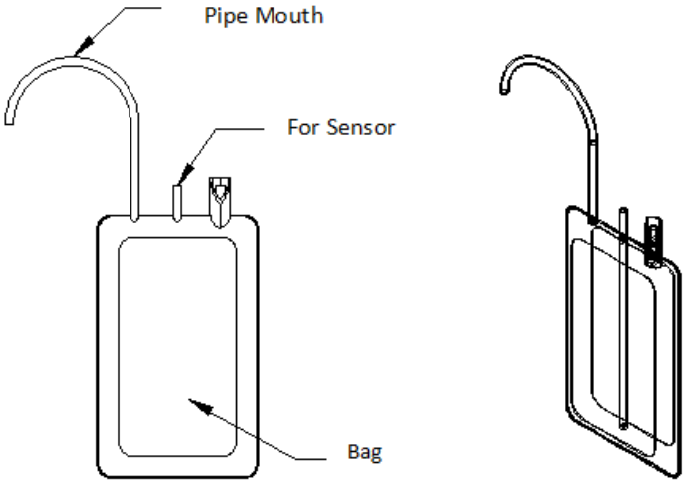


Figure 5.1 Structure of Simulated Plasma Bag (QC Bag)

Chapter Six: Maintenance

Caution: If do not follow the recommended instructions for cleaning may damage the freezer.

i) The Freezer (including the interior and exterior)

- ✧ Before the cleaning operation, make sure that the device power cord is disconnected or the air switch is closed and the EMERGENCY STOP button is released.
- ✧ The device is thoroughly cleaned in our factory before delivery, in any case, we recommend, before using it, to clean the interior and exterior with a soft cloth or sponge moistened with a neutral detergent solution.
- ✧ Clean it once in a year (depends from the dust presence in the room).

ii) Freezing Chamber

- ✧ If the cold plate needs cleaning (such as water etc.), clean it with a cloth when defrosting finished.
- ✧ Every 4 times freezing for once defrosting or it also could be executed when the last freezing process was finished every day.

iii) Dust Filter

- ✧ Before the cleaning operation, make sure that the device power cord is disconnected or the air switch is closed and the EMERGENCY STOP button is released.
- ✧ Open the cover on the left of freezer and remove.
- ✧ Take out the dust filter and clean it with an air jet or a soft brush.
- ✧ Clean it per THREE months or half years (depends from the dust presence in the room).

iv) Condenser

- ✧ Before the cleaning operation, make sure that the device power cord is disconnected or the air switch is closed and the EMERGENCY STOP button is released.
- ✧ Open the cover on the left of freezer and remove. Then, take out the dust filter.
- ✧ Clean the condenser with an air jet.
- ✧ Clean it per THREE years (depends from the dust presence in the room).

Chapter Seven: Troubleshooting

Common Faults

The freezer has a self-diagnostic function. If a problem occurs, the buzzer starts and a warning will be displayed at the bottom of the touch screen and the operator can determine the malfunction as below.

Table 3: Common Faults

Fault	Cause	Solution
Compressor overcurrent protection	1) The voltage of power supply is unstable. 2) The capacity of fun is damaged. 3) Air is mixed into the refrigeration system or the refrigeration system is leakage. 4) The condenser is dirty.	1) Check the voltage at site. 2) Contact our service center. 3) Contact our service center. 4) Contact our service center.
Compressor overheating protection	1) Refrigerant is not enough or leakage. 2) Expansion valve of economizer damaged. 3) Expansion valve of cold plate damaged.	1) Contact our service center. 2) Contact our service center. 3) Contact our service center.
System pressure protection	1) The pressure of pressure controller is set incorrectly. 2) Refrigerant is not enough or leakage. 3) The capacity of fun is damaged. 4) The condenser is dirty	1) Contact our service center. 2) Contact our service center. 3) Contact our service center. 4) Contact our service center.
Oil pressure protection	1) Freezer without pre-heating 2) Refrigeration oil is not enough or leakage. 3) The controller of oil level is fault.	1) Defrosting 1 to 3 times. 2) Contact our service center. 3) Contact our service center.

Caution: The maximum working pressure under normal working condition of equipment is 2.5MPa.

Chapter Eight: Warranty

This freezer is guaranteed for ONE years from the date of delivery provided that it has been operated and maintained properly. The expected service life of the product is 7 years.

Shelf life: 5 years

Warranty period: one year from the date of delivery of machine acceptance.

1) Failures caused by incorrect installation.
2) Failures caused by improper operation during installation.
3) Failures caused by conveyance or relocation after installation.
4) Failures caused by rough or improper handling.
5) Failures caused by unauthorized disassembly or modification.
6) Failures caused by using parts of the other companies.
7) Failures caused by natural disasters including fire, earthquakes and so on.

8) Consumables and parts have a limited guarantee period.

Chapter Night: After-sales Service

In order to ensure to operate the freezer safely and efficiently, it is necessary for regular maintenance. If the device has problems, do not attempt to repair it by yourself. Contact our service center (BASO or the authorized distributor).

Packing list

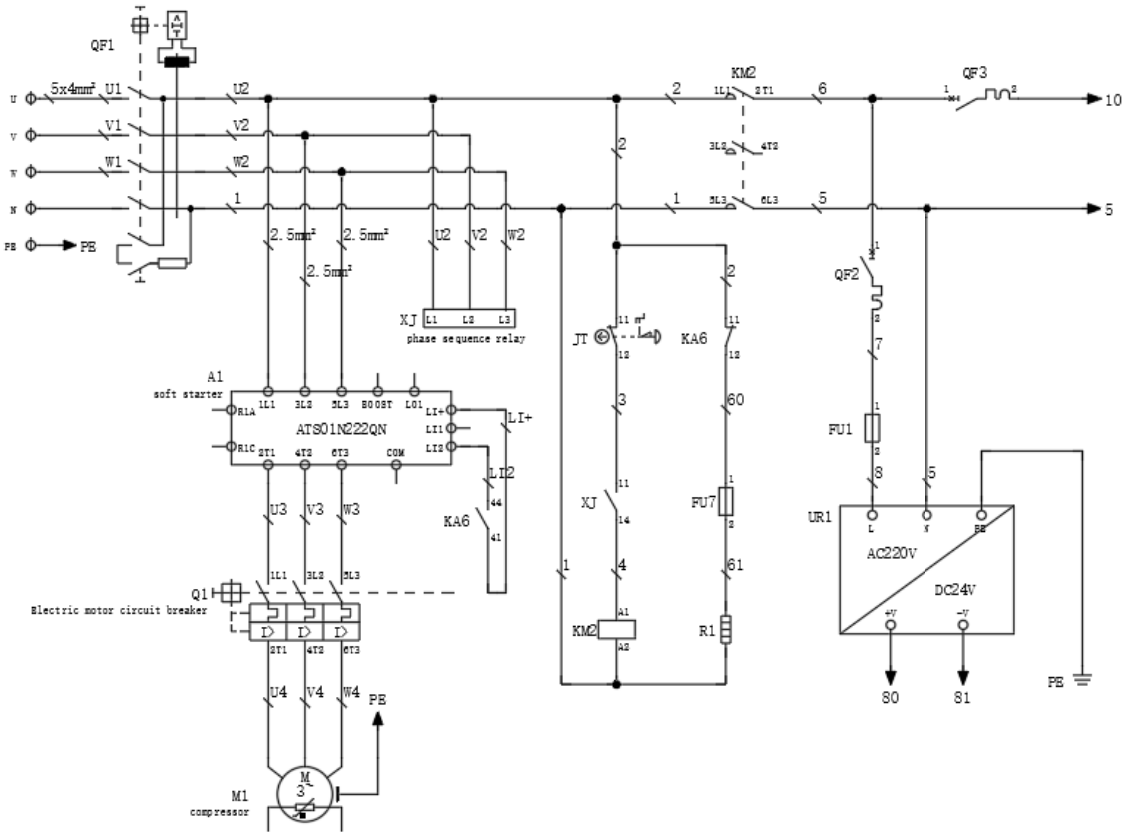
Name	Specification	Quantity	Remark
Plasma Freezing System with Full Temperature Control	BSSD-II-01/ BSSD-III-01	1 set	
Barcode Reader		1pc	
Operating manual		1 copy	
Brief operation procedure		1 copy	
Certificate of Conformity		1pc	

Option List

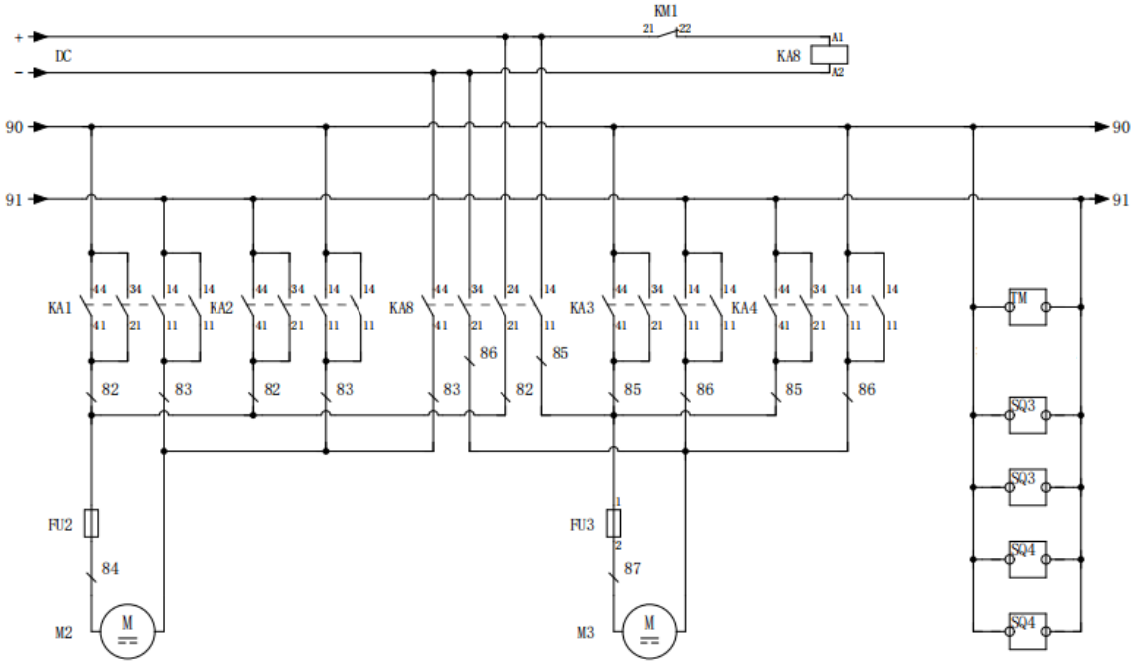
Name	Specification	Quantity	Remark
Anti-adhesion Pad (Soft Pad)		2pcs	
Cart		1 set	
Freezing Tray		2pcs	
Simulated plasma bag (QC bag)	200ml/500ml/600ml	1 package	5 bags/package
QC Bag	200ml	1 package	5 bags/package
QC Bag	100ml	1 package	5 bags/package

Caution: Considering the relevant safety regulations for the transportation of chemicals or liquids, it is recommended that customers purchase QC bags locally.

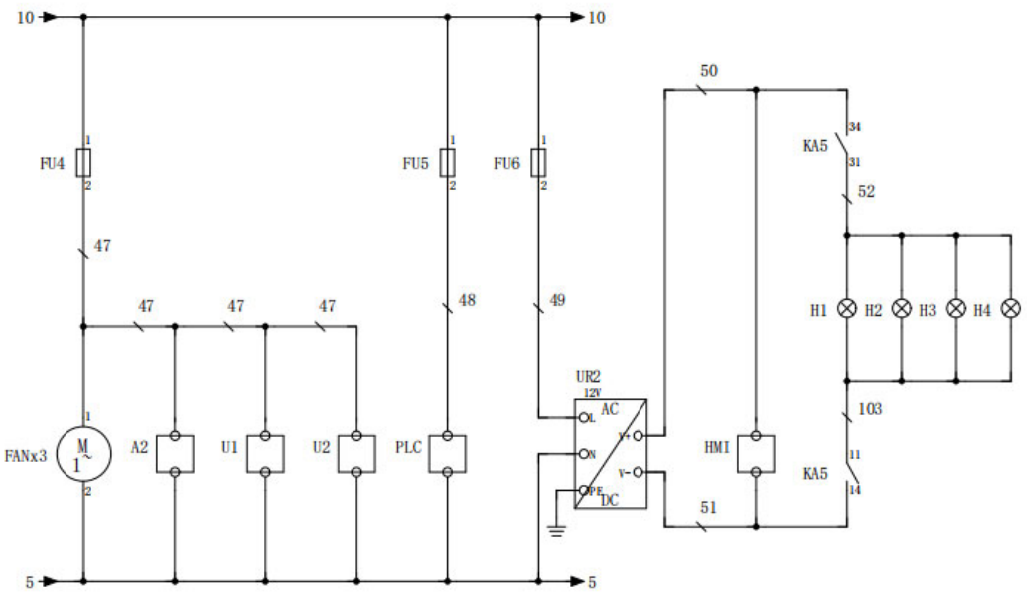
Circuit Diagram



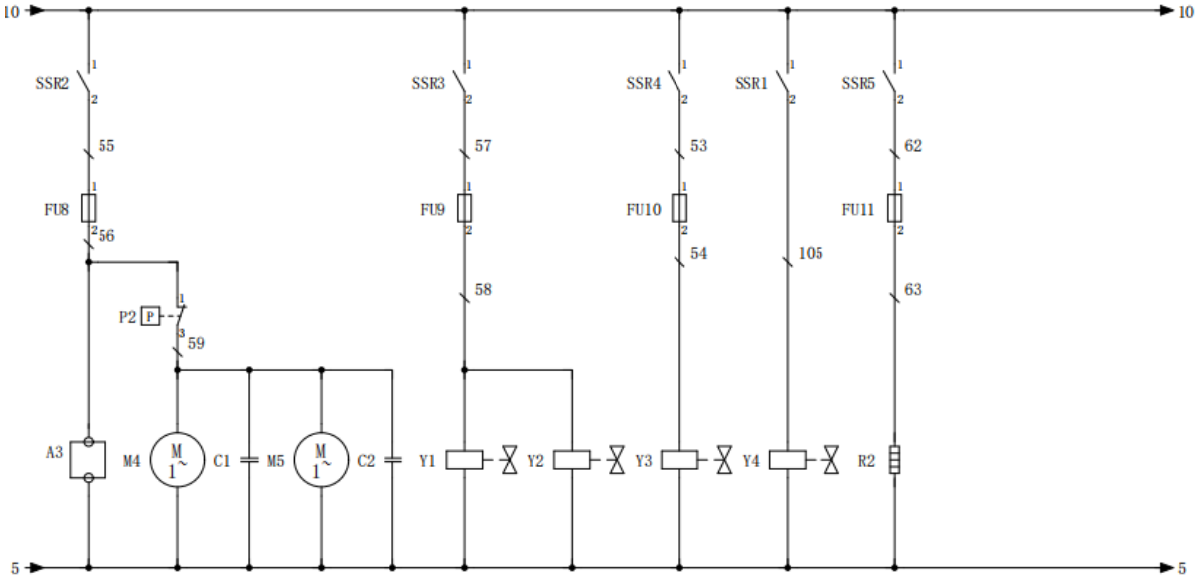
BSSD-II-01 Circuit Diagram 1



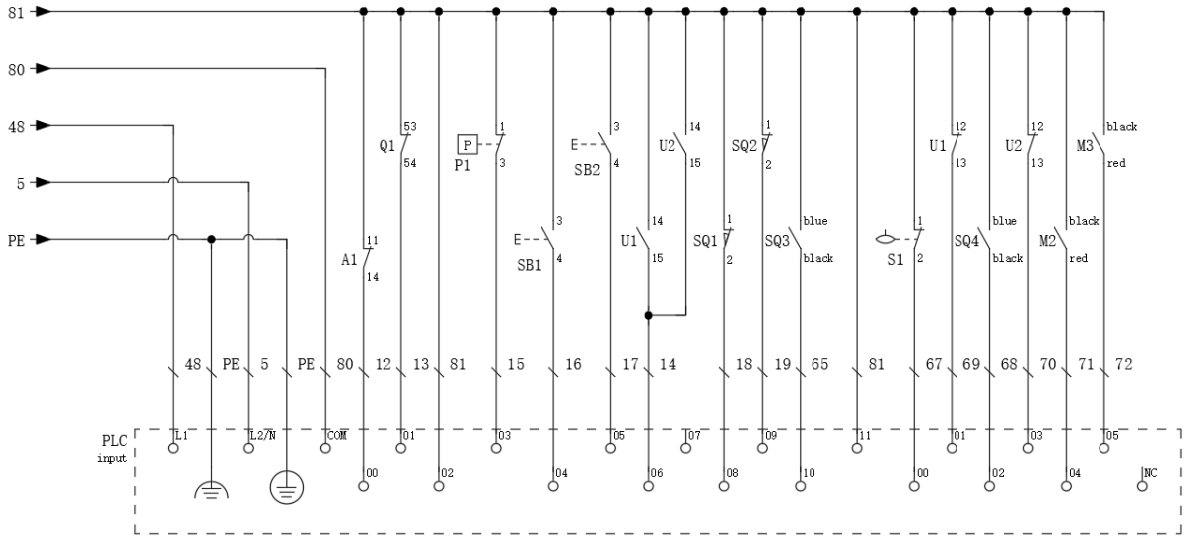
BSSD-II-01 Circuit Diagram 2



BSSD-II-01 Circuit Diagram 3



BSSD-II-01 Circuit Diagram 4



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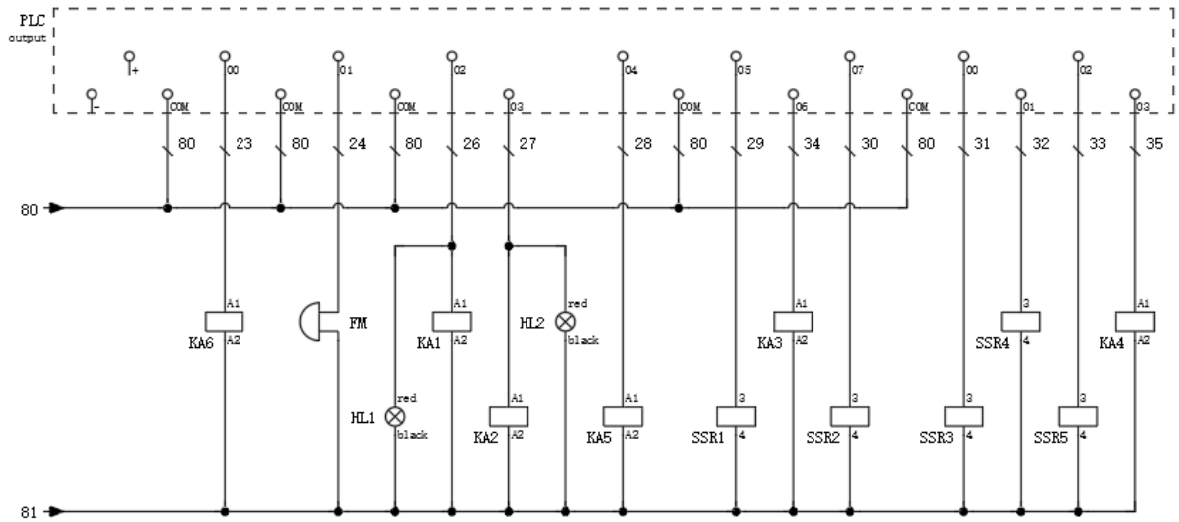
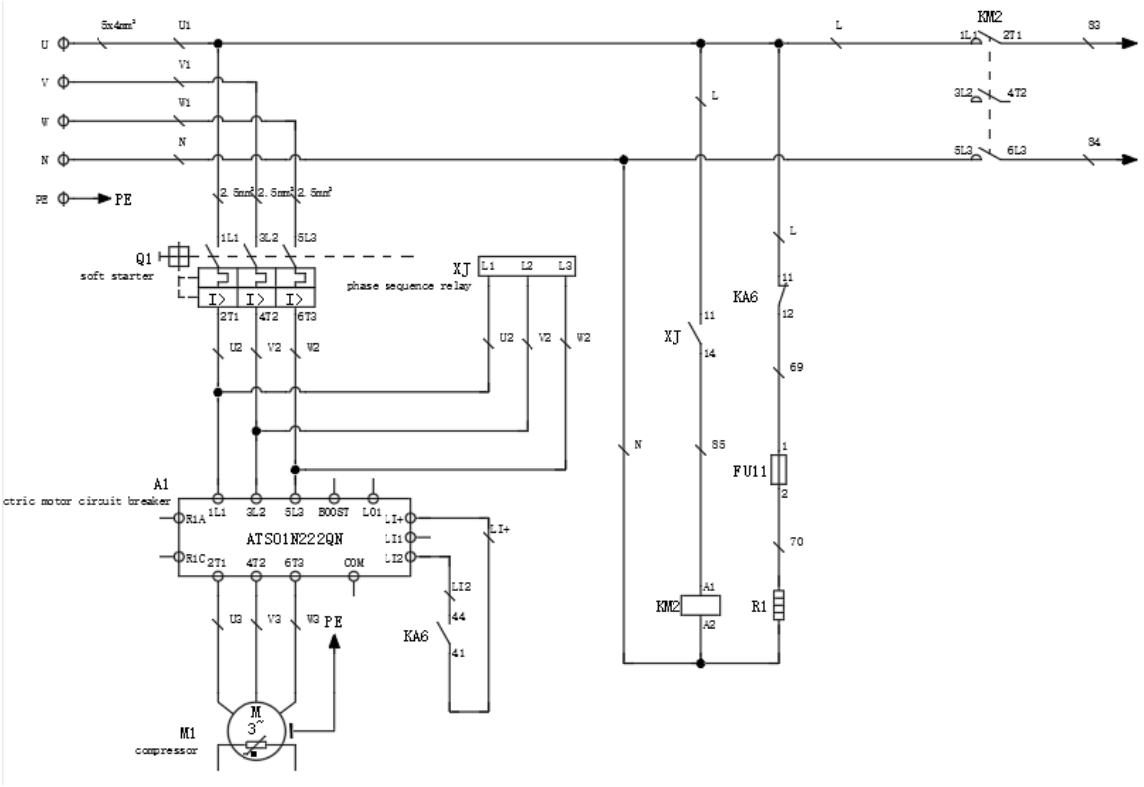
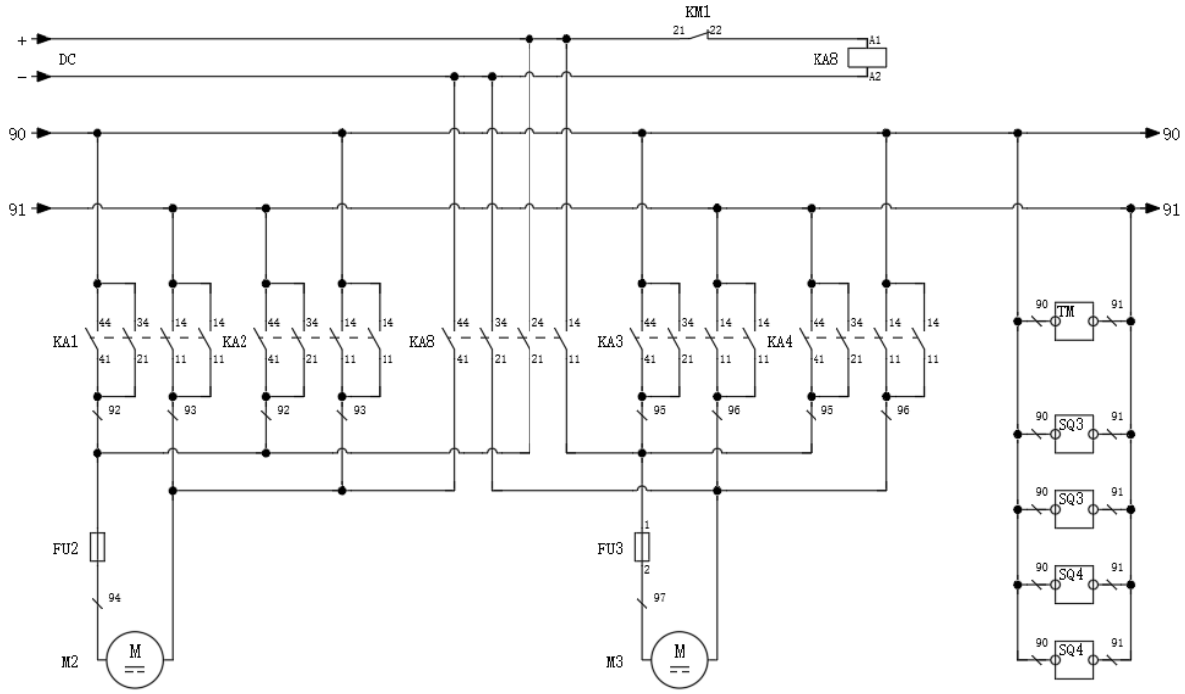


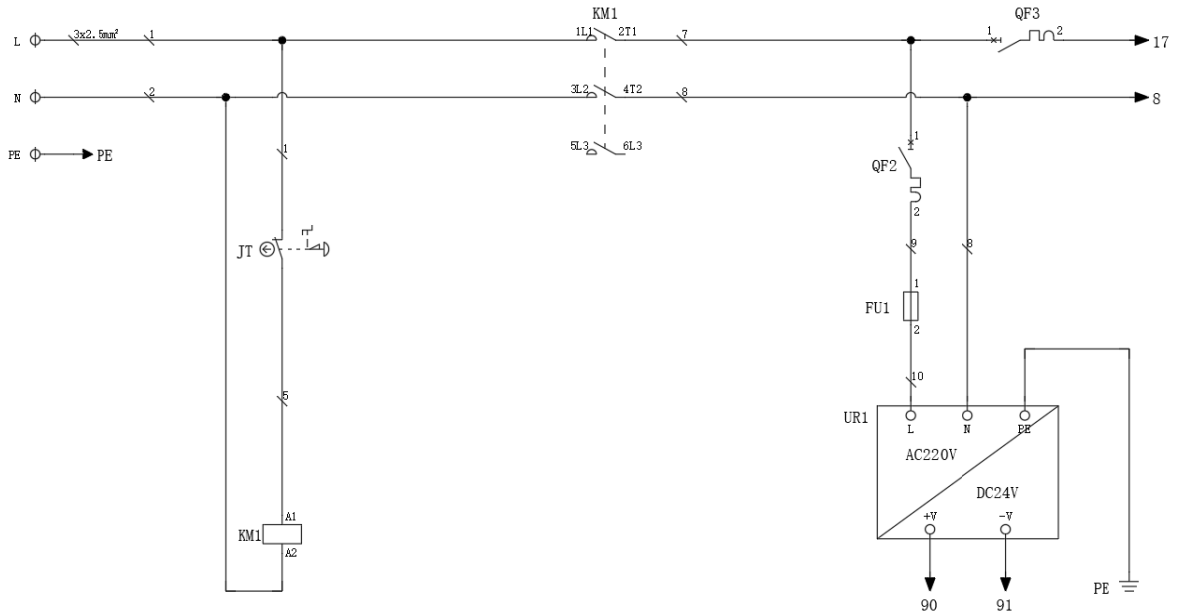
BSSD-II-01 Circuit Diagram 6



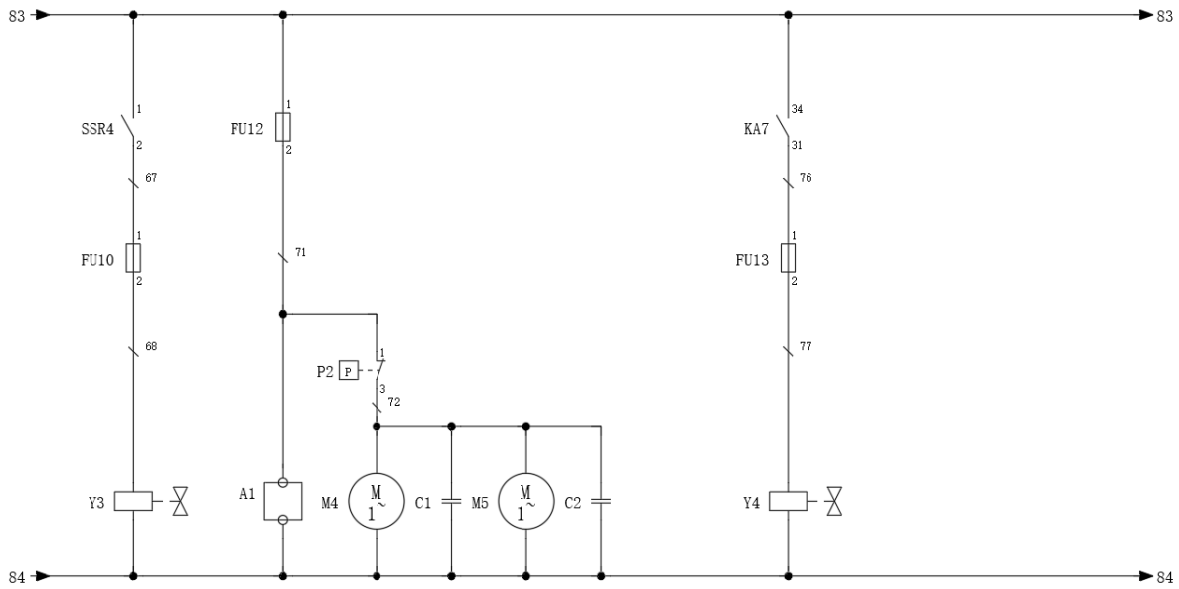
BSSD-III-01 Circuit Diagram 1



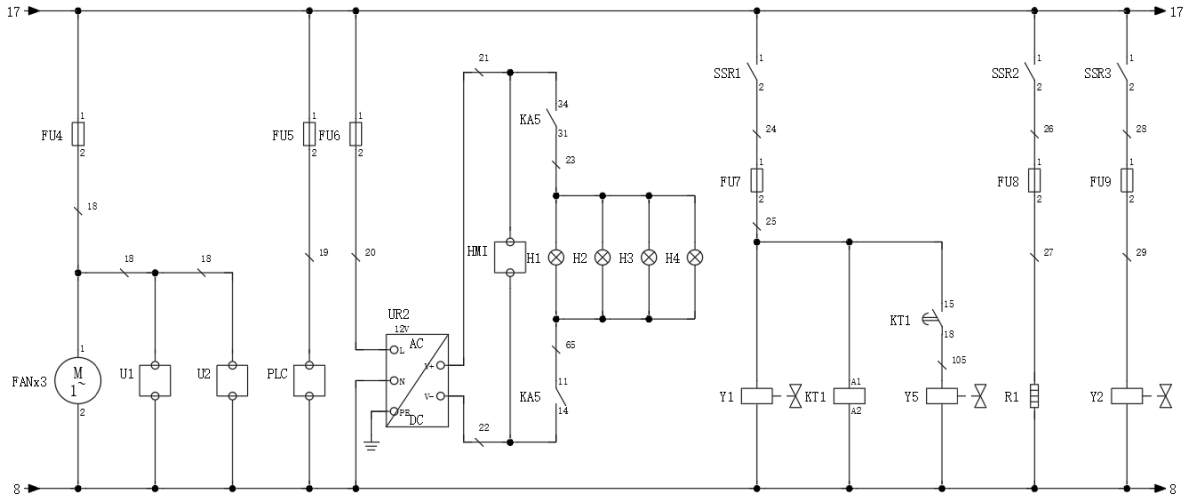
BSSD-III-01 Circuit Diagram 2



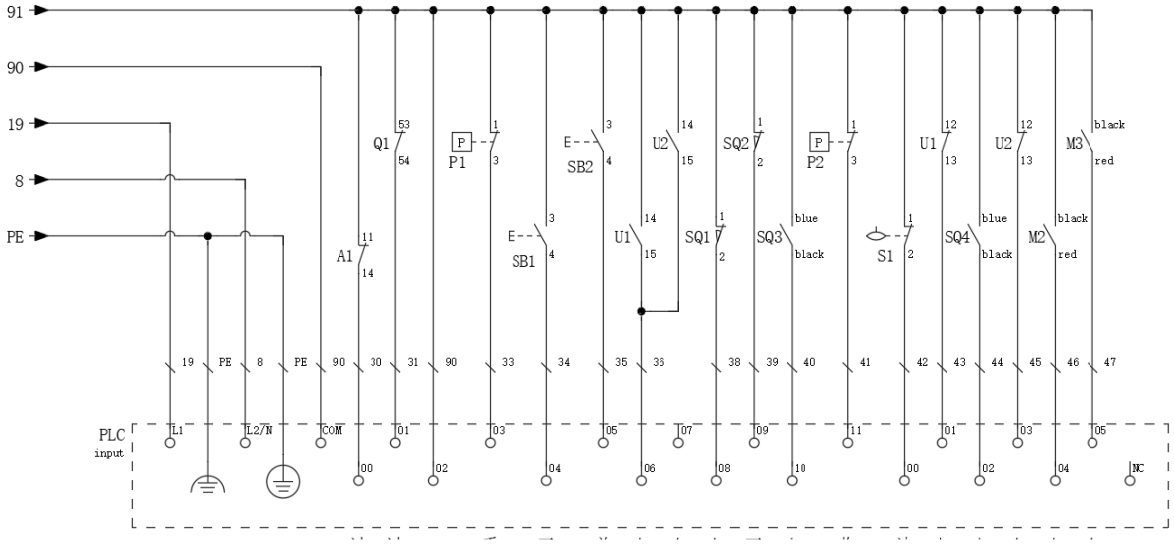
BSSD-III-01 Circuit Diagram 3



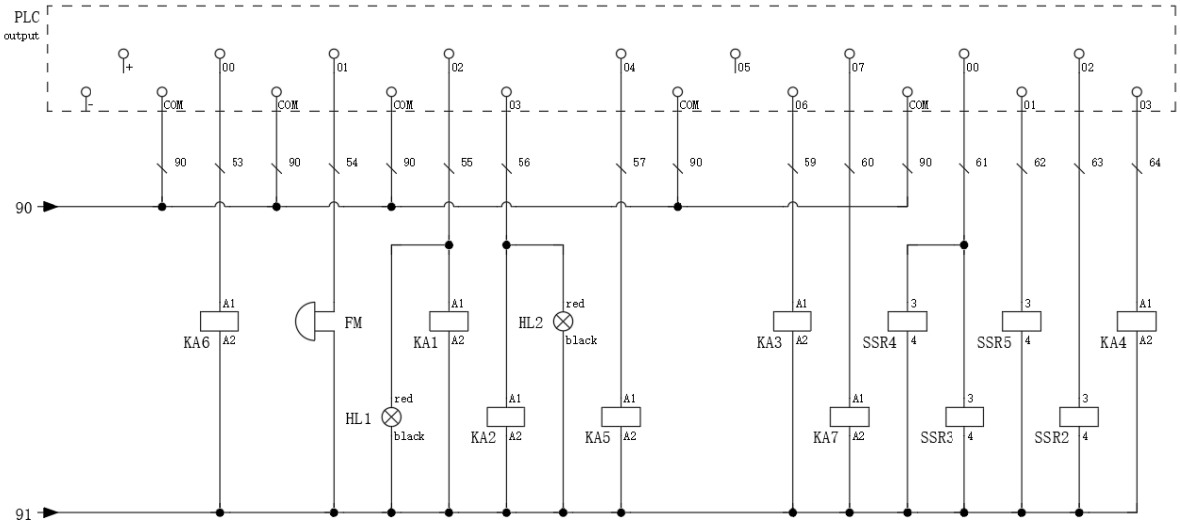
BSSD-III-01 Circuit Diagram 4



BSSD-III-01 Circuit Diagram 5



BSSD-III-01 Circuit Diagram 6



BSSD-III-01 Circuit Diagram 7

Attachment 1

Test requirements for anti-disturbance of equipment used in industrial premises

Port	Test item	Basic Standard	Trial value	Performance criterion
Enclosure	Electrostatic discharge (ESD)	IEC 61000-4-2	Contact discharge:4kV， Air discharge: 8kV	B
	Radiofrequency electromagnetic radiation	IEC 61000-4-3	10V/m (80MHz~1.0GHz) 3V/m (1.4GHz~2.0GHz) 1V/m (2GHz~2.7GHz)	A
	Rated power frequency magnetic field	IEC 61000-4-8	30A/m[e]	A
AC power supply	Voltage sags	IEC 61000-4-11	0%1 cycle 40%10/12[h] cycle 70%25/30[h] cycle	B C C
	Short interruption	IEC 61000-4-11	0%250/300[h] cycle	C
	Pulse group	IEC 61000-4-4	2kV (5/50ns,5kHz)	B
	Surge	IEC 61000-4-5	1kV[a]/2kV[b]	B
	Radiofrequency field induced conduction disturbance	IEC 61000-4-6	3V[f] (150kHz~80MHz)	A
DC power supply	Pulse group	IEC 61000-4-4	2kV(5/50ns,5kHz)	Not Applicable
	Surge	IEC 61000-4-5	1kV[a]/2kV[b]	
	Radiofrequency field induced conduction disturbance	IEC 61000-4-6	3V[f] (150kHz~80MHz)	
I/O signal/ control (A cable that includes a functional grounding port)	Pulse group	IEC 61000-4-4	1kV (5/50ns,5kHz)d	Not Applicable
	Surge	IEC 61000-4-5	1kV[b,c]	
	Radiofrequency field induced conduction disturbance	IEC 61000-4-6	3V[d,f] (150kHz~80MHz)	
I/O signal/control port directly connected to the power supply network	Pulse group	GB/T 17626.4 IEC 61000-4-4	2kV (5/50ns,5kHz)	Not Applicable
	Surge	IEC 61000-4-5	1kV[a]/2kV[b]	
	Radiofrequency field induced conduction disturbance	IEC 61000-4-6	3V[f] (150kHz~80MHz)	

a Line to line

b Line to ground

c Only for long distance lines.

d Applicable to the case of line length exceeding 3m only.

e For equipment sensitive to magnetic fields only, the display interference of the cathode ray tube is allowed when the magnetic field strength is greater than 1A/m.

f The test level of conducting rf test is lower than that of the radiation rf test, which is a more rigorous test because the conducting rf test simulates the resonant state at each frequency.

g DC connections between parts of the equipment/system, if not connected to the dc distribution network, should be treated as I/O signal/control port.

h "25/30 cycle" means that 25 cycles are applicable to tests with rated frequency of 50Hz and 30 cycles are applicable to tests with rated frequency of 60Hz.

IEC 61326-1:2012, EN 61326-1:2013 article 6.4 performance criteria grade

Performance criterion A: during the test, the performance is normal within the limit value of the specification.

Performance criterion B: during the test, the function or performance is temporarily reduced or lost, but can be restored by itself.

Performance criterion C: during the test, the function or performance is temporarily reduced or lost, but operator intervention or system reset is required.

This product is classified as group 1 class A equipment according to IEC/CISPR 11:2009/A1:2010.

CE 2797

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