



Crest Series Intelligent Cryogenic Storage System

User Manual

(V1.0)



Crest Series Intelligent Cryogenic Storage System

Product user manual

The information of the registrant of this product is as follows:

Name: Genepoint Technologies (Suzhou) Co., Ltd

Address: Plant 20, Pingqian (Taicang) Modern Industrial Park, No.525, Linggang South Road, Yuewang village, Shaxi Town, Taicang district, Suzhou City, Jiangsu Province, China

Production address: Plant 20, Pingqian (Taicang) Modern Industrial Park, No.525, Linggang South Road, Yuewang village, Shaxi Town, Taicang district, Suzhou City, Jiangsu Province, China

Production license number: NA

Contact Name: Genepoint Technologies Co., Ltd.

Address: 1F, Block 36, No.1888 New Jinqiao Rd., Pudong New Area, Shanghai, P.R.C. 201206

Tel: +86 (21) 6422 9802

Email: info@genepoint.cn

Website: <https://www.genepoint.com>

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1 Introduction

1.1 About this user manual

This user manual is for the Crest Series Intelligent Cryogenic Storage System produced by Genepoint Technologies Co., LTD. It contains the following contents: safety description, overview, structure and principles, man-machine interaction, installation, use, operation, and maintenance. Please read it carefully before using .

1.2 Conventions of this manual

This section describes the conventions and symbols.

1.2.1 Symbol Conventions

The "< >" with Angle brackets indicates the key name, button name, and information entered by the operator from the terminal;

The square brackets "[]" indicate the man-machine interface, menu bar, data table, and field name.

1.2.2 Marks

The manual uses four eye-catching signs to indicate where special attention should be paid during operation.



Caution;



Careful;



Alarm;



Danger: Remind the matters that should be paid attention to during operation.



Instructions, reminders, tips. (Except safety instructions)

1.3 Exemption Statement

This product is suitable for scientific research, it is not medical device.

Due to the continuous update and improvement of products and technologies, the content of this information may not be completely consistent with the actual products without prior notice. For product updates, please contact your local office.



Genepoint Technologies (Shanghai) Co., LTD. (hereinafter referred to as GP) makes no representations or warranties in this manual. GP shall not be liable for any direct or indirect injury arising from the use of this manual.

1.4 Additional Information

If there is anything not mentioned in this manual, please contact the company before operation.

1.5 About this company

Genepoint Technologies headquartered in Shanghai, it has been dedicated to provide automated and intelligent cryogenic storage solutions since its inception in 2015.

1.6 Suggestion

We attach great importance to user feedback and welcome your valuable comments and suggestions in the process of using our products. You can contact us through the sales channel or call 400-606-8780.

2 Safety Instruction

2.1 Safety Instruction

Only trained and qualified personnel are allowed to install, operate, and maintain the product.

When installing, operating, and maintaining the device, observe the local safety regulations and related operation rules. Otherwise, personal injury or device damage may occur.

The safety precautions mentioned in this manual are only intended to supplement local safety regulations. GP accepts no liability for any breach of the general safety operating requirements or the safety standards for the design, production and use of device.

The Intelligent Cryogenic Storage System needs an external liquid nitrogen supply device, and automatically replenishes liquid when the liquid level in the tank drops to the set low level. Only trained and qualified professionals are allowed to install, operate, and maintain.

When installation, operation, and maintenance the device, read this section and pay special attention to safety instructions and warning information. Improper use without following safety warnings may result in poor equipment performance, equipment damage, and operator injury.

2.2 Environment requirements of device using

The Intelligent Cryogenic Storage System must be used in a dry and ventilated environment.

Ambient temperature range: 10 ° C to 28 ° C

Relative humidity range: ≤60%RH

Power supply voltage: 220V±10%, frequency: 50Hz±1Hz

Avoid use in the following improper environments:

Do not use this device in or near places with strong magnetic devices, which may cause equipment failure or misoperation.

Do not use the device in places where electromagnetic interference, electrostatic discharge, or wireless frequency interference may occur. Otherwise, misoperation may cause risks.

Do not use the device in dangerous places with flammable gas, dust, gasoline, solvent, etc. (The device has no explosion-proof performance) to avoid serious accidents or fires.

Do not use the device in a place where there is water, high temperature, high humidity, and high corrosive gas. Beware of electric shock caused by damage to the device.

2.3 Cautions

This manual is a document that comes with the equipment and should be placed near the equipment for easy viewing at any time.

Before use, check whether the 220V power cable of the device is intact to prevent electric shock.

When using, please comply with the requirements of this manual and the training requirements provided by our professionals. The device must be placed smoothly to prevent tipping over. If the equipment tilts due to the damage of the caster cup, please contact our company for handling.




This equipment needs to use the supplies specified by our company. If you need to use non-specified supplies, please contact our company to confirm/debug before use.















When moving the turnover drum/sample manually, you must wear low temperature protective gloves to prevent low temperature frostbite.

After use, please check that the actions required by the order, such as access box and pipe picking, have been completed, and the device has no abnormal alarm.

2.4 Instruction for security-related symbols

The warning labels shown on this product are intended to let users understand the meaning of the labels and use the product correctly to prevent harm and property damage. The expression and meaning of warning signs and legends are as follows:

Symbols	Meaning
	Important safety information, omission may cause serious injury
	General safety information, omission may cause product damage
	Express compulsion (something that must be followed)

	To forbid (something not allowed to do)
	ground protection
	fragile goods
	Keep dry
	Place up
	No roll
	No stacking
	No card clips
	Indicates the lower limit of ambient temperature to which a medical device can be safely exposed
	Indicates the upper limit of ambient temperature to which a medical device can be safely exposed
	Indicates the ambient temperature limit to which a medical device can be safely exposed
	Indicates the ambient temperature range to which a medical device can be safely exposed
	Possible biohazard
	This indicates low temperature, do not directly contact the skin here, beware of frostbite

A yellow triangular warning sign with a black border, containing a lightning bolt symbol and the Chinese characters '有电危险' (Danger of High Voltage) and 'DANGER HIGH VOLTAGE'.	This is connected to the power supply, please pay attention to the safety of power consumption when operating
A yellow triangular warning sign with a black border, containing a hand being pinched by a mechanical part and the Chinese characters '当心夹手' (Watch Your Hand).	Watch Your Hand
A yellow triangular warning sign with a black border, containing a black exclamation mark.	Take Care your safety
A yellow triangular warning sign with a black border, containing a gear symbol and a hand being pinched, indicating mechanical injury.	Be careful of mechanical injury
A yellow triangular warning sign with a black border, containing a snowflake symbol, indicating low temperature.	Be careful of low temperature
A blue circular mandatory sign with a white border, containing a white hand wearing a protective glove.	Protective gloves must be worn

3 Learn about this product

3.1 Brief

This chapter mainly introduces the application fields, functions and characteristics, technical characteristics and parameters of Intelligent Cryogenic Storage System.

3.1.1 Introduction

The Intelligent Cryogenic Storage System mainly uses liquid nitrogen as a cold source, and uses an automatic filling system to fill liquid nitrogen into the liquid nitrogen tank to maintain the liquid level in the tank, and vaporizes the liquid nitrogen at the bottom, so that the temperature in the tank can maintain a deep low temperature environment for a long time and ensure the safety of biological samples.

3.2 Product functions and characteristics

- Lower storage costs by storing more samples per unit area.
- Multi-dimensional free slide rail design, lifting arm can rotate freely and slide horizontally, accurate positioning of lifting position.
- Electric lift and lower the frozen storage rack, greatly reducing the operation strength.
- High vacuum heat insulation and insulation, the top temperature of the storage area can be as low as -190°C .
- Four PT100 platinum temperature probes can measure the top and bottom temperature, exhaust temperature and liquid inlet temperature in real time to ensure sample safety.
- Differential pressure level gauge for continuous measurement of liquid level in tank.
- It has the functions of automatic filling, manual filling and combined filling.
- No liquid nitrogen injection automatic defogging function, the mist at the mouth of the tank is cleared at any time and anywhere, convenient to find and take samples.
- 12-inch color touch screen control system, real-time display of temperature, liquid level, daily liquid nitrogen consumption and alarm information.
- Standard double-layer quick-disconnecting step, easy access operation and labor saving.

- It has temperature, liquid level, time limit, electronic component failure and other alarms.

3.3 Technical characteristics and parameters

Dimensions					
	CF400-LHC	CF940-LHC	CF200M	CF400M	CF940M
Overall Height	105.5" (2680mm)	108.3" (2750mm)	74.4" (1890mm)	76.8" (1950mm)	79.5" (2020mm)
Outside Diameter	45.7" (1160mm)	60.2" (1530mm)	34.6" (880mm)	45.7" (1160mm)	60.2" (1530mm)
Effective Internal Height	31.5" (800mm)	37" (940mm)	31.5" (800mm)	31.5" (800mm)	37" (940mm)
Neck Opening Diameter	18.1" (460mm)	24.4" (619mm)	13" (330mm)	18.1" (460mm)	24.4" (619mm)
Neck Opening Height	59.8" (1520mm)	62.5" (1587mm)	56.1" (1425mm)	59.8" (1520mm)	62.5" (1587mm)
LN ₂ Capacity (L)	880	1835	430	880	1835
Empty Weight	1168 lbs. (530kg)	2227 lbs. (1010kg)	881 lbs. (400kg)	1124 lbs. (510kg)	2183 lbs. (990kg)
Installation Information					
Minimum Height of Installation	/	/	89.3" (2269mm)	89.3" (2269mm)	98.7" (2506mm)
Minimum Height of Installation (incl. Lifting module)	109.4" (2780mm)	112.2" (2850mm)	105.9" (2690mm)	109.4" (2780mm)	112.2" (2850mm)
LN ₂ Capacity Under Platform (L)	140	320	60	140	320
Static Evaporation Rate of LN ₂ (L/Day)	12	17	7	9	14
LN ₂ Supply (psi)	≤22				
LN ₂ Port	CGA295 external cone nut union				
Load of Lifting	44 lbs. (20kg)				
Temperature Accuracy (°C)	±1				
Liquid Level Accuracy	±0.39"(10mm)				
Working Conditions	220V, 50Hz, 10A, Temperature: 18-28°C, Humidity <60%				
Maximum Capacity					
Vial Capacity (Square Boxes, 2mL)	41,600	99,200	19,500	41,600	99,200
Vial Capacity (SBS Boxes, 2mL)	32,448	70,656	14,976	32,448	70,656
Racks (SBS Boxes, 2mL)	52	92	24	52	92
Stages Per Rack (2mL)	13	16	13	13	16
Blood Bag Capacity (25mL, 7 Layers)	3,108	6,856	1,624	3,108	6,856
Blood Bag Capacity (50mL, 7 Layers)	1,876	3,864	924	1,876	3,864
Blood Bag Capacity (250mL, 5 Layers)	990	2,304	500	990	2,304
Blood Bag Capacity (500mL, 5 Layers)	830	1,032	420	830	1,032
Rack Configuration for Maximum Capacity					
Racks (10'10, 100 cell boxes)	30	60	14	30	60
Racks (5'5, 25 cell boxes)	8	8	4	8	8
Stages Per Rack (2mL)	13	16	13	13	16

4 Structure and principle

4.1 Brief

This chapter mainly introduces the hardware structure and principle of Intelligent Cryogenic Storage System, users can understand the equipment operation easily.

4.2 Hardware structure

The Intelligent Cryogenic Storage System can be assembled of the tank body component, the lifting component, the injection component, the electrical component and the control system.



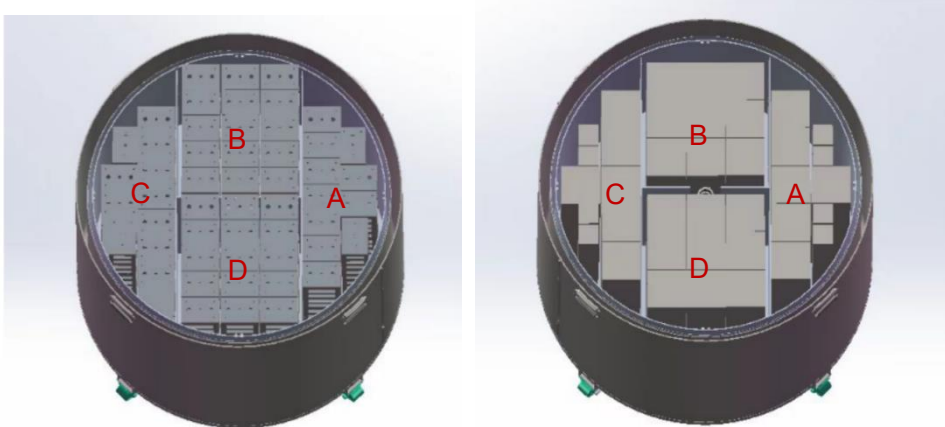
Graph 4.2-1: Components schematic diagram

4.2.1 Liquid nitrogen tank

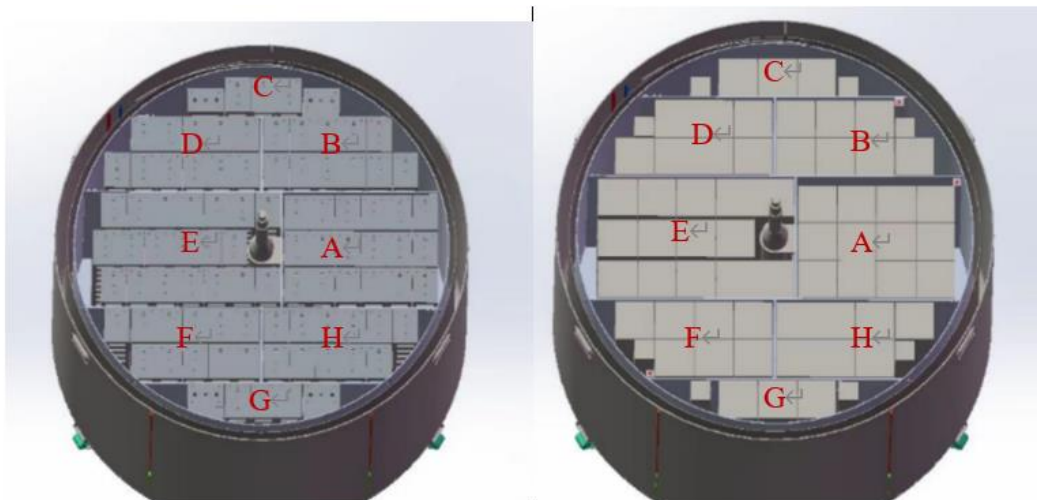
The liquid nitrogen tank is mainly composed of an inner bladder, an outer bladder, a rotating bucket and a neck tube connecting the inner and outer bladder, which is made of high-strength stainless steel and durable. Between the inner bladder and the outer bladder is a vacuum layer, and the vacuum layer is wrapped with multiple layers of insulation material, which has good thermal insulation performance.

According to the different internal space size, CF400-LHC is divided into 4, named A, B, C, D, CF940 is divided into 8, named A, B, C, D, E, F, G. The rotating barrel uses aluminum alloy as the thermal conductivity base material, and the good thermal conductivity ensures that the

temperature in the barrel can be controlled below -180°C . The rotary bucket has an automatic positioning function to ensure that the selected area can be rotated quickly and accurately to the lid opening. As shown in the figure:



Graph 4.2.1-1: CF400-LHC SBS (Left), Square box (Right) layout diagram



Graph 4.2.1-2 CF940 SBS (Left), Square box (Right) layout diagram

4.2.2 Auxiliary lifting component

The auxiliary lifting component is used for the electric lifting and lowering of the frozen shelf in the liquid nitrogen tank. By manually adjusting the front and back, left and right positions of the rotary arm hook, the frozen shelf can be lifted or lowered vertically with one click after the hook is fastened on the target frozen shelf handle. The whole operation process is simple, fast, labor-saving and safety.

4.3 Working principle

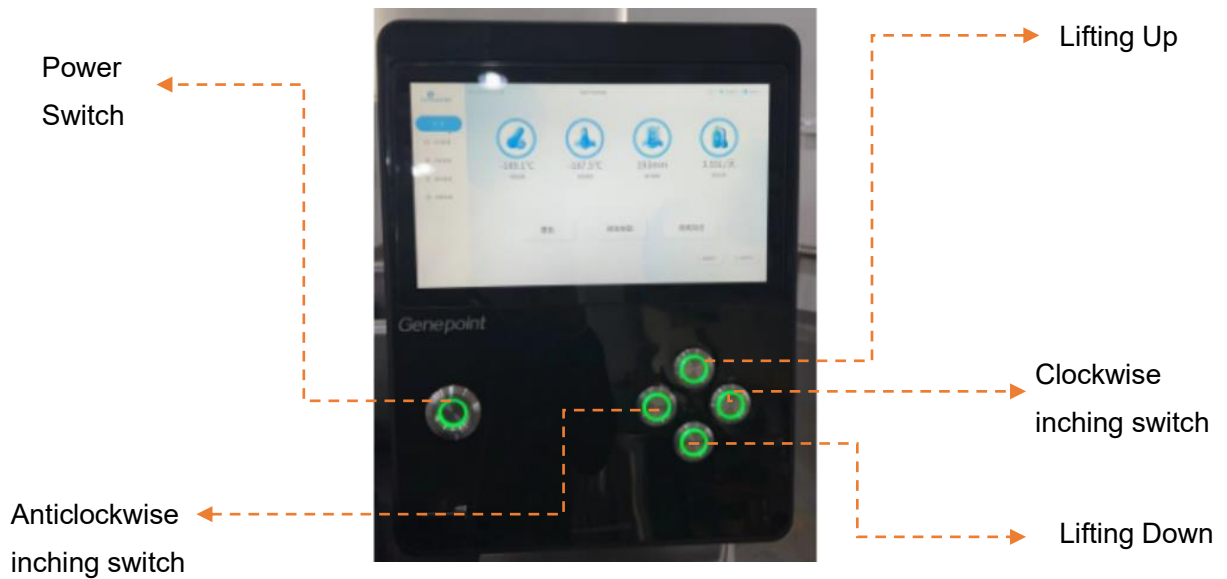
The equipment makes full use of the gas-phase liquid nitrogen environment provided by liquid nitrogen evaporation for long-term safe storage of samples. When it is necessary to store and sample the copy, select the target storage area in the access interface and automatically rotate the location. One key automatically opens the cover, controls the auxiliary lifting mechanism to realize the lifting and placing of the frozen storage shelf, and completes the operation of storing and taking samples. At the same time, the management system monitors the liquid nitrogen in the tank in real time, and the liquid filling will be completed automatically if it is lower than the set limit value.

5 Human Machine Interaction

5.1 Brief

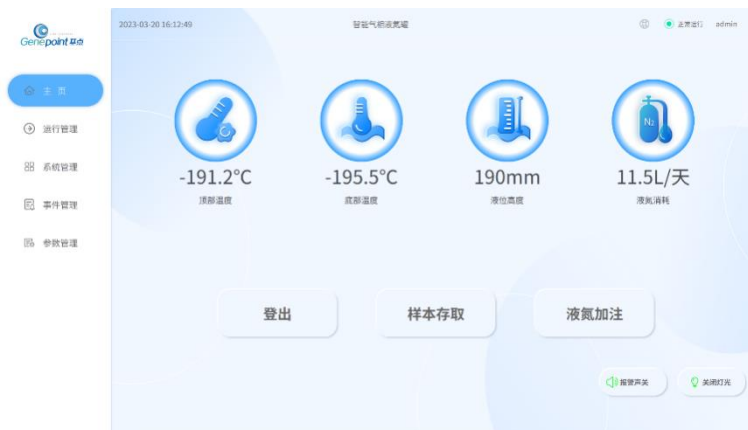
This chapter mainly introduces the human-machine interaction interface of Intelligent Cryogenic Storage System, users can understand the equipment operation easily.

5.2 Controller function area



5.3 User Interface

After the power supply is connected, the management system starts directly, and the main window is displayed. The default Home page is shown in Figure 5.3-1.



Graph 5.3-1 homepage

Homepage introduction:

Top Temperature	Indicates the current temperature at the top of the freezer shelf in the device storage area.
Bottom temperature	Indicates the current temperature at the bottom of the storage area.
Liquid level height	Indicates the current liquid nitrogen height of the device.
Liquid nitrogen consumption	Indicates the current liquid nitrogen consumption of the equipment, in L/ day.
users login	Login management system.
Sample storage	Click to enter storage management page.
Liquid nitrogen filling	For liquid nitrogen injection control.
alarm sound off	Click to power off current alarm sound
Light off	Click to power off current light.



Reminder

- The device is powered on. If no one operates the device for a long time, the system will automatically screen protect it for 5 minutes.
- Liquid nitrogen consumption calculation should be based on continuous data collection for more than 5 hours to reduce the impact of consumption fluctuations. If the power is off for a long time, the display of liquid nitrogen consumption is abnormal.

5.4 Sample storage management system

5.4.1 User login interface

Click the "Login" button to enter the "User login" window.

Use the administrator account and password to enable the device for the first time, as shown in graph 5.4.1-1.



Graph 5.4.1-1 [User login] window

The default administrator account is admin and the initial password is GENE8888.

The storage management system has three rights: administrator, technician, and operator. The administrator has the highest rights. The levels of authority are as follows:

Administrator, Permissions: Save/withdraw operation, filling, account management, parameter setting, maintenance, troubleshooting.

Technician, Permissions: Save/take operation, filling, parameter setting, maintenance, troubleshooting.

Operator, Permissions: Save/take operations, fill.

5.4.2 Sample Save/Take

Log in to the system and enter the "sample access" interface, including open cover, close cover, defog, rotation and stop of the corresponding area, as shown in the figure:



Graph 5.4.2-1, sample save/take

Function button:

- Open the cover: click it and open the tank's foam cover.
- Close the cover: click it and close the tank's foam cover.
- Defog: Clear the fog at the mouth of the liquid nitrogen tank to search of the target freeze shelf easily.
- Stop: Click to stop the current operation of the device.

Click on any letter partition in the left disk, the indicator flashes, and the corresponding area freeze shelf will be rotated to the position below the neck.



Reminder

- During the process of opening the cover, the close the cover button is unavailable.

5.4.3 Operation management

After login, click the "Operation Management" button to enter the real-time operation management interface, which displays the temperature curve of tank and liquid level height in real time, as shown in graph 5.4.3-1.



Graph 5.4.3-1 Operation Management



Reminder

- Click the "Historical Query" button to enter the operation management to view the historical temperature and liquid level information.

5.4.4 System management

After the login is complete, click System Management to enter the system management page, as shown in graph 5.4.4-1.



Graph 5.4.4-1 System management

Function button:

- Add account: administrator add new account, only for administrator.
- Change password: Change account password, only for account owner.
- Permission change: Change account permission, only for administrator.

- Account disable: Disable account, only for administrator.

5.4.5 Event Management

After login, click the "Event Management" button to enter the event management interface. You can query alarm information and operation logs on the screen, as shown in graph 5.4.5-1.



Graph 5.4.5-1 Event Management

5.4.6 Parameters Management

Include basic Settings, maintenance Settings, system Settings, and other Settings, as shown in graph 5.4.6-1.



Graph 5.4.6-1, parameters management



Reminder

- System parameters have been generally set before delivery by GP. The user administrator has the permission to modify them.

- Low liquid level alarm: Set the low alarm level in the liquid nitrogen tank, that is, if the actual liquid level is lower than this set level, an alarm will occur.
- Filling Start: Set the automatic liquid filling level, that is, when the mode of "Enable Automatic liquid filling" is selected, when the actual liquid level is lower than the set liquid level, the liquid filling will be automatically started.
- Filling Stop: Set the automatic stop filling level, whether manual filling mode or automatic filling mode, when the actual liquid level is higher than this set level, the liquid will automatically stop filling.

6 Installation

6.1 Brief

This chapter describes in detail the installation method and procedure of intelligent gas phase liquid nitrogen tank, debugging method and procedure.

6.2 Installation preparation

6.2.1 Field conformation

The device is equipped with casters. Use a forklift to place the device at a large distance to the approximate position, push the device to the final position manually, and use a wrench to turn the four foot cups to keep them close to the ground without lifting the device. Then the device can be locked horizontally.

6.2.1.1 Assistant tools

Table 6.2.1.1-1 lists the assistant tools used during the installation.

Table 6.2.1.1-1 Assistant tools list

No.	Assistant Tool	Specification	Qty	Remark
1	Chair, Desk	Height 0.5~0.8m	1 set	1 Chair and 1 Desk
2	step ladder	/	1 pcs	
3	Net cable	Class 5 network cable or above	Based on field	Device to client (server)
4	Liquid nitrogen supply tank	Pressure 22psi	2~3 pcs	About 300L/tank

6.2.1.2 Power Supply

Socket specifications: Meet GB/T 1002 standard, AC 220V, 50HZ 10A (three holes).

6.2.1.3 Passage

Before moving the equipment, confirm the passage as follows:

- Measure the dimensions of transport corridors or elevators to ensure safe passage of equipment.
- The ground in the passageway should be smooth and without pits. When the transfer channel obstructs the step, it is necessary to prepare the slope block in advance. The Angle of the slope block should be less than 3°, and the length of the block should not be less than 120cm.
- Prepare a floor protection solution at the installation location based on site requirements (if a large load is required per unit area during installation or transportation, or if you have requirements on floor cleanliness).

6.2.1.4 Installation area

The following confirmation should be made when the equipment is moved to the work area:

- Certain space for installation, maintenance, and operation shall be reserved around the device. The effective distance between the left and right sides and the rear of the device shall be $\geq 30\text{cm}$, and the operation space for access and access shall be $\geq 100\text{cm}$ in front of the device.
- The site is level and the nearby ground construction works have been completed. The pipes above the equipment installation have been lifted.
- Construction transportation and fire control roads are unblocked.
- Lighting, water supply and power supply for the construction are ready.



Alert:

- Do not move or install devices without checking the passage or installation area.
-

6.2.2 Work condition requirement

Power supply: AC220V, 50Hz;

Environment temperature: 10-28°C;

Environment humidity: Less than 60%

6.3 Installation

6.3.1 Take apart the package

The Intelligent Cryogenic Storage System is packed in two parts: the main body of the liquid nitrogen tank and the lifting mechanism component. GP engineers or qualified engineers are responsible for on-site installation and commissioning.



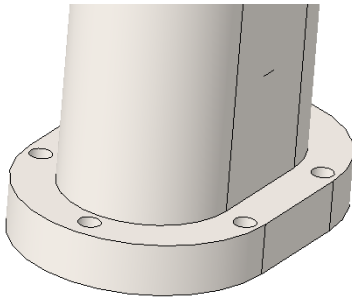
Reminder

When goods arrived, please check the pack list carefully.

6.3.2 Lifting mechanism installation

6.3.2.1 Install stand column

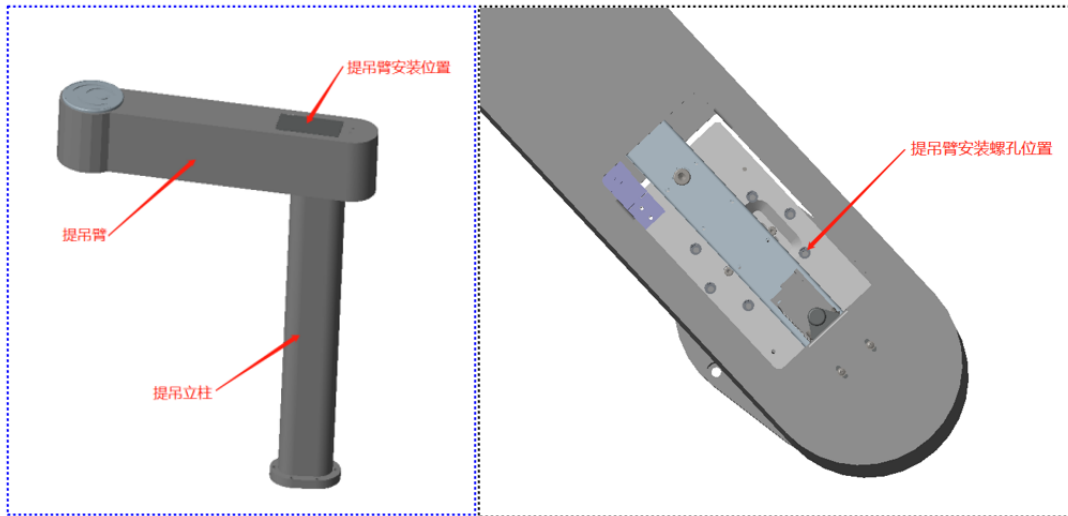
Install the column assembly on the large plate platform of the main body of the liquid nitrogen tank using M6*20, as shown in the graph.



Graph 6.3.2.1-1 Stand column installation.

6.3.2.2 Install cantilever

Mount the step ladder and secure the cantilever bearing to the stand column. As shown in the graph:



Graph 6.3.3.2-1 Cantilever installation



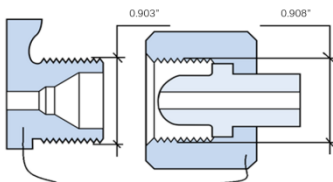
Caution:

- The cantilever should be installed into the hole, and six M4*20 hexagonal round head screws should be secured using a dedicated long wrench.
- Pay attention to safety protection during installation to prevent persons or objects falling off.

6.4 Pipe joint

6.4.1 Connection type

The following graph shows the connection between the reserved interface (left) of the liquid nitrogen tank and the metal bellows connector (right).



Graph 6.4.1-1 connection type

6.4.2 Pipe connector

The Intelligent Cryogenic Storage System is equipped with liquid nitrogen filled metal corrugated hose and CGA295 connector, which is connected to the Dewar tank or liquid nitrogen tower by ZG3/8, as shown in the graph.



Graph 6.4.2-1 metal corrugated hose and CGA295 connector

6.4.3 Pipe connection

Before use, the Intelligent Cryogenic Storage System should be connected to the self-pressurized liquid nitrogen container, as shown in graph 6.4.3-1.



Graph 6.4.3-1 pipe connection



Alert:

- When connecting the joint, wrap raw material belt to ensure tightness.
 - The connection port of the self-pressurized liquid nitrogen vessel shall be the liquid phase end.
-

6.4.4 Connect power supply and network

Take out the power cable from the package and connect it to the device. The connector is on the left of the ring decoration of the device shell.

The network cable interface is a common RJ45. GP provides interface files. Interface programs can be developed in the client equipment monitoring system or sample information management system to realize online information exchange and data transmission with GP Intelligent Cryogenic Storage System.

7 Use and operate

7.1 Brief

This chapter describes in details for operation and use method of Intelligent Cryogenic Storage System, so that users can use and operate it correctly.

7.2 First filling

After Intelligent Cryogenic Storage System is correctly installed and connected according to Chapter 6, the liquid nitrogen is filled for the first time.



Caution:

- During filling process, tank can not be moved.
 - Before filling, please make sure operator/engineer get GP qualification, and be familiar with chapter 4th and 5th of this manual.
-

7.2.1 First power on

For safety reasons, during the transportation of equipment, the external switch of the equipment and the switch in the electric control box may be disconnected. Before starting the equipment, check whether the connection and switch of each part are open. The method is as follows:

- Check the circuit breaker inside the electric cabinet.

Open the electronic control cabinet door and check whether the circuit breaker is open.

- Turn on the main switch of the device.

On the front screen component of the device, press the main power switch of the device, you can see that the display starts to start to standby, and the device is successfully powered on.

7.2.2 Filling preparation and inspection

- For the first time, prepare the model to be filled with more than twice the liquid nitrogen capacity. The working pressure of the liquid nitrogen supply tank is $\leq 0.15\text{MPa}$ (22Psi).
- Check whether the corrugated metal inlet hose is securely connected as required.
- Connect the three-hole power cable plug to the AC220V 50HZ power grid.
- All freezers have been partially placed in rotating platform.

7.2.3 Power on and login system

Turn on the device power, start the system, < administrator user > login.

7.2.4 Filling



Caution:

- First time filling, please open the cover of tank.
 - First time filling, please make sure filling mode is on Manual.
-

7.2.4.1 Manual Mode

The Parameter Setting interface is displayed. The current liquid charging mode of the device is manual mode, that is, the < automatic liquid charging > is off.

7.2.4.2 Filling

Return to the 【 Homepage interface 】 , click the < Fill > button, and the hot gas bypass solenoid valve of the liquid filling system will automatically open. Manually unscrew the liquid phase valve of the liquid nitrogen supply tank, and the hot gas bypass of the Intelligent Cryogenic Storage System starts to exhaust. When the exhaust temperature drops to the set low temperature, the exhaust valve is closed, the two inlet solenoid valves are opened at the same time, and the liquid nitrogen is filled into the tank.

7.2.4.3 Completed

When the intelligent gas phase liquid nitrogen tank is filled to a high level, the two liquid inlet solenoid valves are closed, and the liquid filling automatically stops. Close the lid of the bucket.

After the initial liquid filling is completed, stand for 48 hours, replenish the liquid again to a high level, and stand until the top temperature is lower than -180°C , the liquid nitrogen tank and the internal frozen storage shelf have been cooled and can be used.



Caution:

- After liquid filling is complete, enter the [Parameter Setting] interface, and change the liquid filling mode to automatic mode. When the liquid level in the tank drops to the low level, liquid nitrogen filling will start automatically.
-

7.3 Equipment shutdown



Caution: Device shutdown sequence: Turn off the main power switch (above the screen assembly) -> Turn off the circuit breaker of the cabinet (not required).

7.4 Sample save/take



Alert:

- For the first time, the sample can be saved and taken out after the equipment stands for 48 hours to reach temperature equilibrium.
-

7.4.1 Rotate platform

Login user, select [Sample save/take] in the homepage interface, click the area button, rotate the platform to the storage location.

7.4.2 Open the tank cover

Click the < Open cover > button to open the cover.

7.4.3 Lift shelf and inching

Press the < Down > key on the human machine interaction panel, put down the lifting hook, manually hook the target freezer shelf, and long press < Up >. When the target box in the freezer shelf or the empty box in the freezer shelf is exposed to the mouth of the tank, release the < Up > key, and the freezer shelf will hover in the air.



Tip:

- When the freezer rack is not facing the opening of the tank, you can use the Clockwise/Anticlockwise on the panel to adjust rotating platform.
-

7.4.4 Save/Take sample

Take sample: Move the target box from the freezer shelf, open the cover, move the target tube, close the cover, and return the target box to its original position in the freezer shelf.

Save sample: Put the sample box to be stored into the designated target layer in the freezer shelf.

7.4.5 Reset/Completed

Long press < Down > to return the shelf to its position;

Manually unhook, long press < Up >, the hook reset;

Close the tank cover.

7.5 Alert function

7.5.1 Open/Close cover overtime alert

If the switch cover action is not completed within the set operating time of the switch cover motor, an audible and visual alarm will be made and displayed in the alert log list.

7.5.2 Liquid filling overtime alert

When the filling process exceeds the set filling time and the filling does not stop automatically, an audible and visual alert will be made and displayed in the alert log list.

7.5.3 Over temperature alert

If the actual temperature detected at the top or bottom of the tank exceeds the maximum or minimum limit set by the system, an audible and visual alert will be made and displayed in the alert log list.

7.5.4 Liquid level exceeded alert

If the actual liquid level in the tank exceeds the maximum or minimum limit value set by the system, an audible and visual alert will be made and displayed in the alert log list.


7.5.5 Open cover overtime alert

If the cover is not closed for more than the set time after opening, an audible and visual alert will be made and displayed in the alert log list.

7.5.6 Communication related alert

The UI interface will display the running status of the device in real time. In case of abnormal communication or other abnormalities, the UI interface will display the status in real time and pop up the alert.

7.5.7 emergency management

The operation panel of the equipment mechanism is provided with the emergency stop button switch . If press it, all mechanism will stop. Turn right button to cancel emergency status.

8 Maintenance

8.1 Brief

This chapter mainly describes the routine maintenance of Intelligent Cryogenic Storage System, so that users can take the routine maintenance work.

8.2 Routine inspection

Preventive maintenance of the system according to the maintenance plan, including checking the status of the system, daily cleaning of the equipment (dust-free cloth and/or neutral detergent is recommended for equipment cleaning, alcohol cannot be used to clean the display), system backup, and technical communication with customer engineers.

Inspection content: The purpose of regular inspection is to discover and prevent possible hardware and system problems in time, so as to ensure the continuous and stable operation of the system to the maximum extent.

- Check the running status of the host system, such as the system CPU, memory, I/O status, and processes.
- Check liquid nitrogen consumption.
- Defrost the box.
- Connector inspection, inspection of connection plugs, cables, power sockets, etc.
- Environment check, including power supply voltage, room temperature, humidity, etc.
- Clean and maintain, remove dust and foreign matter in the shell, chassis and scanner.

8.3 Maintenance plan

Storage system routine maintenance items, contents, and weekly/monthly/annual plans are listed in the following table.

Cycle Time	Project	Content	Remark
Daily	Operation Status	Check whether the equipment is powered on and whether the temperature and liquid level in the tank are normal.	By user
Daily	Liquid nitrogen	Check the amount of liquid nitrogen remaining.	By user

	verification		
Weekly	Inside neck, foam cover defrosting	Use a soft dry cloth to cover the foam with frost. Wipe the frosting on the inside of the neck from the inside out to avoid frost falling into the tank.	By user
Monthly	Automatic mechanism	Test switch cover, rotating platform, lifting up and down are performed normally.	By user
Annually	Circuit view	Open the operation box and check whether the cable is normal	By GP or authorized engineer
Annually	defrosting	Move boxes and freezer shelves that are too frosted, put them in the liquid nitrogen cart, and put them back after clearing the frost	By GP or authorized engineer
Five years per time	Minor maintenance	Replace the seal, etc	Payment
Ten years per time	Major maintenance	Clean the whole machine and replace the worn parts	Payment



Alert

- Routine inspection and maintenance of the equipment must be carried out by trained and qualified operators.
-

9 Troubleshooting

9.1 Brief

This chapter mainly introduces the common fault tips and treatment methods of Intelligent Cryogenic Storage System.

9.2 Common fault tips and solutions

No.	fault phenomenon	Cause analysis and solutions
1	Power supply abnormality; Equipment circuit failure	Check whether the external power supply is plugged in properly. Whether the power cord is damaged or disconnected; Check whether there is a power failure; Check the safety in the control box for burnout; Check whether the switch in the control box is tripped or not turned on; Check whether the main switch of the device is disabled.
2	Communication abnormality	Device network fault, try to restart device, check cable connection whether loose
3	Open/close cover failed	The mechanism is stuck or abnormal operation alert occurs during operation; Detect whether the axis sensor is loose or damaged.
4	The rotating platform rotation position is incorrect or failed	Check whether the synchronous belt/wheel is loose; Check whether the region rotation parameter is abnormal.
5	The storage tank liquid nitrogen cannot be filled	The liquid nitrogen supply source is incorrectly connected. Check the liquid nitrogen connection.
		The supply of liquid nitrogen is insufficient or the pressure is insufficient. Check whether the supply of liquid nitrogen is sufficient.
		The filling solenoid valve is not open. Check the filling solenoid valve resistance.
		Check whether there is debris in the filling solenoid valve resistance.
		Detect the current liquid nitrogen level and level control settings

		Auto fill disabled, check whether manual fill, confirm the auto fill setting.
6	Slow filling or long filling time	Liquid nitrogen supply is insufficient. Check whether liquid nitrogen supply is sufficient
		If the pipe filter is blocked, clean or replace the pipe filter.
		Detect the filling solenoid valve resistance.
		Check whether there is debris in the filling solenoid valve resistance.
		Pipelines or liquid nitrogen supply connections are leaking.
7	The temperature reading is incorrect	Restore to default value, calibration is incorrect or need to be recalibrated, recalibrate temperature sensor.
		Liquid nitrogen probe failure, confirm the resistance value, if necessary to replace.
8	The level reading is incorrect	Perform liquid nitrogen level calibration.
		Check the connection and integrity of ethylene pipes.
		Leak detection of ethylene pipes and fittings.
		The storage tank is not fully vented. Check the tank cap outlet for blockage.
		If the level sensing line is blocked, clean the level sensing loop line and remove the debris at the bottom of the storage tank. Defrost and dehumidify the full storage tank if necessary.
9	The filling time is too short	Level reading is not accurate, level calibration.
		The storage tank is not fully vented. Check the tank cap outlet for blockage.
		If the level sensing line is blocked, clean the level sensing loop line and remove the debris at the bottom of the storage tank. Defrost and dehumidify the full storage tank if necessary.
10	The amount of liquid nitrogen is too high	Level reading is not accurate, level calibration.
		The storage tank is not fully vented. Check the tank cap outlet for blockage.

		As more data is accumulated, the liquid nitrogen dosage value will return to normal.
11	Liquid level detection failure	If the level sensing line is blocked, clean the level sensing loop line and remove the debris at the bottom of the storage tank. Defrost and dehumidify the full storage tank if necessary.
12	The use of liquid nitrogen has been high and continues to increase	If the vacuum fails, contact an authorized distributor or technical support.



Alert:

- If a fault occurs, contact the manufacturer's engineers firstly. You are advised to perform fault analysis under the guidance of the engineers.
 - Professional maintenance personnel can handle some common faults under the guidance of manufacturer engineers.
-

10 Customer service

10.1 Brief

This chapter is mainly the after-sales service commitment of Intelligent Cryogenic Storage System, providing training and technical consultation contact information.

10.2 Warranty

Free maintenance service is provided within 1 year from the date of delivery.

After 1 year, the fee will be charged according to the actual situation.

10.3 Training

We will provide technical training and technical consultant services for customer. Includes:

On-site training: GP or distributor hold it during routine inspection or project implementation. GP or qualified engineers will explain the details for equipment installation, commissioning, use and maintenance based on actual conditions, so that customer can use and maintain the equipment independently.

Professional and technical training: Through training, customer can effectively manage the server, monitoring, daily operation and maintenance.

10.4 Technical consultation

Manufacturer and distributors provide free technical consultation.

Technical Hotline: +86 021-64229802 (Shanghai)

Reception time: Monday to Friday 9:00-12:00 13:30-17:00 (except holidays)

Customer service hotline: 400-606-8780

10.5 Warranty service card

Warranty service card

Dear Customer:

Thank you very much for choosing the Genepoint Technologies Crest Series Intelligent Cryogenic Storage System. Our company in accordance with the relevant laws and regulations, to provide the following services for you:

1, warranty principle: warranty period, normal use and maintenance of the case of failure, we provide free maintenance services.

2. Equipment failure caused by the following reasons which is out of warranty:

- ◆ Do not follow the manual or wrongly operate equipment, cause equipment damage;
- ◆ Caused by force majeure factors such as accidents, fires, earthquakes and natural disasters;
- ◆ Caused by disassembly and assembly without the consent of the company.

Device Information

Name	Intelligent Cryogenic Storage System		
Model		SN	
Delivery Date			
Warranty Date			

Customer service hotline:400-606-8780

Genepoint Technologies (Suzhou) Co.,Ltd

Annex A Security information for liquid nitrogen using

Brief

This chapter describes the matters needing attention during the use of liquid nitrogen in the liquid nitrogen backup system to enhance customers' understanding and use of liquid nitrogen.

A.1 Liquid Nitrogen Characteristics

Liquid nitrogen, or liquid nitrogen, is referred to as LN2. It is an inert, colorless, odorless, non-toxic, non-corrosive, non-combustible, extremely low temperature gas. Nitrogen makes up the majority of the atmosphere (78.03% by volume, 75.5% by weight). Specific features are as follows:

- Ultra-low temperature: the boiling point of liquid nitrogen is -195.8°C , at this low temperature, the life activities in the organic body basically stop, so biological samples can be preserved in liquid nitrogen for a long time. When liquid nitrogen is vaporized, each kilogram of liquid nitrogen can absorb 48 kcal of heat.
- Liquid nitrogen is very weakly permeable. When the skin is exposed to liquid nitrogen for more than 2 seconds, frostbite can occur due to the extremely low temperature.
- Expansibility: liquid nitrogen is made of air compression and cooling, and is restored to nitrogen when gasification, and the volume expands 696 times instantaneously. Therefore, the liquid nitrogen container cannot be closed, otherwise there is a risk of explosion.
- asphyxiation: Nitrogen itself does not cause suffocation, but in a certain space, if too much nitrogen and isolated oxygen, the operator will also cause asphyxiation. According to the measurement, 10 kilograms of liquid nitrogen in 10 cubic meters of indoor instant evaporation, can make the space oxygen suddenly reduced to 13%, resulting in space hypoxia, can cause people to suffocate and even death.

A.2 Safety protection

Operators should take the following safety precautions during the operation and use of the equipment:

- Wear antifreeze gloves as required before handling or using liquid nitrogen. Do not touch a substance cooled by liquid nitrogen with any unprotected part of your body.
- Store and use liquid nitrogen only in a well-ventilated area with an oxygen concentration alarm.
- Do not dispose of liquid nitrogen in enclosed areas or Spaces where others may have access.

A.3 Emergency Handling

A.3.1 Emergency rescue

In case of dizziness, loss of consciousness or exposure to liquid gas or cold gas while handling liquid nitrogen, call the hospital emergency number immediately and give the following emergency care:

- It should be moved immediately to a well-ventilated area, kept warm and rested. If you have stopped breathing, artificial respiration should be performed; Oxygen should be administered if breathing is difficult.
- Restore body tissue to normal body temperature (37 ° C) as soon as possible and prevent further injury and infection of the injured body tissue.
- Remove or loosen clothing that may restrict blood circulation to the frozen area. Using water with a temperature of 42 ° C can quickly heat up the affected part.
- Under no circumstances shall hot water be used at a temperature higher than 44 ° C, nor shall the frozen part be wiped before or after the temperature has been restored.
- Patients must not smoke or drink alcohol.

A.3.2 Leak Handling

When leakage occurs during operation and use, it should:

- Cut off the leak source as much as possible, do not contact the leak directly.
- Evacuate the contaminated spill area quickly, move personnel to the upper wind, set up isolation areas, and strictly restrict access.

- Notify the relevant authorities immediately to avoid leaking liquids into basements or other enclosed manned workspaces. Use a mist spray to accelerate liquid evaporation, but do not spray the water gun into the liquid.
- To prevent the accumulation of gas in the low concave, use the exhaust fan to send the leaking gas to the open area.
- Do not stay in low-lying or downwind areas.

Annex B Package, Transportation, and storage

Brief

This chapter describes the packing method, storage conditions and transportation precautions of the intelligent vapor phase liquid nitrogen tank, so as to guide the transportation, unpacking, installation and demolition of the equipment.

B1: Package

The equipment is packaged in a wooden outer box, covered with plastic film, and the internal space is filled with shock-absorbing foam.

B2: Transportation

- Do not crush heavy objects during transportation.
- During the moving of the container, pay attention to preventing impact and falling.
- Use a dedicated forklift to move the device.



Caution:

- The unit is equipped with 4 pulleys and pulls on both sides of the tank for easy movement by 2 people.
-

B3: Storage condition

The device should be stored in a dry environment at room temperature.