

OPERATING INSTRUCTIONS

CRYO 170-0 / 230-0



ARCTIKO

Notice

■ **Please read this user manual before operating or using the product.**

Be aware of the following warnings and cautions.

Ignoring the following warnings and cautions may cause damage to the equipment and/or user injury. The appliance should only be operated after reading the manual, and with the user's due care and discretion. Particular care should be taken not to disassemble the product.



Warning

Ignoring this warning may cause damage to the equipment and/or personal injury.



Caution

Special attention is required when using the equipment.








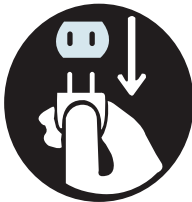

Read this User Manual before use the product and use it right. Place this book within easy reach of the freezer for reference purposes.

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Before using the appliance

- The marks used in this product and this User Manual refer to the following:
Cautionary messages with these marks aim to allow correct and safe use of the product and to prevent any risk and injury of you and other persons.
Precautions are described under the categories, 'Warning' and 'Caution.' However, a crucial result might be caused by other matters depending on circumstances.
Please be sure to keep all matters since they contain important details about safety.

Meaning of marks		
Warning Caution 	Caution:Electric shock 	Caution:Explosion 
Prohibition 	Do not touch 	Do not disassemble 
Strict observance 	Pull out Power-plug 	Grounding connection required 

- Should the product be transferred to a new location or lent to a different user, please ensure the continuing safe and correct use of the appliance by placing this user manual where it can be easily found by the next user.



Warning

For correct use







- Installation should only be performed by a qualified expert from the sales agency or elsewhere. Imperfect installation may result in electric shocks or fire.
- Place the appliance on a firm and level floor, which can hold the weight of the freezer. Imperfect installation or lack of floor strength may cause the appliance to tilt or fall over, leading to personal injury or damage to the freezer.
- Be sure to ground the appliance. Do not earth it to a gas pipe, water pipe, lightning rod, or phone cable. Imperfect grounding may cause electric shocks. (A class 3 grounding work by an electric business is necessary.)
- Use an exclusive power outlet for the product. Do not cut and shorten the power cord by yourself. Do not use extension cords, or any kind of electrical outlet divider. Failure to follow these instructions may cause electric shocks, excessive heat-generation, or fire.
- Do not use the appliance outdoors. Using the appliance in a place where it can come into contact with water may cause electric leakage and electric shocks.
- Do not install the appliance in a damp place or any other place where it may come into contact with water. Failure to follow these instructions may cause electric leakage and/or electric shocks, due to lower electrical isolation.
- Do not pour or spill water on the appliance or wash it with water. Failure to follow these instructions may cause short circuits and electric shocks.
- Do not touch the power plug, switches or any other electrical parts with wet hands. Failure to follow these instructions may cause electric shocks.
- Do not scratch, convert, bend, pull, or tie the power cord. Also, do not put any heavy objects on it. Make sure the cord is not being pinched. Any damage to the power cord may cause fire or electric shocks.
- Make sure that the power plug is cleaned regularly. Make sure the plug is completely inserted into the socket. Dust or dirt on the power plug or incomplete insertion may cause electric shocks or fire.
- If a circuit breaker is activated, please consult your sales agency or other qualified experts. Forceful power restoration may cause electric shocks or fire.
- Do not hang on the door. The door may come off the freezer or the freezer may fall over, leading to personal injury, or electric leakage and electric shocks.
- Do not place volatile substances or inflammables in the freezer. These substances may cause explosions or fire.



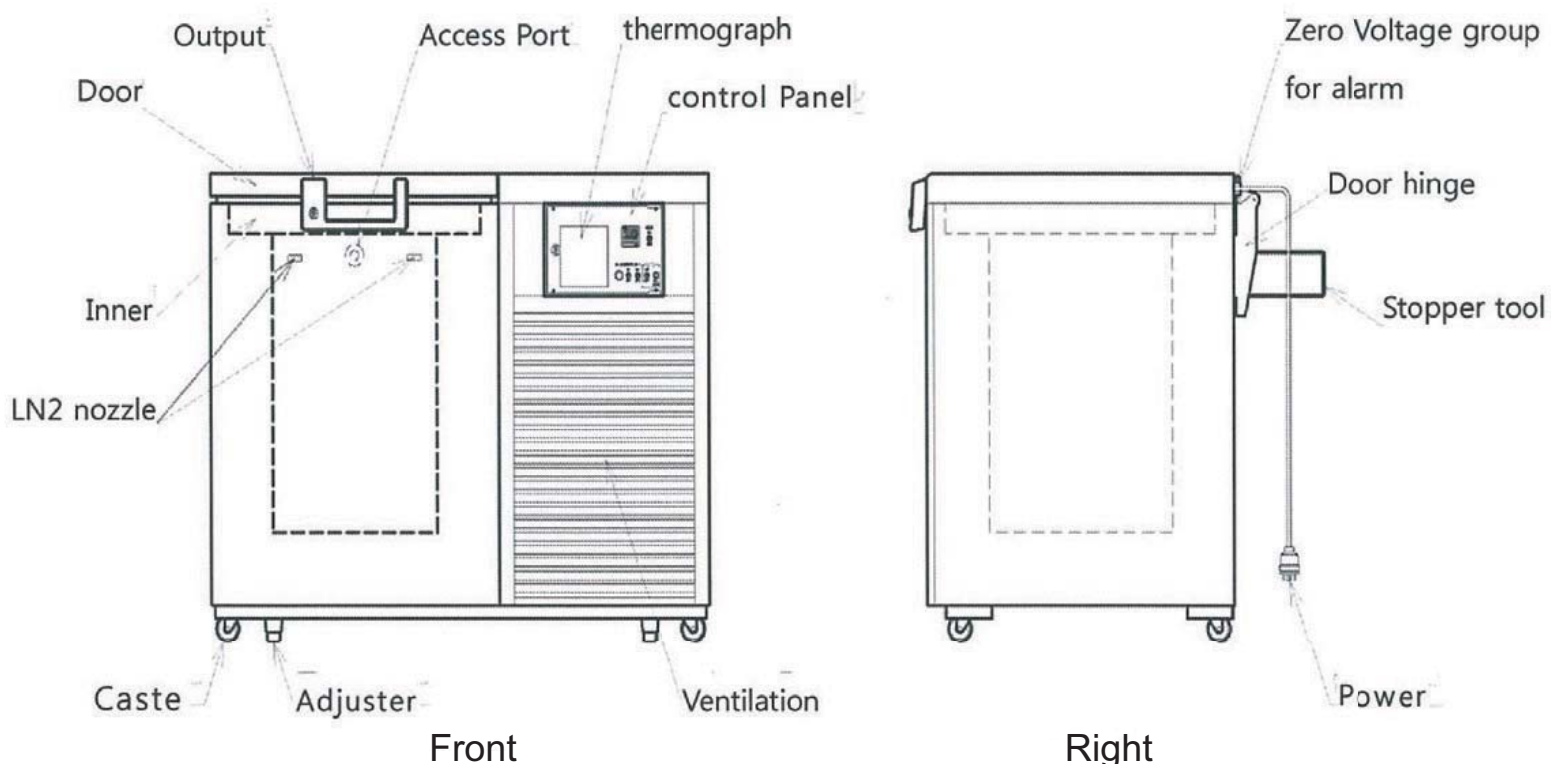
Warning

For correct use

- In case of malfunctioning, switch off the appliance, then pull out the power plug or turn the power off at the source. Failure to perform these actions when the appliance shows any signs of malfunction may cause electric shocks or fire.
- When moving the appliance please consult your sales agency or other qualified experts. Imperfect installation may cause electric shocks or fire.
- When the appliance is not being used, it should be stored away from places where children are present. Ensure that the door cannot be locked. Failure to observe these instructions may lead to people being accidentally locked-in the appliance.

 <p>Use an exclusive power outlet separately. Do not use an electrical outlet divider, since this may cause excessive heat generation and a fire.</p>	 <p>Do not place any inflammables in the freezer, since they may cause explosions.</p>	 <p>In case of gas leakage, do not touch the freezer. Turn off the gas valve and ventilate the area. Pulling out the power plug may cause an explosion due to static electricity</p>
 <p>Keep the appliance away from water. Failure to do so may lead to electric leakage or electric shocks.</p>	 <p>Do not use any inflammables near the appliance, since they may lead to fire.</p>	 <p>Make sure the power cord is not being pressed on by any other objects, such as an appliance foot, since this may lead to electric leakage, or damage to the cord due to excessive heat generation.</p>

Name and function of each part



Door - Door knob

- The door knob is a pulling type, so pull the knob and then open the door. Also the knob has a cylinder padlock, so the door can be locked.

Inner cover

- Ensure to set before operation in order to decrease leaked chilly air or maintain insulation.

Control panel

- Do various controls such as power ON/OFF, temperature display, temperature adjustments, alarm control etc.

Thermograph

- Records the inner temperature of the freezer.
Inner sensor of the freezer: Pt1000 ohm.

◀ Ventilation gallery

- Radiating is in the condenser of the machine room. As it radiates by absorbing the air with an air cooling fan, do not block the front of the ventilation gallery and the rear of a main body with a wall etc.

◀ External output jack for alarm

- 2 P jack is on the rear of the main body. Alarm signal can go off from this jack with contact output.

◀ Access port

- There is a hole at the center of the back of the freezer, where you can insert temperature sensors for measurements etc.
The inside diameter is $\varnothing 20$ mm, and the exterior opening is sealed with a rubber plug.





◀ Stoppertool

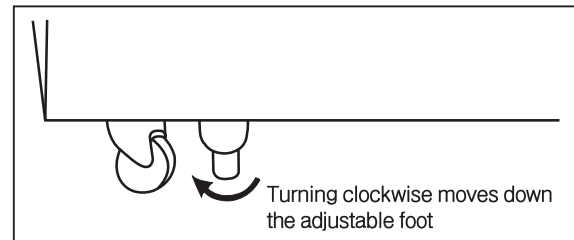
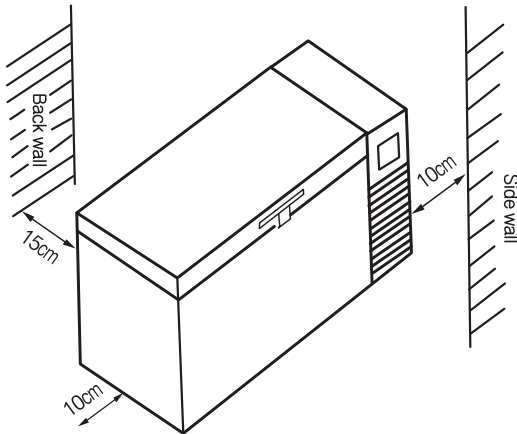
- Able to secure min. space and necessary for the ventilation of the machine room by contacting this tool to the rear wall (approx. 25 cm).




◀ Adjuster

- Turn left to extend and turn right to contract. The width of adjustment is approx. 15 mm. Upon installation, extend an adjuster and check whether or not a main body is firm.

Installation

-  Installation should only be performed by a qualified expert from the sales agency or elsewhere. Imperfect installation may result in water leakage, electrical leakage, electric shocks, or fire.
-  Choose an area with low levels of both heat and moisture.
 - The cooling performance of the freezer may be adversely affected if it is placed in direct sunlight or near a source of high temperatures.
 - If moisture or water comes into contact with the freezer, it may be a cause of poor electrical isolation or rust.
-  Allow adequate space around the freezer
 - Lack of space may cause poor cooling performance, breakdown of the freezer, or overuse of electricity.
 - Allow at least 15cm from the back wall of the freezer, and at least 10cm from the side walls.
 - There should be a space of at least 50cm between the top of the freezer and the ceiling.
-  Install the freezer on a firm and level floor
 - To stabilize the freezer, turn the adjustable feet (front side only) clockwise until they make firm contact with the floor.
 - If the freezer is not stabilized correctly, it may cause unusual noises and vibrations.



-  Ground the freezer to prevent electric shocks
 - The power plug used for this appliance comes with a ground. Make sure to use an earthed power outlet. Imperfect grounding may lead to electric shocks.
 - If there is no existing earthed power outlet, it will be necessary to have one installed by a qualified electrician.
-  Do not connect the grounding conductor to the following objects.
 - Water or gas pipes (This may cause explosions or fire.)
 - Lightning rods or phone cables (This may cause serious injury or death if lightning strikes.)
-  Electric Leakage Breaker
 - If installation in a damp area is unavoidable, the use of an electric leakage breaker is strongly required.

Before commissioning

- ❗ 1. Install the freezer on a flat and level floor.
 - Install the freezer on a level floor.
 - The front side of the freezer should be approximately 1cm higher than the back side.
- ❗ 2. Clean the inside of the freezer and put the sub-lids.
- ⊘ 3. Connect the freezer to the exclusive power outlet.
Do not connect the power cord in the middle, or do not use extension cords, or do not use any electric outlet divider.
- ❗ 4. Before storing anything, make sure the inside of the freezer is fully cooled down.
The plastic odor will disappear once the freezer cools down.
- ⊘ Do not turn on the power for 30 minutes after moving, which may cause breakdown.

Warning



Do not put bagged ice packs (including those containing ammonium nitrate and urea) in the freezer. Leakages from such bags may cause rust or breakdown of the freezer.



Do not place any form of volatile substance or inflammable, such as ether, benzene, alcohol, propane gas and glue, etc. inside the freezer. Failure to follow these instructions may lead to explosions or fire.



Any type of bottle or can that contains liquid that can be frozen should never be stored in the freezer since the bottles and cans may explode. This can lead to personal injury.



Do not touch stored materials, containers (especially metallic ones), or the inside of the freezer with bare or wet hands. Failure to follow these instructions may lead to frostbite. Make sure to wear gloves when working.

Before commissioning

(Make sure to read the following)



Warning



If the surrounding temperature is outside the optimum range (5°C-30°C), it may cause breakdown.



Do not use any inflammable spray, such as lacquer paint, or any form of volatile substances or inflammables near the freezer. Sparks discharged from the electrical components of the freezer may ignite such substances that lead to explosions or fire.



Do not pour or spill water directly onto the appliance or wash it with water. Failure to follow the instructions may lead to short circuits or electric shocks.



Do not touch the electrical components of the freezer, such as the power plug and the switches, with wet hands. Failure to follow these instructions may lead to electric shocks.



Do not scratch, convert, bend, pull, or tie the power cord. Also, do not put any heavy objects on it. Make sure the cord is not being pinched. Any damage to the power cord may cause fire or electric shocks.



When unplugging the freezer, pull on the plug itself. Do not pull the power cord. You may damage the inside wires leading to overheating and fire.



Use the switch to turn the freezer on and off inserting or unplugging the plug while the freezer is switched on may cause electric shocks or short circuits.



After switching off the appliance, wait for at least 10 minutes before switching it on again. Failure to do so may overload the compressors, causing a breakdown. However, please note that the appliance should be switched on within 1 hour after the power is cut. If you switch off the appliance for more than 1 hour, please wait for at least 48 hours with the door open before restarting it.



Make sure that the power plug is cleaned regularly. Always make sure that the plug is completely inserted into the outlet. A dusty or dirty plug or incomplete insertion of the plug may cause electric shocks or fire.



Please carry out regular checks to ensure that the circuit breaker is functioning correctly. If it is defective, it may lead to electric shocks in the case of electrical leakage.



When a circuit breaker activates, please consult your sales agency or qualified experts. Forceful power restoration may cause electric shocks or fire.



Do not place any objects or containers containing water in the freezer. If they fall over, they may cause personal injury and the spilled water may lead to poor electrical isolation and electric leakage.



Do not put your hands in the mechanical compartment as it contains high speed fans and heat-generating parts. Failure to follow these instructions may lead to personal injury.



Do not hang on the door. The door may come off the freezer or the freezer may fall over, leading to personal injury, electric leakage, or electric shocks.



Do not climb on the freezer. It may fall over and cause personal injury.



Do not insert fingers or other objects into the air vents or air intakes. As the fan is spinning at a high speed, it may cause personal injury or breakdown.



If you do not use the freezer for a long time, for safety purposes, please unplug the appliance at the outlet. Failure to follow these instructions may lead to dust collecting on the power plug resulting in fire.



Do not use the appliance on-board vehicles or any other type of vessel.

Connecting transformer to CRYO 170-0 & 230-0

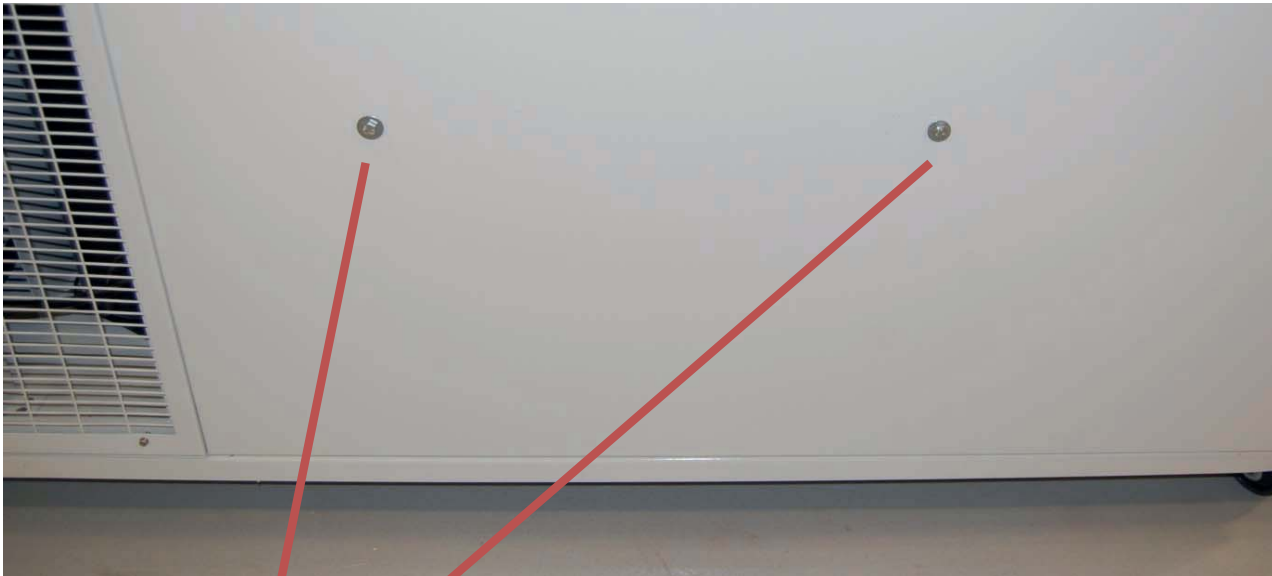
ATTENTION!!!!!!

The transformer must be connected before use.

Tools to be used.

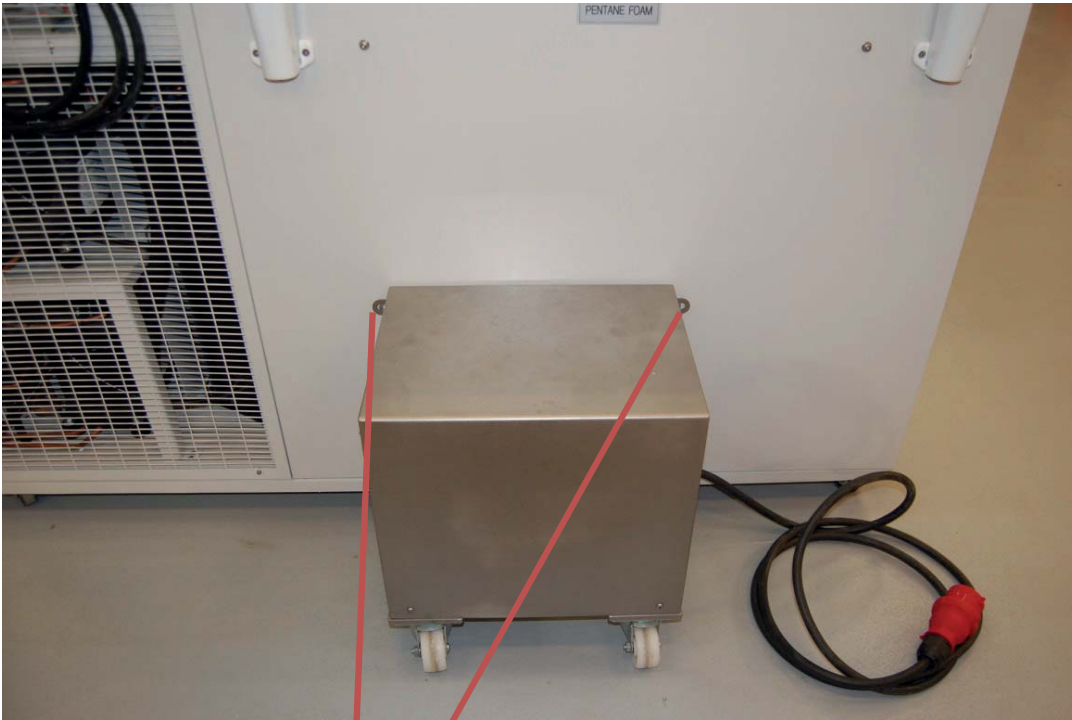


The unit is prepared for installation of transformer at the back of the unit.



Remove the screw.

Place the holes on the transformer in front of the holes on the unit.



Mount the screw.



Cut the strip.



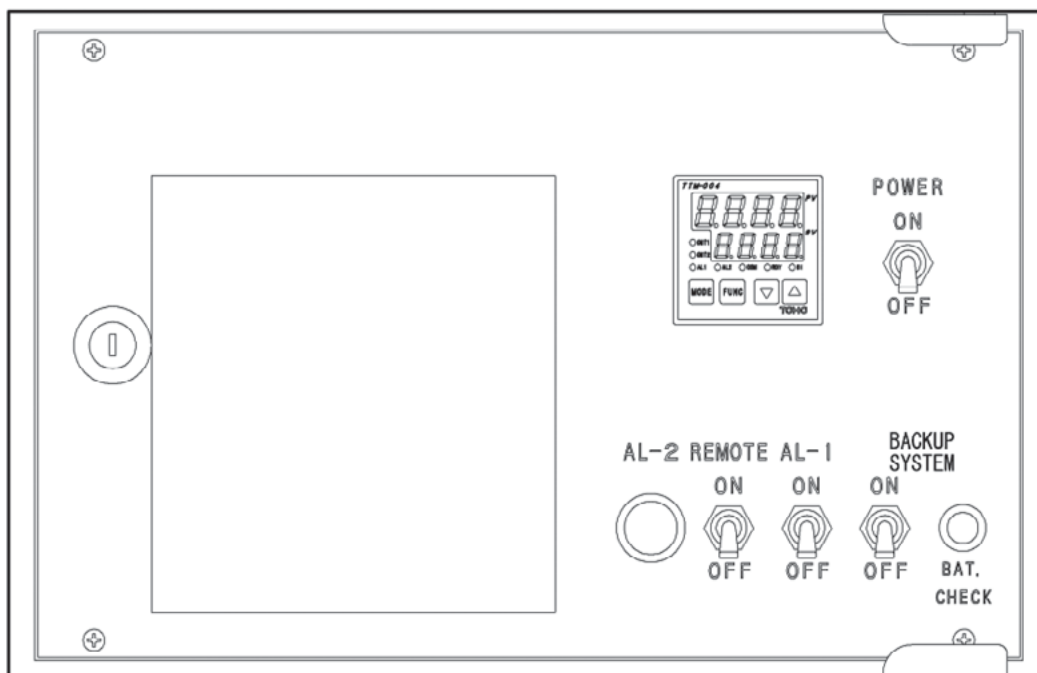
Connect the cable from the unit to the transformer.



Mount the main cable from the transformer the wall socket.

Operation panel (Double Cooling System)

Operation Panel

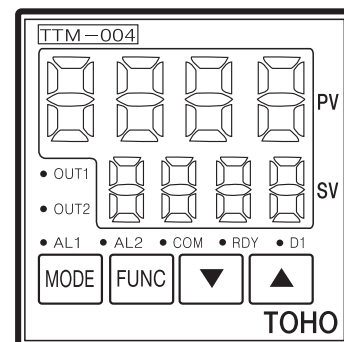


Temperature Controller

- You can control the temperature by setting parameters.
 1. Once the freezer is switched on, the initial screen will be displayed for 4 seconds.
 2. The controller shows the present value (PV) and set value (SV)
 Changing the set value by pressing ▼, ▲ Key to set the temperature.

Names & Functions of Front Display

PV	Present value, Character display on the setting mode screen
SV	Setup value, output value, display of selected input value on the setting mode screen
OUT 1,2	The light is on when control outputs 1 and 2 are on
AL 1,2	Light is on when event outputs 1 and 2 are on
COM	Flickering during communication, when there are communication selection specifications
RDY	Flickering when it is getting ready
DI	Light on when DI is on
MODE Key	Used to shift screen
FUNC Key	Used to run the set function
▼▲ Key	Used to increase/decrease (change) the set value



- ⚠ The range of temperature of use is $-140^{\circ}\text{C} \sim -150^{\circ}\text{C}$.
Use in a condition other than this range may cause breakdown.
- ⊘ Do not operate this for a purpose other than temperature control, since it may cause a breakdown.

Follow the order below when starting the operation.

1. Insert a power lamp into a socket
2. Turn off AL-1 switch and REMOTE switch.
3. Turn on POWER switch. The display of a temperature adjuster will be on and operation starts.
4. Set the temperature for use within the range of the designated applicable temperature.
5. Store the keeping when the inner temperature of a freezer reaches the set temperature.
For reference, start storing the keeping one by one 7-8 hours after the start operation.
Store the keeping of room temperature little by little.
6. To enable the alarm function, turn on AL-1 switch and REMOTE switch after confirming that the inner temperature of a freezer is stable..

Follow the order below when stopping the operation.

1. Turn off AL-1 switch and REMOTE switch.
2. Turn off POWER switch. The display of a temperature adjuster will be off and operation will stop.
3. Pull the power plug from the socket.



Ensure to restart after min. 10 minutes after stopping the operation.
Restart right away causes the breakdown of a cooler.

A little at a time when storing the keeping of room temperature

This product is for cold reserving (consecutive cooling of what has been cooled already). If a user puts plenty of the keeping of room temperature into a freezer, the temperature will go up temporarily and an alarm may go off. When storing the keeping of room temperature in a freezer, store it a little by a little several times after checking such is cooled enough. Also, where a user puts plenty of cold storage packs or cold insulation material into a freezer, the same state will occur. cold storage packs or cold insulation material has the merit of keeping the low temperature environment for a long time, but requires considerable amount of time in cooling, so if a user puts them a lot in a freezer, such will cause a lot of load to the product. As such, a user shall refrain from storing cold storage packs or cold insulation material. If it's unavoidable to store them, ensure to put only a little of them.

Battery change

- The battery for blackout alarm is consumable. The life is 3 years after installation. When the battery is out, an alarm buzzer won't sound even upon blackout, which may affect the keeping adversely. We recommend that a user should check the battery regularly and exchange in advance. Inquire of a store a user purchased the product or the local company about battery exchange.

How to check a buzzer

A buzzer will sound when POWER switch is off while AL-1 switch is ON.

Alarmfunction

This product alarms with a buzzer sounding when the inner temperature of a freezer increases or power goes out, in order to protect stored items. Furthermore, it has the zero voltage terminal to output such an alarm signal outside. All is equipped with On/Off switches, so use it as necessary.

Temperature increase alarm

The temperature increase alarm sounds under the following conditions.

- AL-1 switch is ON
- The inner temperature of a freezer (PV) is +15°C compared with the set temperature (SV)
- In case of the first use, the alarm will sound because the inner temperature of a freezer is high. After confirming sufficient cooling, turn on the AL-1 switch.

Blackout alarm

The blackout alarm sounds under the following conditions.

- AL-1 switch is ON
- Occurrence of blackout and equivalent incident (plug is pulled out or the power switch is off)
- An alarm buzzer sounds for about 48 hrs continuously even when an electric current is not applied. Limited to the case of sufficient charging (after operation for min. 5 days). The life of a battery is approx. 3 years.

Alarm signal output to outside

The alarm signal output to outside runs under the following conditions.

- REMOTE switch is ON (output even when AL-1 switch is OFF)
- The output timing is same as that of temperature increase alarm and blackout alarm.
- The contact output of the external alarm is Off (open) when 「A contact」 is normal, and On (close) when it's not normal.

Anomaly alarm of double cooling system

Where there's an electrical anomaly in the double cooling system (where it doesn't run because of the breakdown of a freezer), AL-2 lamp (red) turns on. Also, where AL-1 switch is ON, a buzzer sounds interworking with AL-2 lamp.

- Where only one cooling system runs as either one has system anomaly, the inner temperature of a freezer maintains approx. -130°C.

Fan motor anomaly

The abnormal fan motor runs under the following condition.

In case of the insufficient rotation or stop of a fan motor, an alarm buzzer will sound and AL-2 lamp (red) will be on.

Start of automatic cooling auxiliary device

Where the inner temperature of a freezer becomes -130° C or higher when the BACKUP SYSTEM switch is ON, an alarm buzzer will sound and simultaneously LN2 is sprayed into the freezer.

How to change parameter in level set1, set2, set3, set7

1. Press the MODE for 2 sec.
2. Select the desired SET level by pressing the button UP or DOWN
3. Access to the SET level by pressing the MODE button.
4. Scroll between the parameter in the SET level by pressing the MODE button.
5. To change the parameters press the button up or down.
6. Accept the changed parameter by pressing the MODE button.
7. To return to the main menu press the button for 2 sec.

SET 1

Code	Name	Description		Arctiko Default Settings
_InP	Setting for input types	**	Input type	10
		00	K Thermocouple	
		01	J Thermocouple	
		02	R Thermocouple	
		03	T Thermocouple	
		04	N Thermocouple	
		05	S Thermocouple	
		06	B Thermocouple	
		10	Pt 100	
		11	JPT 100	
_PdF	Setting for filter input	Setting range : 0 ~ 99 sec.		1
_dP	Setting for decimal position	0	none	0
		0.0	on decimal position	
_FU	Setting function by FUNC Key	0	none	0
		1	Change of digit	
		2	RUN/READY	
		3	AT	
		4	Timer start/Reset	
_LoC	Lock setting	0	OFF	3
		1	All lock	
		2	Lock of operation mode only	
		3	Lock except operation mode	

SET 2

Code	Name	Description	Arctiko Default Settings																						
_SLH	Setting for SV high limiter	Setting range : Low to high limit (Keep 50 digits between high limit of SV limiter and high limit of SV limiter) Setting unit : °C	-50																						
_SLL	Setting for SV low limiter	Setting range : Low to high limit (Keep 50 digits between high limit of SV limiter and low limit of SV limiter) Setting unit : °C	-180																						
_nd	Control mode	Setting for control mode rUn : Control action rdy : Control stop (Manipulated variable low limiter output) nAn : Manual control	rUn																						
_Cnt	Setting of control type	Function <table border="1" data-bbox="582 958 1145 1070"> <tr><td>*</td><td>Type</td></tr> <tr><td>0</td><td>Type A</td></tr> <tr><td>1</td><td>Type B (Overshoot protection)</td></tr> </table> Control type of Output 1 <table border="1" data-bbox="582 1111 1145 1223"> <tr><td>*</td><td>Type</td></tr> <tr><td>1</td><td>PID control</td></tr> <tr><td>2</td><td>ON/OFF control</td></tr> </table> Control type of Output 2 <table border="1" data-bbox="582 1263 1145 1451"> <tr><td>*</td><td>Type</td></tr> <tr><td>0</td><td>None</td></tr> <tr><td>1</td><td>PID</td></tr> <tr><td>2</td><td>ON/OFF</td></tr> <tr><td>3</td><td>EV output</td></tr> </table>	*	Type	0	Type A	1	Type B (Overshoot protection)	*	Type	1	PID control	2	ON/OFF control	*	Type	0	None	1	PID	2	ON/OFF	3	EV output	020
*	Type																								
0	Type A																								
1	Type B (Overshoot protection)																								
*	Type																								
1	PID control																								
2	ON/OFF control																								
*	Type																								
0	None																								
1	PID																								
2	ON/OFF																								
3	EV output																								
_dl r	Setting for change of normal or reverse	<table border="1" data-bbox="582 1458 1145 1529"> <tr><td>0</td><td>Reverse</td></tr> <tr><td>1</td><td>Normal</td></tr> </table>	0	Reverse	1	Normal	1																		
0	Reverse																								
1	Normal																								
_nu l	Manipulated value for output 1	Setting for manipulated value monitor output 1 and manipulated value on manual control. Display range : 0. 0 ~ 100 . 0% Setting range : low to high limiter manipulated value.	100.0																						
_CI	Output 1 , control sensitivity	Setting range : 0 to 999 or 0. 0 to 999. 9 Setting unit : °C	1																						
_CP I	Output 1, OFF position	Setting range : -100 to 999 or -1999 to 999. 9 Setting unit : °C	0																						

SET 3

Code	Name	Description	Arctiko Default Settings	
_E IF	EV setting/function (PV & Additional event)	PV EV function	2	
		2 Type		
		0 None		
		1 Deviation high and low limit		
		2 Deviation high limit		
		3 Deviation low limit		
		4 Deviation high and low limit range		
		5 High and low limit		
		6 High limit		
		7 Low limit		
		8 High and low limit range		
		Additional EV function		
		1 Type		
		0 None		
1 EV Output hold				
2 Stand-by sequence				
3 EV output hold & stand by sequence				
_E IH	High limit setting	Range : -199. 9 to 999. 9 Unit : °C -1999 ~ 9999	15	
_E IC	Setting of EV output sensitivity	Range : 0. 0 to 999. 9 , 0 to 9999 Unit : °C	0	
_E It	Delay timer setting	Range : 0 to 9999 sec.	0	
_E Ib	Abnormal SV/heater function setting	2 Type	00	
		0 None		
		1 PV EV output normal		
		2 Heater abnormal		
		3 PV EV output abnormal & heater abnormal		
		Additional EV function		
		1 Type		
		0 None		
1 EV output hold				
_E IP	Polarity setting of EV output	1 Type	1	
		0 Normal Open (NO)		
		1 Normal Close (NC)		

SET 7

Code	Name	Description	Arctiko Default Settings
_tno	Timer output setting	Output type	0
		0 Non-use timer function	
		1 Control	
		2 EV output 1	

Chart Recorder



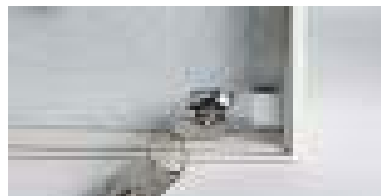
Wall Mounting Two recessed holes are provided for wall mounting screws.



Panel Mounting Two Panel Mounting sprung screw clips are provided to mount the mini-chart in a 138mm square cut out. See below



Door Lock A quarter turn security lock and two keys are provided. See below.

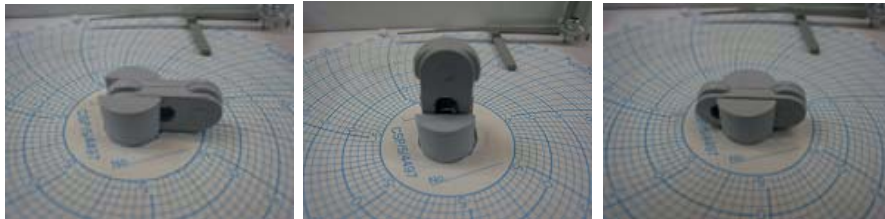


Battery / Mains Powered Battery recorders have two factory fitted 3.6 volt lithium AA cells which provide a minimum of eighteen months operation. There is a low battery audible alarm.

Mains powered recorders have a 2 core lead that can be connected to a 110Vac to 240Vac Supply. They also have a factory fitted re-chargeable battery that provides a minimum of three months operation in the event of a power failure.

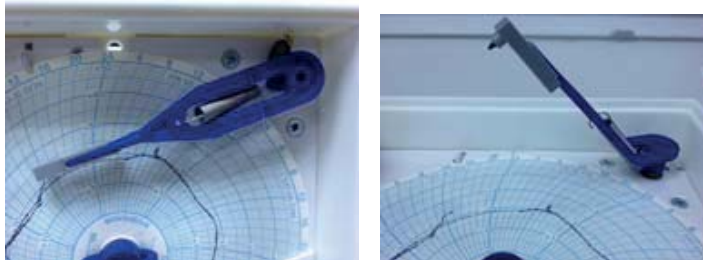
Changing the Chart

The chart is removed by first lifting the pen arm then using your thumb and fore fingers push the retaining toggle to the open position (diagram 1). Lift the toggle upright position (diagram2), Remove and replace the chart taking care to ensure the chart goes behind the two chart guides. Rotate the chart anti-clockwise until the pen nib is approximately 10mm to the left of the start point. Lock the chart by pushing the toggle back to the centre position (diagram 3) Lower the arm so that the pen nearly touches the chart and use the chart advance button to align the pen with the start position. Then release the pen arm.



Changing the pen

Gently lift the pen arm then pull the pen nib off in the direction of the arm taking care not to twist the arm on its spindle. Replace with a new pen.



1.0 Pen Alignment

It is recommended that this procedure is carried out whenever the pen nib is changed or at any time if it is suspected that the pen arm has been forced out of position by rough handling.

1. Start with Rotation Switch set to 1 (see diagram overleaf)
2. Set S1 ON
3. Set Rotation to 0
(sounds "dah dit dah dit" C for align)
4. Press HI until the pen is at the outer edge of chart (HI & LO to fine adjust)
5. Press ACCEPT
(sounds "dit dah" A for Accept)
6. Press LO until the pen is at the inner edge of chart (HI & LO to fine adjust)
7. Press ACCEPT
(sounds "dit" E for END of alignment)
(Pen will now return to indicate temperature)
8. Return Rotation Switch to the required chart speed
9. Set S1 OFF

Note all modes timeout after 30 seconds of inactivity, if the setting mode is lost then return Rotation SW to 1 then 0 to restart the setting procedure

2.0 Setting the Alarms (If fitted)

Note: The alarm function is NOT fitted on the -100 / -170°C version!
If HI is pressed first then the HIGH alarm will be adjusted.
If LO is pressed first then the LOW alarm will be adjusted.

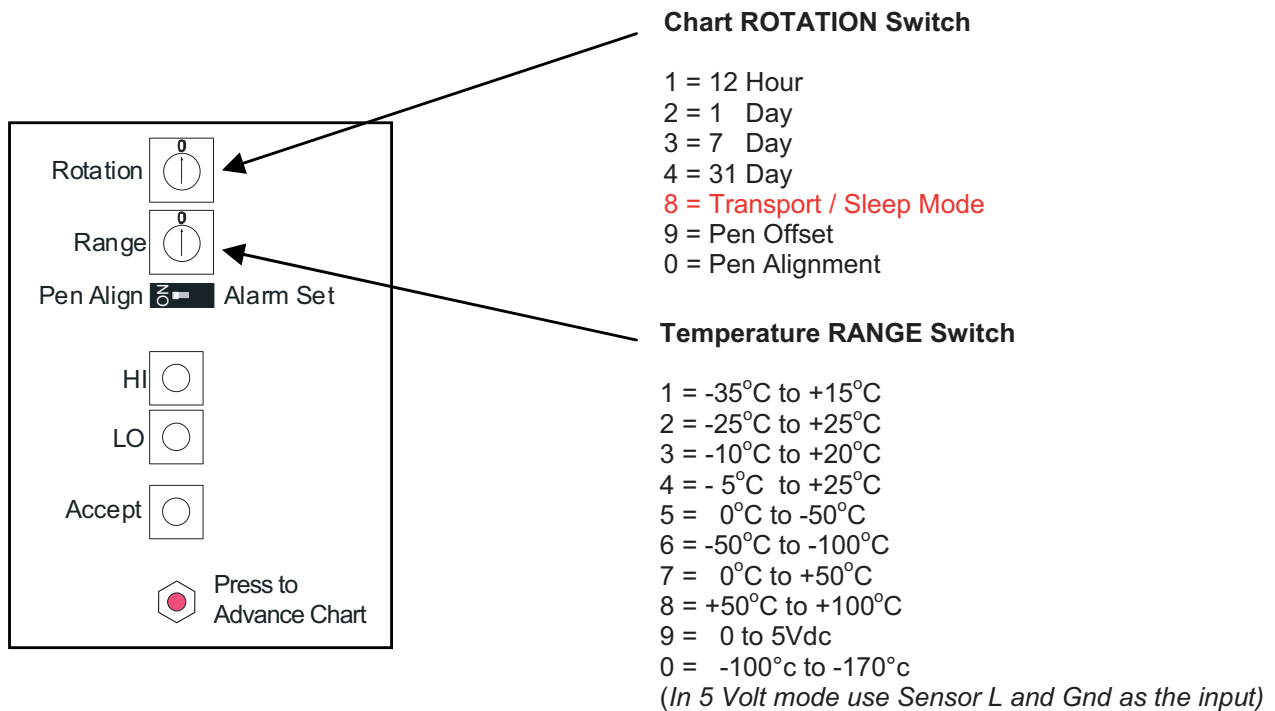
1. Start with Rotation Switch set to 1 (see diagram overleaf)
2. Set S1 OFF
3. Set Rotation to 0
(sounds "dit dit dit " S for SET alarms)
4. Press HI
(If alarm is already set the pen will move to indicate previous value)
(sounds "dit dit dit dit" H for HIGH alarm)
(Pressing Accept will keep the old setting)
5. Press HI/LO until the pen is at the desired HI alarm value
6. Press ACCEPT
(sounds "dit dit dit" O for OK)
(Pen will now return to indicate temperature)
7. Press LO
(If alarm is already set the pen will move to indicate previous value)
(sounds "dit dah dit dit" L for LOW alarm)
(Pressing Accept now will keep old setting)
8. Then press HI/LO until the pen is at the desired LOW alarm value
9. Press ACCEPT
(sounds "dit dit dit" O for OK)
(Pen will now return to indicate temperature)
10. Return Rotation Switch to the required chart speed

3.0 Setting a Pen Offset (if required)

1. Start with Rotation set to 1
2. Set S1 ON
3. Set Rotation to 9
(sounds "dit dah dah dit" P for pen offset)
4. Press HI or LO until pen indicates desired value on the chart.
5. Press ACCEPT, sounds "dit dah" A for Accept
6. Return ROTATION to the required chart speed
(pen will now move to indicate temperature with the pen offset)
7. Set S1 OFF

4.0 Remove the Pen Offset

1. Start with Rotation set to 1
2. Set S1 ON
3. Set Rotation to 9
(sounds "dit dah dah dit" P for pen offset)
4. Press Accept and the offset will be zeroed
5. Return ROTATION to the required chart speed
(pen will now return to indicate temperature with no offset)
6. Set S1 OFF



START UP PROCEDURE:

The chart recorder is delivered in "Transport / Sleep mode". To activate the chart recorder, please turn the "Rotation" button to position 3 (for 7 days operation).

Functions:

Accept / Alarm set Button - When in alarm pressing the **Accept / Alarm set** button will cancel the Alarm Sounder but the Alarm Relay will remain in its alarm condition until the temperature returns to normal. To accept an alarm press and hold the **Accept / Alarm set** button until the sounder stops.

Paper Advance - If there is no alarm sounding, pressing and holding the **Accept / Alarm set** button will advance the Chart. If there is an alarm you must cancel it first by pressing and releasing the **Accept / Alarm set** button, then pressing and holding it will advance the Chart.

Arm Displacement - The pen arm mechanism is protected against rough handling by a clutch mechanism. If it is suspected that the pen arm has been moved by rough handling or inappropriate use then the pen alignment procedure 1.0 should be carried out.

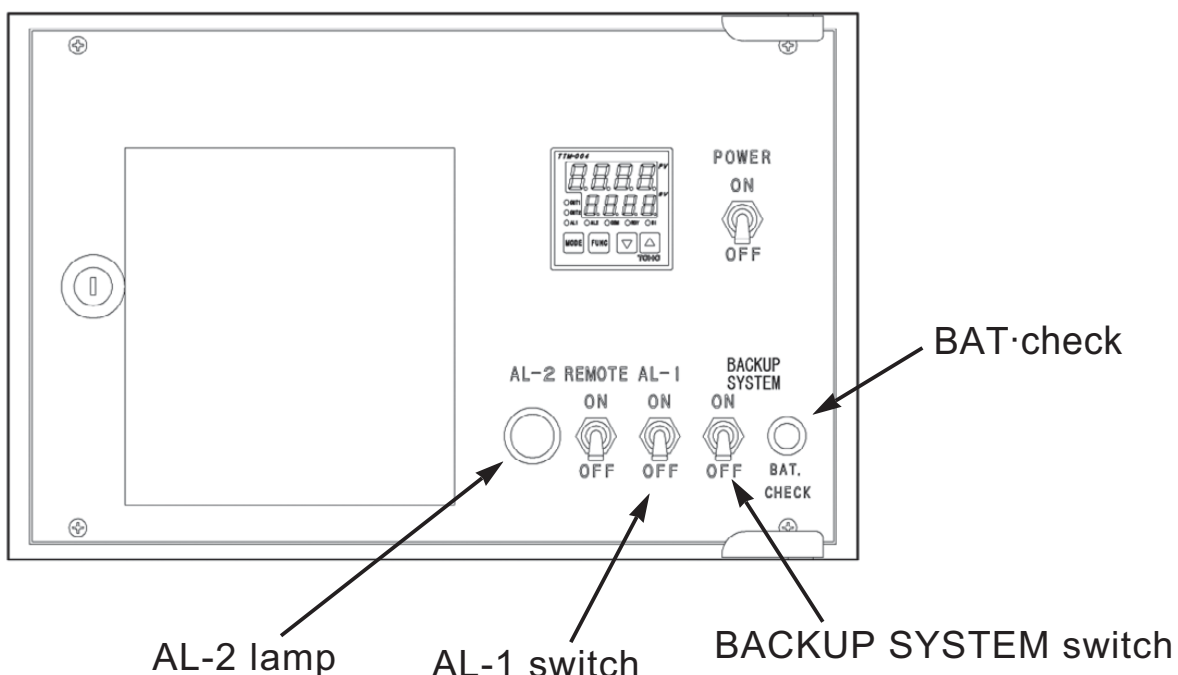
Dismantling will invalidate the warranty

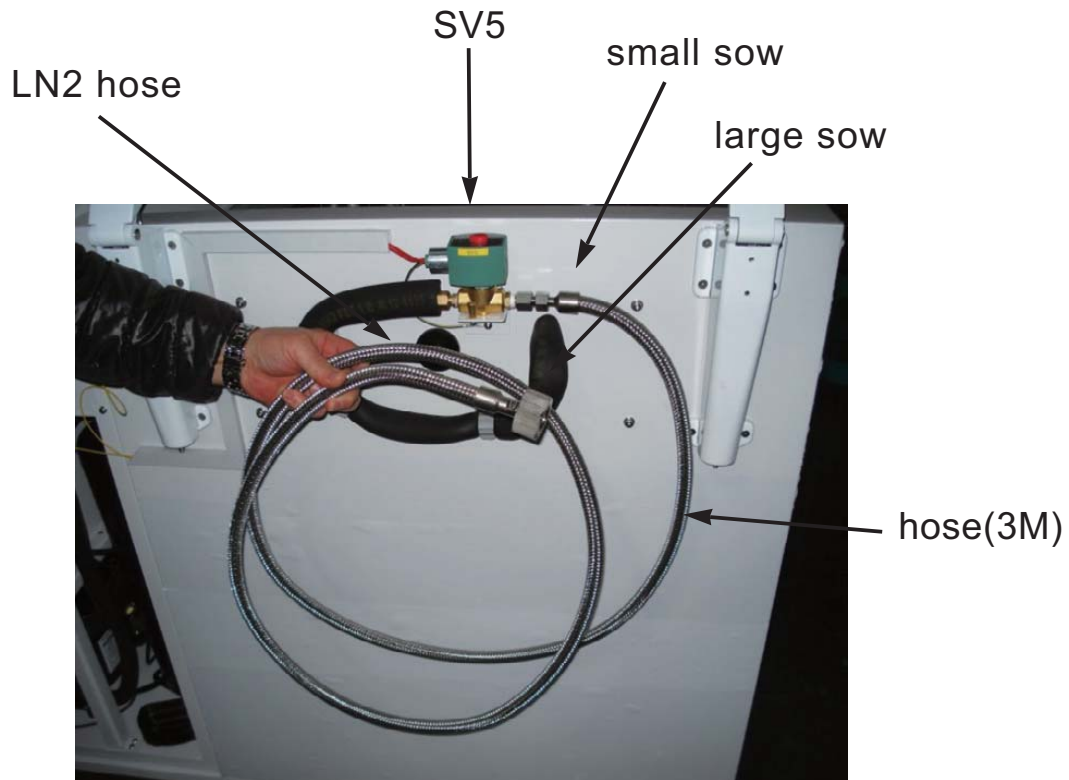
Explanation on Automatic Cooling Auxiliary Device (LN2)

The product of -150°C has an automatic cooling auxiliary device as standard. As to an automatic cooling auxiliary device, the inner temperature of a freezer rises, a magnetic valve connected to LN2 cylinder opens when the temperature reaches -130°C, an alarm buzzer goes off and at the same time LN2 sprays from 2 nozzles of a freezer. The inner temperature of a freezer while LN2 sprays intermittently keeps around -125°C~-135°C.

1. Installation of LN2 cylinder and hose connection

- A pressurized nitrogen cylinder is used for a LN2 cylinder
- Turn off AL-1 switch, REMOTE switch, and BACKUP SYSTEM switch on a control panel.
- Connect the sow block (small sow block) on the end of an automatic cooling auxiliary device hose (3M) to a magnetic valve (SV5) and clap up firmly with a spanner not to have a leakage. Then, connect the large sow block on the end of a hose to a cylinder, clap up firmly with a spanner not to have a leakage.
- If a user opens a liquid purge valve of a cylinder, LN2 fills up to a magnetic valve (SV5) via the hose of an automatic cooling auxiliary device.





The temperature under which an automatic cooling auxiliary device operates is set as -130°C . When the inner temperature of a freezer reaches a setting temperature, a magnetic valve opens and LN2 sprays into a freezer.

Ask LN2 cylinder installation work to a high pressure gas expert.

If there's garbage or metal powder in a connecting hose or connecting metal, a magnetic valve is clogged and LN2 is leaked or a magnetic valve becomes defective. Ask a high pressure gas expert to be extra careful of garbage or metal powder for installation

2. Operation check

- When the connection to a cylinder is done, start operation and cool the inner temperature of a freezer down below -130°C .
- If the inner temperature of a freezer reaches below -130°C , turn on AL-1 switch and BACKUP SYSTEM switch.
- To check LN2 spray, turn on BACKUP SYSTEM switch and check if LN2 sprays only while BAT
 - CHECK button is pressed
- If a user opens a door upon LN2 spray, spray stops temporarily as per the operation of Door Limit Switch on the rear door, and if a door is closed, spray starts again.

Ensure to use a cylinder stand for cylinder installation, or use after fixing a cylinder firmly. Otherwise, a user may be injured by a fall or an unexpected accident may occur because of cut connecting hose and scattered LN2.



The power of an automatic cooling auxiliary device uses a chargeable battery (lead storage battery). The life of a battery is approx. 3 years. Inquire of a store where a user bought it for replacement.



Install it where sufficient ventilation is possible. Ensure to ventilate since there's a risk of hypoxia or gas poisoning due to N₂ gas discharge while an automatic cooling auxiliary device is running.

Also, even when an auxiliary cooling device is not running, N₂ evaporation gas is generated. Always ventilate the installation place.

3. Common use of alarm boozer, alarm lamp

The alarm boozer and the alarm lamp of the product with an automatic cooling auxiliary device use the alarm in common as 5-type alarm system.

[Alarm boozer going off, where a lamp is on]

① Inner temperature anomalies of a freezer (setting temperature above +15°C) The inner temperature of a freezer rises while running by +15°C or above than the setting temperature.
Eg : Where the set inner temperature of a freezer is -150°C, an alarm boozer goes off at -135°C (alarm boozer 1)

② Freezer overload

Where the thermal relay of an electron switch for a freezer runs and a freezer doesn't start, AL-2 lamp (red) is on.

③ Fan motor anomalies

Where a fan motor lacks rotation or stops, alarm boozer 1 goes off and AL-2 lamp (red) is on.

④ The Automatic cooling auxiliary device runs (anomalies of freezer inner temperature above -130°C)

If the inner temperature of a freezer is above -130°C while BACKUP SYSTEM switch is on, an alarm boozer goes off (where LN₂ cylinder is correctly connected, LN₂ sprays into a freezer).

⑤ Blackout alarm

Alarm boozer goes off where the power is down while AL-1 switch is on.



If an alarm boozer or an alarm lamp goes off, inquire of the service center immediately.

Trouble shooting



Under no circumstances should the appliance be disassembled, repaired, or converted by unqualified people. Failure to follow these instructions may cause personal injury and/or loss of property due to malfunctions, electric shocks or fire.



Should the appliance malfunction, stop the operation, and then pull out the power plug or turn off the power supply at source. Continuing to operate the appliance when it shows signs of malfunctioning may cause electric shocks or fire.

Check the following :

1. When the appliance does not cool down at all:

Is the power plug fully inserted into the outlet?

Is the fuse or circuit breaker disconnected? Has there been a power cut?

Is the power switch turned off?

2. When the appliance shows poor cooling performance:

Does the set temperature correspond to the desired temperature?

Is the appliance placed out of direct sunlight? Is the appliance placed away from any source of high temperatures?

Is there enough space around the appliance for good ventilation?

Have any materials, which were at room temperature, just been put inside the freezer?

Has the door been opened and closed frequently?

Is the appliance too full?

3. When the appliance generates unusual noise:

Is the appliance installed on a firm and level floor?

Is the appliance leveled properly?

Is there sufficient space between the back and sides of the freezer and the adjacent walls?

Check the above. If the problem remains, contact your sales agency.

- Model Name ? See the sticker on the right
- Serial Number ? See the sticker on the right
- Breakdown Symptoms ? Describe in as much detail as possible.

Trouble Q&A

Question	Answer
<p>1. A freezer doesn't cool at all (Temperature display is not on)</p>	<p>Check the power source as : -</p> <ol style="list-style-type: none"> 1) Isn't the power plug pulled out? 2) Isn't the breaker switch off? 3) Isn't power is out? 4) Isn't the power on/off switch of a main body off?
<p>(Temperature display is on)</p>	<p>Check inside of a machine room immediately since there's a possibility of machine anomalies</p>
<p>2. A freezer cools but not enough. (The temperature doesn't come down to a set temperature)</p>	<ol style="list-style-type: none"> 1) Isn't the product installation indoor temperature (ambient temperature) too high? This product is designed to perform the fixed cooling capacity under +30°C of the ambient temperature. It's desirable that the ambient temperature maintains +20~25°C and if the ambient temperature is more than +30°C such as in summer, cooling capacity declines. Maintain a proper ambient temperature. 2) Isn't the product installed close to a wall? Upon installation, no clearance causes radiating fault, so there's a case of not performing cooling capacity enough. Secure min. 25cm for the rear, 10cm for both sides, and 120cm for ceiling as clearance. 3) Faulty fan motor leads to faulty cooling. (Refer to Q5-2) 4) Contaminated radiator with dust or clogged gallery cause faulty cooling. Clean radiator, gallery.

	<p>5) Didn't you put too many things of room temperature in a freezer?</p> <p>In this case, the inner temperature of a freezer rises temporarily and a temperature alarm may not go off depending upon the storage volume. In that case check the temperature change with 1-2 hours' time interval.</p> <p>In case of storing a lot of substance which doesn't simply coagulate even under the freezing point such as cold storage packs, there are cases that it won't freeze up even after running more than 24 hours. It's because load is excessively greater than the cooling capacity of the product. Such use causes a breakdown.</p>
<p>3. Covered with frost</p>	<p>It's not rare when there are frequent door open/close and high humidity. If frost is too much and serious, check as follows.</p> <p>1) Check if there's a gap between door lute and main body with a door closed. If yes, frost forms by air with moisture getting into a freezer.</p> <p>If this frost is left as it is, it will increase more and closing a door gets worse, which will then cause frost again : vicious circle. In this case, turn off the power first, have frost melt completely and wipe moisture with dry towel thoroughly.</p> <p>Also, in case of removing frost while the power is on, use the frost removal spatula etc. Refrain from removing frost with a sharp tool. If using a sharp tool, the evaporator or a refrigerant pipe is damaged, which may lead to gas leakage.</p> <p>2) Check if there's any dented lute part due to frost forming around a door.</p> <p>If yes, mend the dented lute part using a hair dryer, etc.</p> <p>If it won't be mended smoothly, replace a lute or a door.</p>

4. A door doesn't open	Sometimes a door doesn't open when a user tries to open again right after closing it, It's because warm air getting in to a freezer when a door is open cools rapidly and contracts, and the pressure in a freezer declines temporarily. Namely, the phenomenon of a door being dragged and sticking to a freezer (sound pressure state). Open a door after a while.
5. Strange sound comes out of a machine room	<p>1) Check if there's any foreign substance inside a machine room. There are cases when noise comes out because of a foreign substance stuck in radiating fan motor such as paper, vinyl, etc. In that case, ensure to turn off the power and remove the foreign substance.</p> <p>2) In case of scratchy sound, vibrating sound, check inside a machine room, confirm the cause and actions accordingly.</p>
6. There's a difference between the displayed temperature on a main body and that of a separate sensor	As this product adopts natural convection type, the temperature inside of a freezer differs depending upon a point where a temperature is measured. Also, even at the same point, temperature changes constantly. That's from the difference of sensor type, sampling cycle, etc.
7. Does it reset automatically after blackout?	<p>This product automatically resets after blackout if the switch remains as in operation..</p> <p>No special control with a controller, etc. is required.</p>
8. Where the main body display temperature shows	The main body temperature sensor inside a freezer has a short circuit. In that case, the main body display temperature shows 「----」 because of consecutive operation. Replace a sensor.

<p>9. Main body display temperature is lower than set temperature (excessive cooling)</p>	<p>Faulty controller. Replace it.</p>
<p>10. Chart of a thermograph isn't transferred. No record on a chart.</p>	<p>Refer to the user manual of a manufacturer</p>
<p>11. An automatic cooling auxiliary device doesn't operate even when the main body display temperature rises.</p>	<p>1) Check if [AL-1] and [BACKUP SYSTEM] on a control panel are ON. As the automatic cooling auxiliary device works with an alarm device, it doesn't work if [AL-1] is off.</p> <p>2) Check if a main body door is open. If a main body door is open by the operation of LN2 spray stop door switch of the rear main body, LN2 won't spray.</p>
<p>12. An alarm buzzer sounds and an alarm lamp is turned on</p>	<p>1) Increase of the inner temperature of a freezer</p> <p>2) Fan motor anomaly backup</p> <p>The anomaly of a radiating fan motor will be remedied under the following conditions.</p> <p>In case of the insufficient rotation or stop of a fan motor during operation, an alarm buzzer sounds and AL-2 lamp(control panel) is on. Cooling is maintained as an auxiliary fan runs and an alarm buzzer sounds at the same time, but an alarm buzzer will continue sounding (alarm hold circuit).</p> <p>In case of stopping a buzzer, turn off the power switch.</p> <p>Continue operation by turning on the power switch after the alarm buzzer stops.</p> <p>Request for fan motor repair after checking the alarm buzzer and the AL-2 lamp ON.</p>

	<p>Fan-Motor: UF25GC23BTH (230V Ball type) Ball=bearing (Fulltech Company)</p> <ul style="list-style-type: none"> • As to the alarm buzzer, it will sound when the piping temperature reaches $+70^{\circ}\text{C}(\pm 5^{\circ}\text{C})$ on the bimetal thermometer attached to the piping of high pressure (the front piping with the front gallery of a machine room detached). <p>3) Freezer overload :</p> <p>Where a freezer doesn't work due to a certain reason, a thermal relay of a magnetic switch for freezer operation will run.</p> <p>Check the inside of a machine room and a freezer.</p> <p>If there's no anomaly in a freezer, a user can resume operation by pressing the protruding thermal relay switch.</p>
<p>13. The operation sound will change about 1 min after the start of operation.</p>	<p>Movement of the bypass circuit for unblocking</p> <p>The bypass circuit for unblocking is mounted for the following reason.</p> <p>Hydrocarbon refrigerants melting in freezer oil will boil being exposed to high temperature and high pressure upon the start of operation. The refrigerant melting in oil flies actively and moves into the high pressure pipe. At this time, oil (high concentration) moves into a high pressure pipe together and passes a capillary, which may cause blocking/clogging. To prevent this, place a bypass between BC (block condenser) and driver and install SV. Upon the start of operation, SV opens simultaneously and the refrigerant moves to the low pressure and returns to a freezer via SV. By running this move for 30 sec to 1 min, oil will be blended well with refrigerants which decreases blocking/clogging. The operation sound will change once SV is closed.</p>

Maintenance

◀ Cleaning the freezer



Before cleaning the appliance, you must unplug it and take out all the stored materials. Then, open up the door to defrost the appliance.

- Prepare lukewarm water containing a small amount of neutral detergent. Soak a cloth in the water, wring it out, and clean the door. Remove any remaining water with a dry cloth. Keep the door open until it is completely dry. Do not use any polisher.
- Clean the door gasket with water and dry it regularly. Do not use oil or grease, since the gasket may get damaged or ripped.
- To clean the exterior of the freezer, use any commercially available wax cleaner. However, make sure that the wax does not touch any plastic parts of the appliance.



The condenser and compressor are very hot. Do not touch any part of them, or you may suffer burns.



Make sure that any electrical parts do not come into contact with water. Failure to follow these instructions may lead to electric leakage or breakdown.



Do not use the following substances:

Thinner, benzene, alcohol, petroleum, powder soap, polisher, alkaline-detergent (Including mild ones), hot water, acid, scrubbing brushes, etc.

- The above mentioned substances may damage the paintwork and plastic surfaces of the appliance. Especially, Alkalescent detergents may transform the plastic surfaces. Follow precautions in using a chemical rag. Clean inside the compressor room (in particular, condenser) with a vacuum cleaner at least once a year.

The following things do not indicate breakdown

- You may hear the noise of water flowing.
This noise comes from the refrigerant circulating around the cooling system. Even when the compressor is not working, there may be a flowing noise.
- The external door may become heavier or impossible to open immediately after being shut.
The air that entered into the freezer is cooled down rapidly, so the pressure inside it becomes lower than that outside temporarily.
 - Do not try to open the door forcibly and wait for some time.
- Condensation appears on the surfaces of the appliance.
This happens in a condition of high humidity, when the doors are opened and closed frequently, or when the stored materials have high moisture levels. Wipe it off with a dry cloth.
- The front and sides of the appliance are warm or hot.
The front and sides of the appliance contain built-in hot pipes that radiate heat and reduce condensation on the outer walls. The temperature of stored materials is not affected by the regular functioning of these pipes.
- The alarm goes off after putting in or taking out materials.
When large quantities of materials are taken out or put in at the same time, and the doors are kept open, the alarm goes off. After a while, the inside temperature will go back to the set point and the alarm will be deactivated. To stop the alarm temporarily, turn off the "ALARM" switch.

Moving and Reinstalling the Freezer



When you need to move the appliance, consult your sales agency or qualified experts. Imperfect reinstallation may cause electrishocks or fire.



When you need to move the appliance, make sure not to tilt it or let it fall over. Failure to follow these instructions may lead to personal injury and/or property damage.



When you need to move the appliance, pull out the power plug from the outlet, taking care not to damage the power cord. Damage to the cord may lead to electric shocks or fire.



Before moving the appliance, remove all stored materials from the freezer.



When you need to move the appliance, do not lay it on its side, since this may become a cause of a breakdown.



Power cut

- Limit door opening as much as possible.
- Do not put any new materials into the freezer. It will make the inside temperature higher.



Turning off the appliance for long periods

- Clean the inside of the freezer and leave the doors open for 2~3 days until the inside is completely dry in order to avoid mold or unpleasant odors.



Repair of scratches on the painted surface

If you leave the damage as it is, rust will occur. Take action immediately. (Simple measures)

- Seal a small damaged area.
- Cover with a water-proof wall paper for a big damage area (First, remove any rust with sandpaper).



Disposal of the appliance

- Remove the door hinges and the gasket.
- Do not leave the appliance in a place to which children have easy access.
- Contact a qualified scrap merchant for disposal.

Specifications

Name	of product Freeze Ultra Low Temp Chamber(-150°C) double cooling system	
Type	CRYO 170-0	CRYO 230-0
Cooling function	-140°C ~ -150°C	
Cooling Approx	Approx. 172L	Approx. 233L
Extern. dimension	W1420xD960xH1090	W1600xD960xH1090
Inner dimension	W500xD500xH685	W680xD500xH685
Exterior	Electronic galvanized sheet(acrylic coating)	
Interior	Stainless steel sheet	
Insulator	Rigid foam polyurethane	
Inner cover	Polystyrene resin 1 sheet	Polystyrene resin 2 sheets
Compressor	1100W x 2	
Cooler	Pipe on sheet	
Condenser	Pinless block condensor	
Refrigerant	Mixture refrigerant (HFC)	
Radiant value		
Power		
Operation current		
Rated power consumption		
Suggested power capacity	Mixture refrigerant (HFC)	
Power cord · plug	Refer to the picture below	
Thermostat	Digital temperature indicating controller	
Temperature alarm · blackout alarm	Boozer alarm upon blackout and temperature increase (upon +15°C increase from the set temperature), battery charging type 2.5V(48 hour operation), including an alarm signal output jack (zero voltage A contact)	
Double cooling system anomalies alarm	Lamp (red) light on upon electric anomalies of a cooker	
Fanmotor anomalies alarm	Digital temperature indicating controller	
Automatic cooling auxiliary device	Responding to LN2(pressurized cylinder)	
Weight	Approx. 374 kg	Approx. 391 kg
Components, etc	Key - 2types (2 each), 4 casters, 2 adjusters, access port rear 1 small (φ20mm)	

1. The cooling function of the above specifications is under the ambient temperature of +30°C without a load.
2. Operation current, power consumption are under the ambient temperature of +30°C lowest temperature, zero load, stable condition.
3. This specification is subject to change without prior notice for improvement.

Electric Wiring Diagram

Bz2	DC12V Buzzer
R1-3	Support Relay
TC2OUT	Temperature Controller Output
DPSW	DOOR Switch
Pt2	Temperature Sensor (Pt100Ω)
TC2	Temperature Controller
SV5	Solenoid Valve
SVSW	Solenoid Valve Switch
Th2	Thermostat
PB	Push Button(BAT CHECK)
Bz1	DC12V Buzzer
BzSW	Buzzer Switch(AL-1)
BAT-1	Battery(DC12V)
CHG-1	Battery Charger

If the Auto Back-up System is Installed (LN2)

R1	Support Relay
RSW	Switch Remote Control
TP	Terminal Output Signal

SIMBOL	DESCRIPTION
Remote	

ThSW1-2	Thermo Switch(50VA)
T1	Transformer(220V → 100V)

SV1-4	Solenoid Valve
PSW1-2	Pressure Control Switch

RL	Error Lamp(AL2)
T1-3	Freezer Delay Timer

COMP1-2	Compressor(φ3 220V)
TH1-2	Thermal Relay

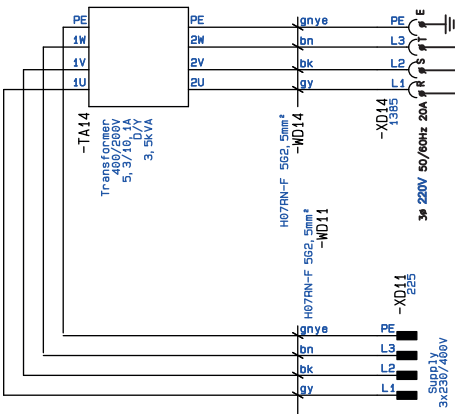
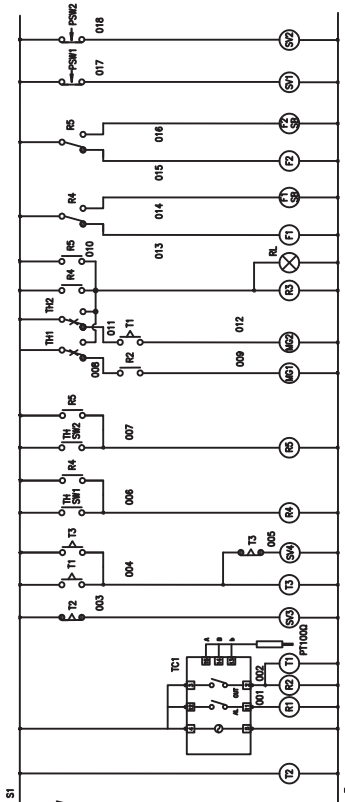
F1sb.F2sb	Support Fan Motor
F1-2	Fan Motor

CS	Power Outlet
R1-5	Support Relay

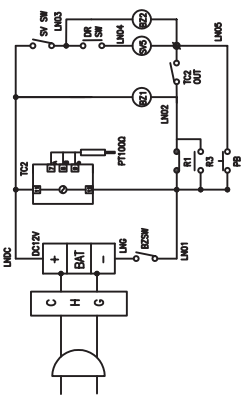
Mg1-2	Magnet Relay
Pt1	Temperature Sensor (Pt100Ω)

TC1	Temperature Controller
PSW	Power Switch

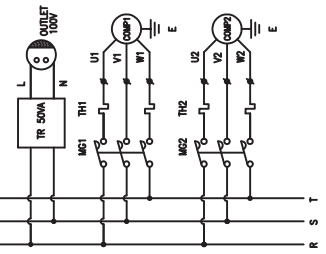
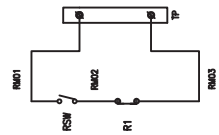
SIMBOL	DESCRIPTION
MAIN	



If the Auto Back-up System is Installed (LN2)



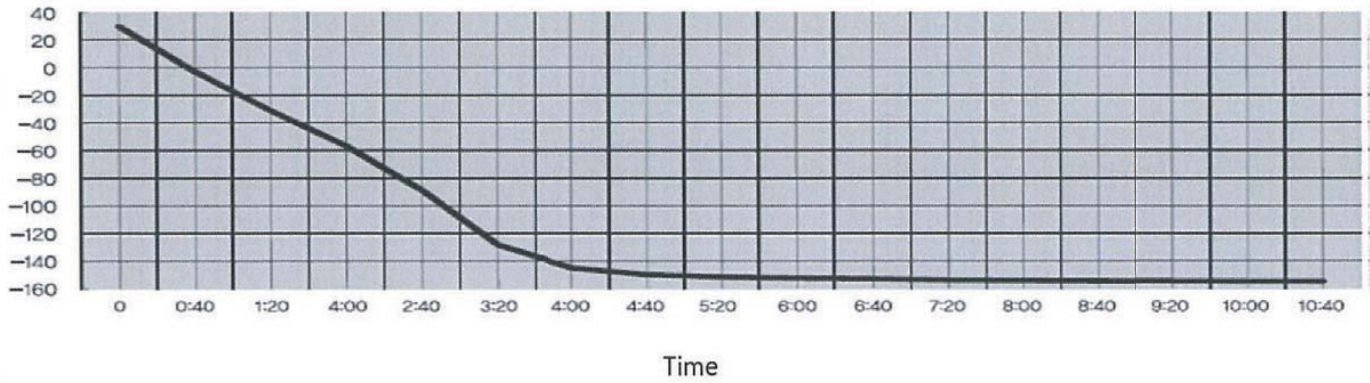
REMOTE (Remote Switch)



Test data

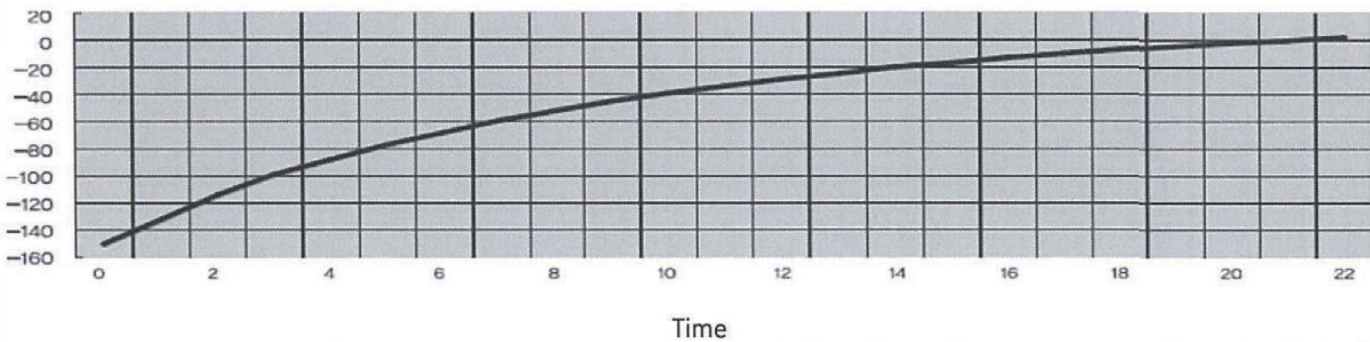
Pull down data CLNCRYO0170E & 3CRYO230-0

Temperature(°C)

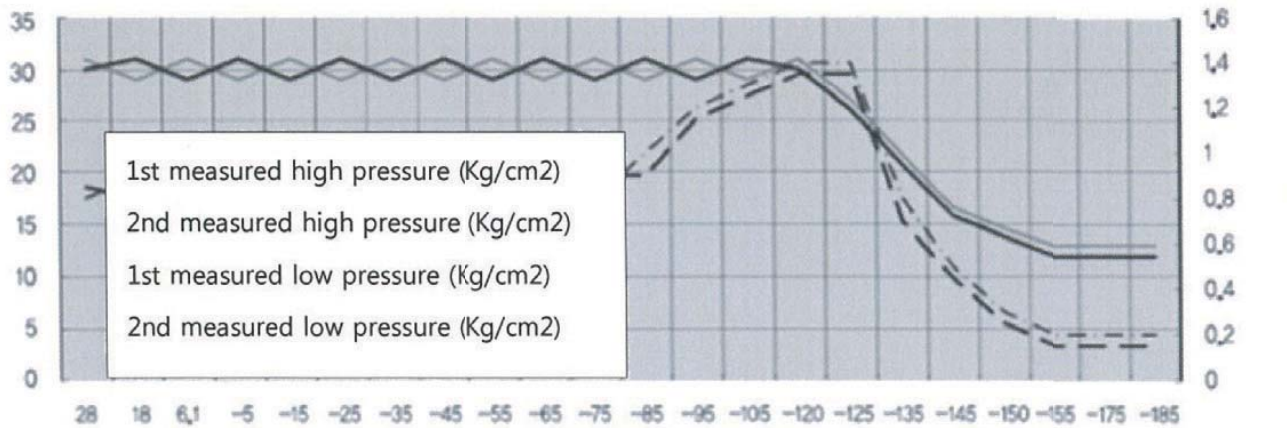


Pull up data CLNCRYO0170E & 3CRYO230-0

Temperature(°C)



Temperature-pressure data CLNCRYO0170E & 3CRYO230-0




high pressure(Kg/cm²)

temperature (°C)

low pressure(Kg/cm²)



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