

OPERATING INSTRUCTIONS

DP-80 CRYO PORTER

ARCTIKO

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Safety Precautions

- For your own safety, please read through these safety precautions, prior to actual operation.
- The following icons are the signs to avoid and prevent death, personal injury to others, or damage to property. Read and follow these safety precautions carefully before use and use this product accordingly. These precautions are classified as “DANGER”, “WARNING”, and “CAUTION”, depending its level. As these signs are extremely important for your safety, follow each instruction.

Risk Signs & Precaution



DANGER

Risk of Death or Severe Injury, when used in wrong way, and/or if precautions are ignored.



WARNING

Risk of Serious Injury, when used in wrong way, and/or if precautions are ignored.



CAUTION

Risk of Serious Injury, when used in wrong way, and/or if precautions are ignored.

Icon Examples



Prohibited

These icons tell you the following actions are NOT allowed and AVOID doing so. Specific actions you should take are also mentioned nearby.



Disassembly
Prohibited

These icons tell you the following actions are NOT allowed and AVOID doing so. Specific actions you should take are also mentioned nearby. (Ex: “Do NOT disassemble.”)



Careful for
Pinching

These icons are to instruct or enforce proper actions to take, Or call your attention followed by the risk signs such as “DANGER”, “WARNING”, or “CAUTION”. Specific actions you should take are also mentioned nearby.



Pull out



DANGER



Prohibited

Do NOT use the power cable except the one supplied with this product.

Danger of electric shock or short circuit causing fire, if any other power cable is used. Use the proper power cable for the required voltage in the area/region.

Do NOT use the wrong fuse. Use proper fuse for the required voltage.

Using the wrong fuse can result in short-circuit causing fire. Initially installed fuse on this unit is 0.4A fuse for 220-240V. DO NOT operate the unit at 100-120V without changing the fuse. At 100-120V, the fuse has to be changed to the 0.75A fuse, which is attached as the accessory.

Do NOT use a socket splitter or extension cable.

Voltage drop and the unit may stop working, or may cause fire. If there is any unavoidable reason to use extension cable, enough electrical capacity is required.

Do NOT touch or intend to operate this product with wet-hands.

There is danger of electric shock if you touch with wet-handed.

Do NOT operate with inappropriate voltage.

Wrong voltage may cause excessive heat of uncertain part of the unit, electric shock, short circuit, or unpredictable fire. Check the operating voltage of the product and used area before turning the power ON.

Do NOT damage the power cable.

Do not cut, damage, modify, sharply bend, twist or knot the power cable. Also, placing heavy objects on the cable or forcing it into small spaces will damage the cable, which may result in fire or electric shock

Keep the unit out of direct sunlight or immersing in rain and snow.

UV rays and excessive heat may cause damage to the unit. Operating in rain and/or snow may cause danger of electric shock or risk of short circuit.

Do NOT insert any foreign objects/materials inside of the unit.

If any foreign object like water, metal items, or flammable items objects like paper is brought in the air outlet vent, it may cause fire, electric shock, or malfunction. If any of these objects is brought in the unit and cannot be taken out, immediately disconnect the power plug and call for repair.



Disassembly
Prohibited

Do NOT disassemble, repair, or modify this unit.

This unit must not be disassembled, repaired, or modified by anyone except our repair technician. Risk of combustion, electric shock, or malfunction causing injury. If any of these incidents occurred by disassemble, repair, or modification without our permission, responsibility of the result is at your own.



WARNING

 Prohibited	<p>Do NOT use the unit near any flammable items. Keep flammables away from the unit. Do not operate the unit near the flammable items such as gasoline, gas, thinner, or aerosol spray. Danger of explosion from these flammables.</p>
	<p>Do NOT use a socket splitter or extension cable. Voltage drop and the unit may stop working, or may cause fire. If there is any unavoidable reason to use extension cable, enough electrical capacity is required.</p>
	<p>Do NOT use the unit on a surface tilted or with the side-surfaced up. Operated in these position is prohibited. It may result in dropping the unit, and/or malfunction.</p>
	<p>Do NOT touch the container (i.e.: Aluminum Block)/parts when it is frozen to ultra-low temperature range. Do not touch the part/area concerned to be frozen (such as Aluminum Block, or other container) directly with bare-hands. Risk of frostbite and/or serious burns. When it is necessary to touch these part/area, do it so only after the part/area is completely defrosted, or make sure to use the dry cloth when it is necessary to do so before defrosted. Putting on the rubber gloves is the most recommended for your own safety.</p>
	<p>Do NOT insert any food or animal inside of the unit. This unit is for the purpose of keeping samples/objects in tubes or schales, not for keeping foods or animals. To insert foods in any place of the unit and/or animals are strictly prohibited.</p>
 Careful for Pinching	<p>Be careful for your hands/fingers not to be pinched when closing the lid. Gently close the lid, to avoid pinching your hands/fingers. Attention required to prevent pinching your hands/fingers while the lid is open.</p>
	 Attention
<p>Always check and confirm to use the proper cable for the required voltage prior to operate the unit. Using wrong power cable at the wrong voltage may cause fire, voltage drop leads to operational abnormality, or unexpected harmful accidents.</p>	
<p>Keep the unit out of humidity and/or dusts. If inside of the unit is dust-covered especially at high humidity, it may cause damage the parts, short circuit, or unpredictable fire. (Humidity: Max. 85%, without condensation.)</p>	

**Attention****Take enough provisions before setting the unit.**

Place the unit on flat, solid, stable, and spacious surface. If the area to set the unit is narrow, the unit may be dropped off and causes unpredictable accidents. If used in a vehicle, take enough provisions to prevent dropping off from the set place when any sudden stop/curve happened. Dropping may cause malfunction.

Defrost the Aluminum Block, after turning the power OFF.

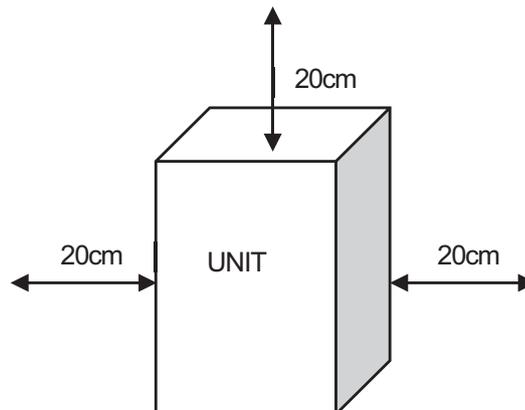
Defrost periodically, for better temperature accuracy. To defrost the Aluminum Block, turn the power OFF, wait until it is completely defrost and wipe the frost/moisture away with soft cloths. If it is in a hurry, take the block out with the rubber-gloves or soft cloths, and soak it in lukewarm water.

In case if any abnormality is noticed;

If any abnormal noise, smell, and/or smoke is occurred/noticed, stop operation, immediately disconnect the power plug and call us for repair.

Place the unit at well-ventilated, cool environment.

Do not block the air vent with any disturbed object. Operating the unit at ill-ventilated and narrow area, or with anti-dust object covered on, may overheat the inside of the unit and/or may cause insufficiency of the exhaustion, occurring overheat the whole unit, unpredictable fire, accidents, malfunction.





CAUTION

	<p>Do NOT place the unit on high places when you store the unit. When you store the unit, avoid placing on high places, like top of the drawer or cabinet. It may risk dropping of the unit.</p>
<p>Prohibited</p>	<p>Avoid long-term preservations of irreplaceable samples/objects. Take extra attention for preservations of the samples/objects. This unit is designed for temporary storage, preparative freezing, or short-distance delivery (by person or by vehicle), as it is not integrated with back-up/save system. Take enough provision for the case if the unit is failed its working by any incidents like sudden black-out or short circuit.</p>
	<p>Do NOT store the unit in a vehicle. Keeping the unit in a vehicle may damage the surface, parts, and/or electrical area of the unit by the room temperature change.</p>
	<p>Handle the power cable gently. When removing the power plug, be sure to hold the end of the plug rather than pulling on the power cable. Check the power cable periodically. When any external damage is noticeable, repair or change the cable promptly.</p>
<p>Attention</p>	<p>Call for check-up or repair when the unit is dropped. When the unit is dropped down from the surface to the floor, stop operation immediately, disconnect the plug, and call for check-up or repair.</p>
	<p>Avoid operating in places under excessive heat. Temperature of contents may rise, causing damage or malfunction. (Recommended Room Temperature: 25°C) *For operating in a vehicle, set the room temperature to 25°C prior to the actual operation.</p>
	<p>Do NOT turn the power ON/OFF consecutively. After turning OFF (including when it is automatically turned off), take at least 30 seconds for another turning ON. Turning the power ON/OFF consecutively causes malfunction.</p>
	<p>Disconnect the power plug, when you store the unit. When you do not use the unit, clean both exterior and interior, cover the unit for prevent dust or foreign objects/materials got in from the air outlet vent, and store it to the place with low humidity.</p>
<p>Pull out</p>	<p>If used in a vehicle, disconnect the DC power cable whenever the vehicle's engine is turned off for extended periods of time. In some cars, the power does not turn off automatically after switching off the vehicle's engine. Always make sure to turn off the power of the unit after turning off the vehicle's engine.</p>
	<p>To store, disconnect the power plug. For your safety, disconnect the power plug when not using the unit over 14days or more.</p>

Operator Limitation

The following persons are NOT allowed to operate this unit.

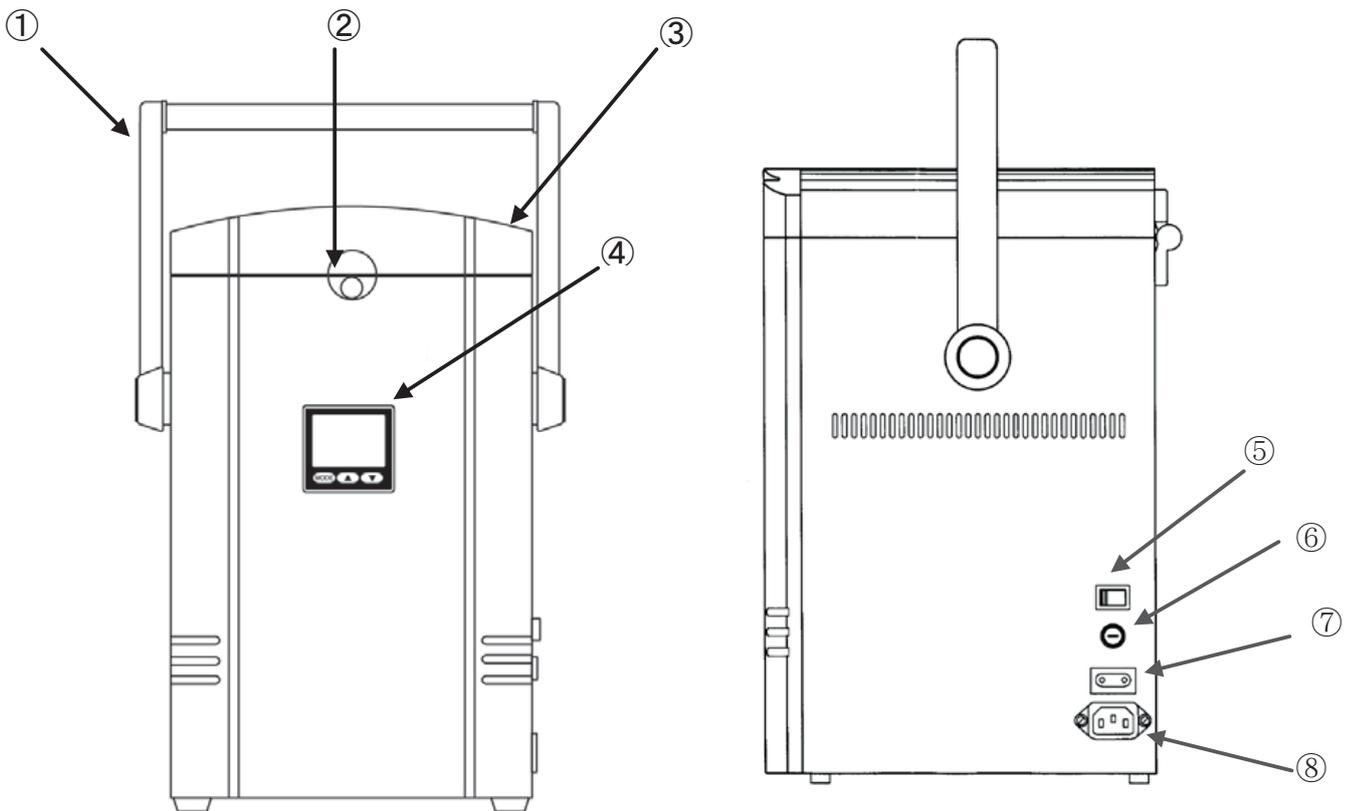
The person who:

- Has/can not read this operation manual thoroughly.
- Is a child under 12 years old.
- Has total or partial blindness.
- Has a sense deficiency of sense of temperature or sense of touch.
- Is a psychiatric patient.
- Is under the influence of alcohol.
- Is under the influence of a controlled substance such as opium, morphine, cocaine, etc.
- Has a heart pacemaker.
- Is not wearing appropriate safety gears, such as rubber gloves.
- Has not had his/her long hair in a know to prevent from being caught to the unit.

Outline of the unit

This unit is Cryogenic Refrigerator “Cryoporter” (Model: DP-80), designed and produced for the purpose of keep the samples/objects at the temperature range between 0°C to -80°C at the laboratory. Do NOT use this unit for any other purpose.

This unit is portable, it is able to keep the desired temperature when it is operated with the car battery using DC12V cigarette lighter plug. However, when used this unit in a vehicle, it is necessary to pay extra attention on driving the vehicle. For your safety, and in order to use the unit with maximizing its operational ability, carefully set the unit as instructed on this operation manual.



① Handle For carrying the unit.	⑤ Main Power For Turning ON/OFF.
② Lid Latch & Operating Button Push the button and pull up the lid.	⑥ Fuse Holder For Anti-Overcurrent
③ Lid Close while operating.	⑦ DC12V Power Socket Plug in the cigarette lighter cable for the use in a vehicle.
④ Temperature Controlling Panel Indicates/controls the current/set temperature.	⑧ AC100 ~ 120V Power Socket Plug in the AC cable.

**Caution: Do NOT use AC Power Cable & DC Power Cable at the same time.
It may cause risk of short circuit or electric shock.**

Safety Function

If abnormal temperature rising occurs during operation in the storage compartment or in the engine room, a buzzer alarm (acoustic alarm) will be turned on, and the **COOLING WILL BE STOPPED** automatically. (Main power shall still remain "ON" until it is turned off.)

In case the unit shows this condition;

*Turn OFF the main power immediately

*Check the unit if there is any blocking objects especially around the air ventilation area behind the unit. (See page 5; "Place the unit at well-ventilated, cool environment" section.)

After checking and removing any blocking objects, turn ON the main power. If the unit still shows the same condition, turn OFF the main power and call for repair.

Checkpoint before Using the unit

For your own safety, check the followings before using the unit every time when it is used;

- Any crack on the unit?
- Any crack, damage, tear on the power cable?
- Any abnormal noise when turning the main power ON?

If any of these abnormalities is noticed, do not use or immediately turn off the unit, and call for repair.

In Case of Emergency

Turn the main power switch (on the left side of the unit) OFF, in case of emergency. In case if any abnormality such as abnormal noise, smell, and/or smoke, etc. is occurred/noticed, stop operation and immediately disconnect the power plug and call for repair.

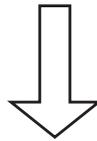
Before Starting Operation

1. Setting Aluminum Block

- 1) Prior to setting this unit, check all optional parts are ready to use at your side.
- 2) Insert the optional “ALB (Aluminum Block) Holding Spacer” into the cooling space before setting Aluminum Block. (“ALB Holding Spacer” is initially equipped at the cooling space.)

NOTE:

Also check there is no any blocking object like paper trash. If there is any blocking item between Aluminum Block and the cooling space, it may cause difficulties to reach to the desired temperature.

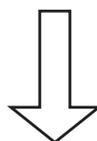


2. Setting Container (Tubes/Receptacles)

- 1) Insert the tube/receptacles to the wells of Aluminum Block.
- 2) After inserting the tubes/receptacles, place the optional “Blocking Lid” on top of Aluminum Block. (“Blocking Lid” is already equipped on top of Aluminum Block at your purchase of the unit.)

NOTE:

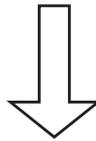
This “Blocking Lid” is for the purpose of blocking absorbing the humidity from the outside of the unit. It is not necessary, but to prevent frosting, we strongly recommend you to place it on top of Aluminum Block while the unit is operating.



Operation

1. When used indoors

- 1) Check the main power on the left side of the unit is OFF, before starting the unit.
- 2) Insert the AC power plug into the AC power socket of the unit.
- 3) Insert the power plug to the household power supply provided, as far as it will go.
- 4) Turn ON the main power.



2. When used in a vehicle, at DC12V

- 1) Set the unit on a flat, solid surface with the lid facing up. Do NOT use the unit on a surface tilted, as it may result in malfunction.
- 2) Insert the power plug to the unit.
- 3) Insert the power plug into the cigarette lighter or accessory socket.
(The unit immediately starts when the power plug and the socket is connected.)
- 4) Connect the plug and the socket and use the unit only when the vehicle's engine is ON.

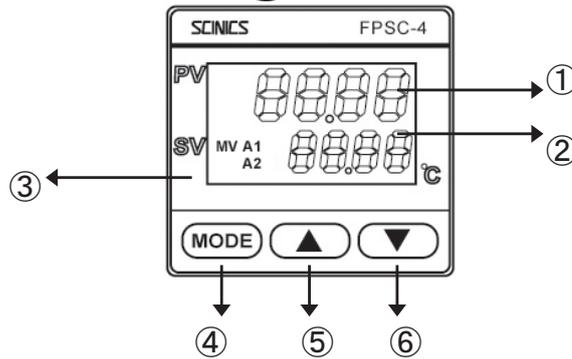
NOTE:

Do NOT connect the power plug into AC plug of the unit. It may consume too much batteries of the vehicle.

Stop Operation

- 1) Turn the main power OFF.
- 2) To disconnect the power plug is recommended, to avoid unexpected fire or accident.

Temperature Settings / Controls



① PV: Processing Value	④ MODE: For Various Settings
② SV: Set Value	⑤ ▼(DOWN): For lower temperature
③ Status:	⑥ ▲(UP): For higher temperature
MV: Monitoring Value	
AT: Autotune is ON	

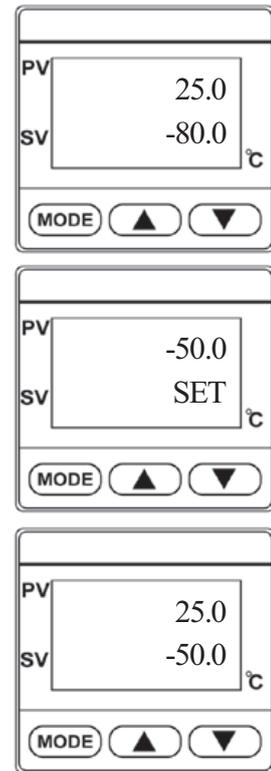
Example: When setting at -50°C (Initial setting temperature is at -80°C .)

1) When the main power turned ON, the display shows the initial setting temperature at each line of "PV" (Processing Value) and "SV" (Set Value).

[Example shows the present temperature of Aluminum Block as 25°C , setting (desired) temperature as -80°C .]

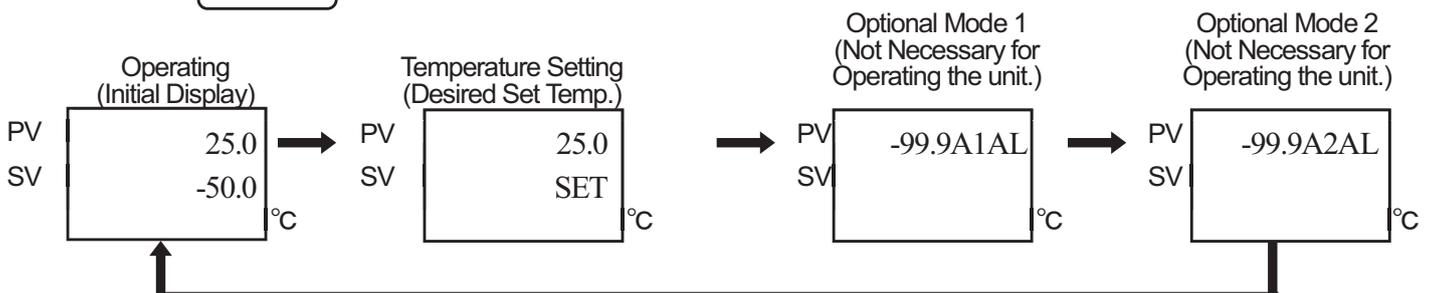
2) Press "MODE" key once, for changing the setting temperature. Press ▲/▼ (Up/Down key) for the desired temperature. Pressing ▲/▼ (Up/Down key) once makes the setting temperature bring up/down 0.1°C . For more faster/wider change of the Setting temperature, keep pressing ▲/▼ (Up/Down key) for a while.

3) Press "MODE" key 3 (three) times, for back to the initial set-up display, and the temperature setting is done. It starts the operation comes to -50°C (setting temperature).



Basic Tip:

Pressing **MODE** key moves to the next stage.



NOTE: "Optional Mode 1&2" are preset at -99.9°C at your purchase of the unit. Do not change the temperature.

Auto-tune

After setting the desired temperature, the unit shall be operated with temperature-controlled. For more accurate temperature controlled operation, setting "PID Auto-tune Mode" is recommended.

After setting "PID Auto-tune Mode", it shall be set PID automatically revise the inequality of the temperature. Unless you prefer to change the setting temperature, it is unnecessary to make auto-tune again.

Setting Auto-tune mode:

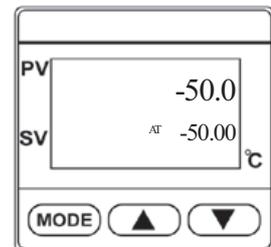
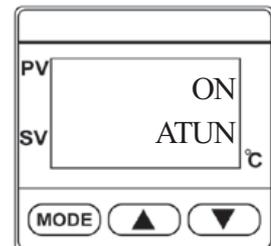
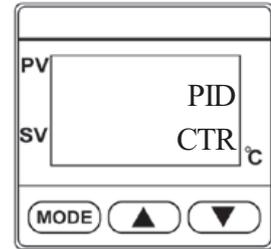
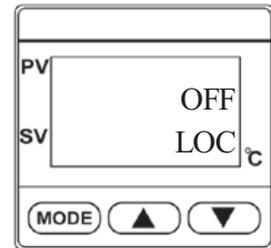
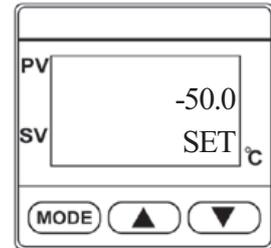
- 1) After setting the temperature following on the previous page, press "MODE" key once, for setting Auto-tune Mode.
- 2) Press "MODE" key longer than 3(three) seconds.
Lower side of the display shows "LOC". At the same time, Upper side of the display shows "OFF". (If it shows "ON", Press ▲/▼(Up/Down key) to choose "OFF". It is preset as "OFF" initially.)
- 3) Press "MODE" key once.
Upper side of the display shows "ONOF".
Press ▲/▼(Up/Down key) until "PID" is shown on the upper side of the display.
At the same time, Lower side of the display shows "CTR".
Press ▲/▼(Up/Down key) until "OTDB" is shown on the lower side of the display.
- 4) Press "MODE" key once.
Upper side of the display shows "ON". At the same time, Lower side of the display shows "ATUN". If the upper side of The display shows "OFF", press ▲/▼(Up/Down key) to choose "ON". It is preset as "OFF" initially.)
- 5) Press "MODE" key once.
"AT"(Auto-tune) is shown on the lower side. Now Auto-tune Mode is set and automatically controls the temperature.

NOTE:

When Auto-tune is finished, "AT" display vanishes.
When Auto-tune temperature is set at near the room temperature, it may take long time to finish or cannot be set. In these cases, re-try setting Auto-tune Mode by setting upper/lower temperature.

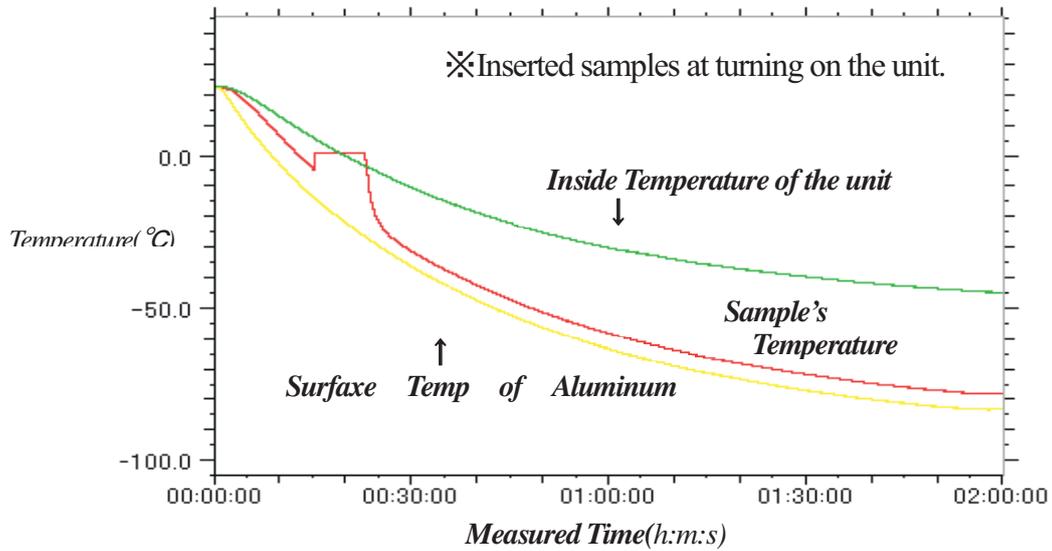
When canceling Auto-tune Mode:

- 1) Press "MODE" key once.
- 2) To go back to the initial display, press "MODE" key 3(three) times.

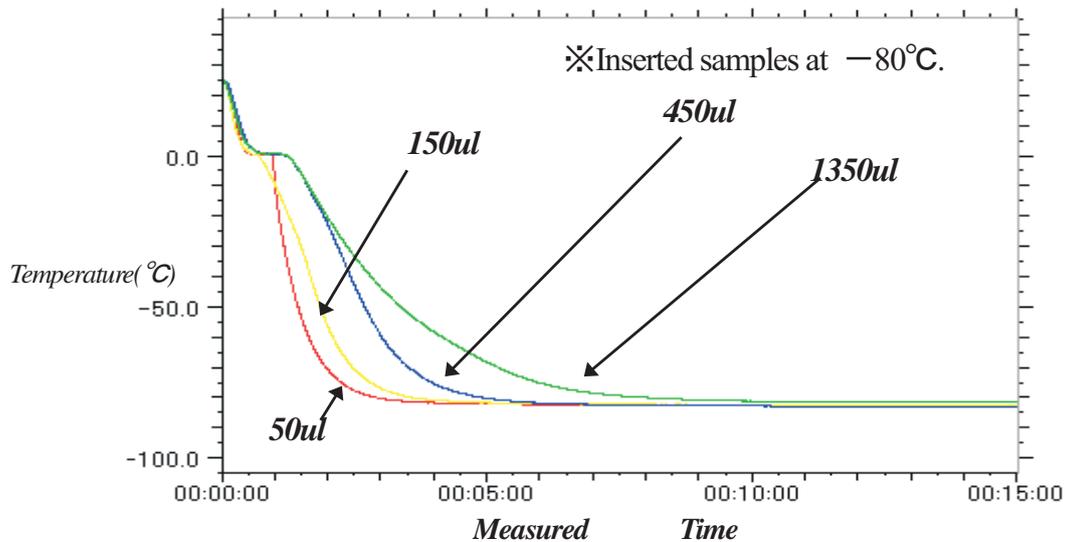


Experimental Data

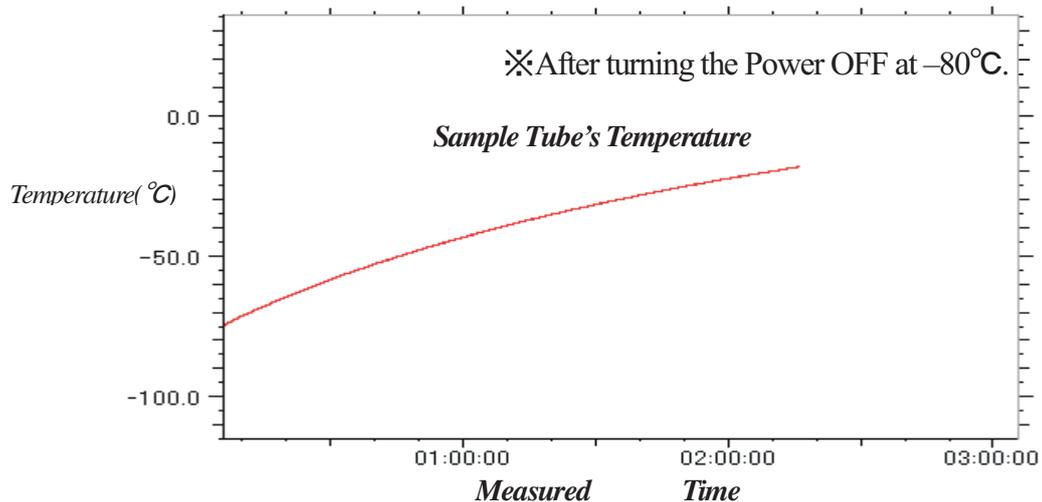
1) Cooling Speed with 1.5ml Tubes(Water:1350ul)



2) Cooling Data of various sized tubes



3) Temperature Keeping Ability with 1.5ml Tubes (Water:1350ul)



Troubleshooting



WARNING

 Disassembly Prohibited	<p>Do NOT disassemble any parts screwed up, or open the back panel. These places/parts must not be disassembled/opened, by anyone except our repair technician. Risk of combustion, shock, or malfunction causing injury. If any of these incidents occurred by disassemble, repair, or modification at your side without our supervision/permission, we cannot take responsibilities.</p>
 Attention	<p>For any necessary repair, contact us/our dealers ONLY. Do not tend to repair this unit at your own or any other person. Risk of combustion, shock, or unpredictable fire.</p> <p>When the followings are conformed at returning or asking for repair this unit or any parts of this unit, sterilize the unit completely before dispatch the unit..</p> <ol style="list-style-type: none"> 1) When it is considered any contagious/radioactive substances might have contaminated whole unit or any part of the unit. 2) When it is considered there is any danger/risk when blood or any biological/chemical substances are adhered to whole unit or any part of the unit. <p>These cases are extremely dangerous for causing secondary contamination/contagion. Inform us, or our dealer prior to send the unit for repairs.</p>

- Please check the following points before contacting us for repairs.
- If you are not sure about the cause of the trouble, disconnect the power plug and attach the note describes the problem, and contact us or the our dealers you have purchased the unit.

Problems	Possible Cause	Solution
Unit does not start operation after turning the power on.	ON/OFF button has not been pressed continuously for 1(one) second.	Push the button until you hear a high-pitched tone (approximately 1 second.)
	Electrical connections are not properly connected.	Check electrical connections, such as Power plug, socket, or power supply.
	Ashes or dust in the power supply socket.	Clean the power supply socket.
	Fuse has blown.	After turning the power OFF, replace the fuse in the fuse-box. If the same problem occurred after replacing the fuse, contact us, or our dealers near you.
	Power button is broken.	Contact us, or our dealers.

Unit does not cool sufficiently, or takes too long to reaching the desired temperature (longer than 90 minutes.)	Environmental temperature is considered to be too high.	Set/change and keep the room temperature approximately 25°C.
	The lid is not completely closed.	Close the lid properly and lock it.
	The air outlet vent is covered or disturbed.	Check the air outlet vent on the back. Remove any items covering the vent.
PV/SV Indicator displays incorrectly.	Electro-magnetic interference may near the unit. Uncontrollability of CPU in the controlling unit occurred by these devices.	1) Leave the unit away from these devices. 2) Turn OFF, leave it for about 10 seconds and turn the power ON again. If the incorrect display continues, contact us or our dealer you purchased unit.

Specification

Temperature Range	Approximately $-80^{\circ}\text{C} \sim 0^{\circ}\text{C}$												
Temperature Accuracy	$\pm 0.2^{\circ}\text{C}$												
Temperature Controlling System	PT100/Digital PID Indication, Inverter Control												
Cooling System	Free Piston Sterling Cooler, 40W, supplied by Twinbird Corporation												
Fuse	AC220-240V, 0.4A/DC12V, 8A												
Power	62VA/AC100 – 69VA/AC115 – 82VA/AC240V – 60VA/DC12V												
Dimension	W230(275, including the handle)mm x D262mm x H390 mm												
Weight	Approximately 10kgs, without Aluminum Block												
Accessories	<ol style="list-style-type: none"> 1) AC Power Cable for AC220–240V x 1 2) DC Power Cable for DC12V x 1 3) ALB Holding Spacer (For Holding Aluminum Block) x 1 4) Blocking Lid (For Anti-defrosting, Keeping temperature) x 1 5) 8A Fuse for DC12V (large) x 1, in the DC Power Plug 6) 0.75A Fuse for AC100-120V x 1 (For the use at 100-120V ONLY. DO NOT use this fuse at 220-240V.) 												
Attached Documents	<p>Operation Manual x 1 Warranty x 1, Attached to Operation Manual</p>												
Optional Aluminum Blocks' specification (Sold Separately)	<table border="0"> <thead> <tr> <th>Type</th> <th>Spec/Well</th> </tr> </thead> <tbody> <tr> <td>DPB-0296</td> <td>0.2ml x 96-well (For 0.2ml PCR Tubes)</td> </tr> <tr> <td>DPB-0548</td> <td>0.5ml x 48-well</td> </tr> <tr> <td>DPB-1548</td> <td>1.5ml x 48-well</td> </tr> <tr> <td>DPB-1840</td> <td>1.8ml x 40-well</td> </tr> <tr> <td>DPB-2040</td> <td>2.0ml x 40-well</td> </tr> </tbody> </table> <p>Other specs or types are available upon request (Price may vary). Ask our dealer for more information.</p>	Type	Spec/Well	DPB-0296	0.2ml x 96-well (For 0.2ml PCR Tubes)	DPB-0548	0.5ml x 48-well	DPB-1548	1.5ml x 48-well	DPB-1840	1.8ml x 40-well	DPB-2040	2.0ml x 40-well
Type	Spec/Well												
DPB-0296	0.2ml x 96-well (For 0.2ml PCR Tubes)												
DPB-0548	0.5ml x 48-well												
DPB-1548	1.5ml x 48-well												
DPB-1840	1.8ml x 40-well												
DPB-2040	2.0ml x 40-well												



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