

User's Manual

INCU-LT series
Premium Low Temperature
Incubator

This Manual applies to:

INCU-LT Series

Models: INCU-160LT, INCU-270LT and INCU-430LT.



Thanks !

Thank you very much for purchasing one of our INCU-LT Series premium low temperature incubator, especially designed for you-the lab professional. Your choice indicates that you have very high requirements on style and performance of this type of incubators.

SciQuip premium low temperature incubators have achieved a good reputation and trust among various clients for its advanced temperature controlling technology, sound framework design, excellent molded exterior and outstanding professional workmanship. These products have been exported through most leading companies into European, American and East Asian markets.

INCU-LT incubators have some unique features like LCD touch screen panel, programmable control-9 segments and 18 steps, intelligent tracing (graphic monitoring) and solid operating safety items, etc. It also has featured designs of innovated frost-free refrigeration system and also three-dimensional heating with smooth air circulation.

This equipment is specialized to meet the research needs in a great variety of industries. It is ideal for microbiology laboratories, medical and veterinary, research and quality control examinations in pharmaceutical, and food and cosmetics industries and for aging test and biotechnology applications.

Since the date of your purchase of this product, after-sale service will always be with you through your dealer and/or the importing company of your region.

No matter what questions happen to you when using your incubator, please do not hesitate to contact us.

Thanks you for your trust in its product!

Reminder!

Prior to operation, this manual should be read thoroughly and completely understood-as it might be helpful to master the operation techniques of this unit.

Safety instruction!
Please be sure to follow the instructions, they are really important for your safety.



Danger!

Warning against damage and injury.

1. The electrical supply circuit to the incubator must confirm to all national and local electric codes. Check the serial-data plate for voltage, cycle, phase and amperage requirements before you connect the unit.
2. Only use grounded power source (outlet) to avoid an electric shock or fire.
3. In case of a problem, do not attempt to repair the product yourself. Do not open the power box to avoid electric shocks.
4. Do not pull out the plug when the unit is in use. Never drag on the wire to unplug the unit.
5. A separate branch circuit is recommended to prevent loss of samples due to overloading or failure of other equipment on the same circuit.
6. A surge protector is recommended to avoid power-related faults.
7. In case of malfunction or burning smell, the unit must be unplugged immediately. Use a circuit breaker to cut off the power supply. Continuance of abnormal state will end up with fire as a result of overheating.
8. The electric power supply must be cut off in following situations:
 - 8.1. When opening the door of electrical power box. Opening the top cover without cutting off power supply might result in electric shock.
 - 8.2. When replacing the fuse. Replacing the fuse without cutting off the power supply will probably result in electric shock.
 - 8.3. When a malfunction occurs, mishandling will result in the further damage of the equipment or accidental injury.
 - 8.4. If you do not use the unit for a long period of time.
9. Never touch the glass door and/or inner chamber when the incubator is hot.

	<p>Attention!</p> <p>Instructions for optimal performance</p>
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1. The unit must be placed vertically on a solid, flat floor or table.
2. The incubator needs even heat lost on all surfaces in order to maintain small internal temperature variations. As a result, a minimum of 20 cm must be allowed between the rear and sides of the incubator and any walls, partitions or obstructions to facilitate adequate convection of air around the unit.
3. Do not locate the unit exposed to direct sunlight or near heating /cooling ducts.
4. The unit must be kept away from electromagnetic interference sources.
5. Culture placed inside the incubator should be placed to the extent of which the air flow inside the incubator is not affected to maintain the temperature uniformity in the working chamber.
6. Make sure the shelves inside the chamber are placed horizontally.
7. Slam the door(s) will probably leads to damage of the equipment.
8. When in operation, do not open the door (too much or too long) as this might affect the temperature inside.
9. The incubator must be kept away from volatile, flammable, explosive liquids or gases.
10. Please keep the chamber clean. Regular cleaning is required.
11. After transport of the Incubator – DO NOT USE IT for at least 24 Hours, unless you are 100% sure that the unit has been moved in an upright position only.
12. If the incubator is used continuously at low temperatures, condensate can occur inside of the incubator. You might need to wipe this out, or-if possible-heat up the incubator to evaporate the condensation.
13. There is however on the right side (low) a drain that might be emptied. (see the picture).
14. To extend the compressors life and maintain an excellent performance of your refrigeration system, the condenser of the unit should be cleaned every month.
15. Please do not touch the screen with sharp objects.



	<p>Attention!</p> <p>Apart from the above warnings and instructions, there are several other special notes that need attention.</p> <p>Please read them. Any neglect might cause serious problems, damage, or injury.</p>
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1. Performance Features

- ★ Both the interior and exterior are made of robust materials for lifetime operations. The inner chamber is made of high quality #304 stainless steel sheets, with 4 round covered corners. All exposed edges are de-burred to insure no sharp edges. The exterior is cold rolled steel finished with powder coated polyurethane finish, which is resistant to most chemicals and easily cleaned with mild household detergents.
- ★ 4.3" LCD 480x272 touch screen panel clearly indicates all parameters in one page display, which also simplifies all fuzzy settings with just quick finger touches.
- ★ The INCU-LT incubator microprocessor temperature control systems all use fast responding PT 100 sensors which commands and executes a special control algorithm that energizes a solid-state switch to supply power to the heaters.
- ★ The compressor system runs at all times-(except for higher internal temperatures). If cooling is required, a solenoid valve –also driven by the microprocessor-will be activated and cool down the incubator to the required temperature.
- ★ The control electronics are protected through a circuit breaker that may trip at 110% of loading rate, but will trip within 1 second at 150% of load rating.
- ★ Space-age high density material is used to insulate the inner chamber walls.
- ★ All electrical components are fully accessible after removing the top-cover.
- ★ A fluorescent light is installed as standard, for medium intensity of illuminating needs in the chamber.
- ★ A magnetic gasket on the outer door helps to insure a tight seal against the cabinet.
- ★ A double-layered observation window comes as standard on every INCU-LT Series Incubator.
- ★ 2 grid shelves, 50mm test port and built-in printer on the side wall as standard, UV light as options available upon request.

2. Technical Specification

Model	INCU-160LT	INCU-270LT	INCU-430LT
Volume (L)	160	270	430
Control Panel	4.3" LCD Touch Screen		
Door type	Highly-Insulated Single Door		
Grids no.	2		
Temperature Range (°C)	-10-65		
Temperature Accuracy (°C)	±0.1		
Temperature Uniformity (°C)	±0.5@37		
Working Temperature(°C)	5-35		
Temperature Control Mode	Fixed Value, Programmable		
Alarm	Enabled		
Timer (min)	1-999		
Settings	Digital		
Cooling System	Automatic, Auto Defrosting Cycle		
Inner dimensions (mm) (WxDxH)	500x500x650	600x600x750	700x645x950
Grid size (mm) (WxD)	380x456	477x556	513x656
Net Weight (kg)	98	130	180
Gross Weight (kg)	145	180	220
Power (W)	860	950	1350
Electricity	220-240Volt 50/60 Hz		
Approval	CE, ISO		
Security	Over-temperature Protection, Compressor Overload Protection, Electrical Leakage Protection		
Additional	Built-in Printer, RS-485 interface		

3. Preparation and Start-up

Clean the incubator before you put it into use and on a regular base. The interior should be wiped down with an appropriate disinfectant, such as 70 % ISOPROPYL ALCOHOL or equivalent.

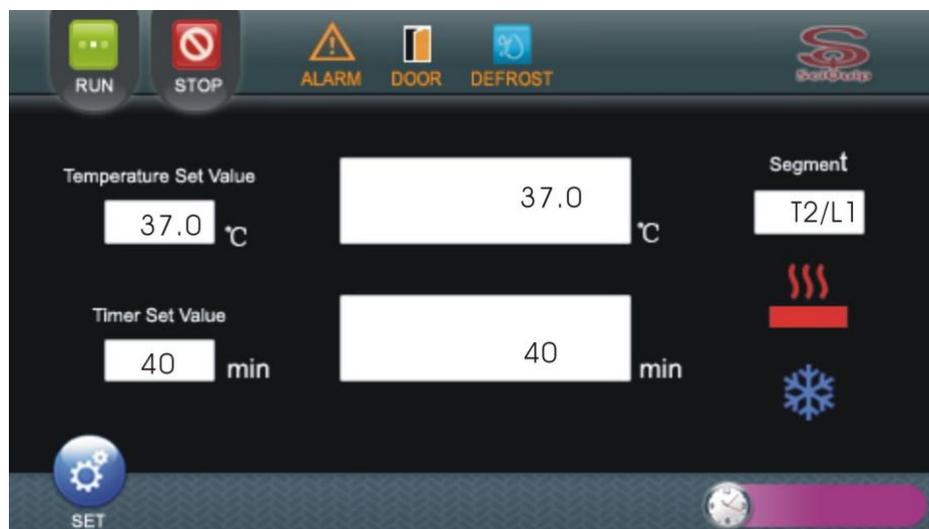


**DO NOT USE ANY CHLORINATED OR HALOGEN MATERIAL-
AS THIS IS HARMFUL TO THE POLISHED STAINLESS STEEL!!!**

3.1 Turn the main switch which is located on the right side of the unit, power is applied to the unit.

3.2 The screen will display the welcome picture, then the home page. In the meantime, the system remains standby.

4. Home Page Operation



“Stop” button:

Press this to stop running operation;

“Run” button:

Press this button to start running operation;

“Temperature Set Value”:

It displays the current set temperature value;

“Timer Set Value”:

It displays the current set timer value;

“Set” Button: (See Chapter 5)

Press this button to enter the “Set” Page;

“Actual Running Time”:

It displays the current running time.

“Alarm” Status:

Once the conditions of alarms are fulfilled, the alarm is declared, and indicator will be lighted.

“Door” Status:

This indicator will be lighted if door is opened or closed improperly.

“Defrost” Status:

This indicator will be lighted if the defrosting cycle is in operation.

“Actual Temperature”:

It displays the current actual temperature value.

“Control Mode” Status:

This box indicates the status of the current control mode, fixed value mode or programmable mode. If it is controlled under Fixed Value mode, it displays “Fixed”

If it is controlled under Programmable mode, it displays the current segment number and remaining cycle times.

**Special Remind!**

Under programmable mode, the “PROG” box shows as followings,

T”m”/L”n”,

m: Current segment No.

n: Remaining cycle times.

“Heating” Status:

The indicator will be lighted when the main heater is active.

“Cooling” Status:

The indicator will be lighted when the cooling system is active (Solenoid valve is switched on).

“Clock Time” Display:

It displays the actual clock time.

5. Set Page Settings



Control Mode-- Control Mode Settings [\(See Chapter 6\)](#)

Press it to enter the page and set control mode, and other functions, such as, temperature holding (programmable mode use only), cooling control, power recovery, door switch and print.

Fixed Value Parameter—Fixed Value Mode Settings [\(See Chapter 7\)](#)

Press it to enter the page of setting parameters (temperature, timer, auxiliary, cooling system) for fixed value mode.

Programmable Parameters—Programmable Mode Settings [\(See Chapter 8\)](#)

Press it to enter the page of settings parameters (ramp timer, end temperature, hold timer, cycle times and hold deviation) for programmable mode.

P.I.D-- P.I.D Control Settings (Factory Default) [\(See Chapter 8\)](#)

Press it to enter the page of setting P.I.D parameters, to set the parameters of temperature controlling.

Clock—Clock Settings [\(See Chapter 9\)](#)

Press it to enter the page of clock time settings.

Alarm—Alarm Settings [\(See Chapter 10\)](#)

Press it to enter the page of setting temperature deviation alarm and over-temperature alarm values.

Temperature Corrections (Factory Default) [\(See Chapter 11\)](#)

Press it to enter the page of temperature corrections.

Temperature Calibrations (Factory Default) [\(See Chapter 12\)](#)

Press it to enter the page of Temperature calibrations. Restricted and authorized access only.

Print/Communication Settings—Print and Communication Settings [\(See Chapter 13\)](#)

Press it to enter the page of setting print timer (interval) and defrosting cycles.

Defrost Setting—Auto Defrosting Cycle Settings (See Chapter 14)

Press it to enter the page of setting defrosting cycle parameters.

Quit—“Quit” Button

Press it to exit the current page after all settings are finished.

6. Control Mode-- Control Mode Settings**MODE—Control Mode Set**

All INCU-LT model units can operate under two different control modes, either Fixed Value mode or Programmable mode.

FIX (Fixed Value mode): The temperature of incubator will be controlled at one constant value for certain given period of time only. See Chapter 7 for more information.

PROG (Programmable mode): The temperature of incubator will be controlled with different segments with certain ramp time, hold time, cycle times to achieve the “ramp and soaks” running. See Chapter 8 for more information.

To set it, simply press the button for required control mode, with highlight. Press the “Back” button to save and exit.

**Special Remind!**

Make sure the unit is stopped (or by pressing “STOP”) before changing the state of “MODE”, “KEEP” and “COOL”.

KEEP—Temperature Holding Switch

This function will enable or disable the system to keep constant control, either at the end temperature of last segment after all programmed operation finishes (under Programmable mode), or at the set value after the timer is down to “0” (under Fixed Value mode).

COOL—Cooling System Switch

This function will enable or disable the cooling system.

NRUN—Power Recovery Switch

This function will enable or disable the non-volatile running to retain all set points when power interruption occurs.

DOOR—Door Switch

This function will enable or disable the door switch. Enable this function to automatically switch off the main heater when door is opened.

PRT-Printer Switch

This function will enable or disable the printing function.

RET—“Return” Button

Press it to exit the current page after all settings are finished.

7. Fixed Value Parameter—Fixed Value Mode Settings**Set Temperature—Temperature Set button**

Press it and use the keyboard to enter the temperature set value.

Press the “+/-” key to set the “minus” temperature value, and press “OK” to confirm and save.

Set Timer—Timer Set button

Press it and use the keyboard to enter the timer set value between 0 and 9999 minutes, and press “OK” to confirm and save.

Set Auxiliary—Auxiliary Heating Set Button

Please leave it as “0” for all INCU-LT models

Back—“Back” Button

Press it to exit the current page after all settings are finished.

**Special Remind!**

- ◆ If the entered value exceeds the maximum limit, then the max value will be set for this parameter.
- ◆ Press the “C” on the key board to clear the entry.
- ◆ Setting of each parameter must be confirmed and saved by pressing “OK” button.

8. Programmable Parameters—Programmable Mode Settings



This new incubator can operate according to stored program to meet various requirements of professional experiments. Under programmable control mode, it is possible to program up to 9 different segments, each with their own Ramp Time, Ramp End Temperature, Hold Time and Speed. At the end of the settings, you are also required to set the Hold Deviation and Cycle Times.

Segment—Segment No.

The function indicates the serial number of current segment. No setting required.

Ramp Timer

This function indicates the time duration for the temperature to reach from current actual value to the ramp end (temperature) value. Use the keyboard to enter the ramp time from 0-999mins.

End Temperature—Ramp End Temperature

This function indicates the ideal temperature value for the unit to reach for the segment. Use the keyboard to enter the ramp end temperature value.

HOLD—Hold Time

This function indicates the time of hold step, which is the length of time that the unit has to maintain the (Ramp End) Temperature for the segment. Use the keyboard to enter the hold time from 0-999mins.

PREV—“Previous” Button

Press it to return to the set page of previous segment.

NEXT—“Next” Button

Press it to forward to the set page of next segment.

BACK— “Back” Button

Press it to exit the current page after all settings are finished.

Keyboard

Use the keyboard to enter the value of each parameter, and press “OK” to confirm and save.

Detailed Setting Instructions:

Set the parameters for all segments required. Simply leave as blank for unused segments. Keep pressing “NEXT”, until the following page appears.



Hold Deviation—Hold Deviation Temperature

This function indicates the temperature deviation that the incubator may have at the end of each “Ramp Time” before starting the “Hold Time”. In another word, the difference between actual temperature and desired “Ramp End Temperature”, this activates the “Hold Time”.

If it’s set as “0”, “Hold Time” will start counting down as soon as the “Ramp Time” dues, no matter if the actual temperature reaches the “Ramp End Temperature”.

Otherwise, if set as not “0”, the “Hold Time” will remain on hold until the actual temperature reaches “Ramp End Temperature” \pm “Hold Deviation”.

Use the keyboard to enter and press “OK” to confirm and save.

Cycle—Cycle Times

This function indicates the number of times for the whole program to run repeatedly, if it’s set as “1” cycle, the program will run for 1 repeat, so a total of 2 times!

Use the keyboard to enter between 0-99 times.

PREV—“Previous” Button

Press it to return to the set page of previous segment.

BACK—“Back” Button

Press it to exit the current page after all settings are finished.

9. P.I.D—P.I.D. Control Settings (Factory Default)



P.I.D Control Settings

Press the parameter button and use the keyboard to set the value, and then press “OK” to confirm and save.

BACK—“Back” Button

Press it to exit the current page after all settings are finished.



Warnings!

- Factory default setting only!
- Any unauthorized access and changes may result in interference of controlling system!

10. Alarm—Alarm Settings



Deviation Alarm—Alarm Deviation Temperature

This value determines the maximum deviation, measured in temperature ($^{\circ}\text{C}$), which the chamber is permitted above/below once the incubator reaches the specified set point before an alarm condition is declared. Use the keyboard to enter and press “OK” to confirm and save.

Limit Alarm—Over-temperature Alarm

This value determines the maximum limit, measured in temperature($^{\circ}\text{C}$), the unit is permitted. An alarm condition will be declared if this value is exceeded. Use the keyboard to enter and press “OK” to confirm and save.

BACK—“Back” Button

Press it to exit the current page after all settings are finished.



Special Remind!

The alarm will be deactivated if the alarm value is set as “0”!

11. Temperature Corrections (Factory Default)



Attention:

1. The unit is delivered with calibration done in the factory, so please perform the corrections only if necessary.
2. This may only be performed by an authorized engineer with certified equipment.
3. To get a linear temperature in the chamber, a 2 point correction must be executed.

- 11.1 Take a certified calibrated thermometer in a small bottle with glycerin and place that in the middle of the incubator.
- 11.2 Change the set point to 8.0°C to perform the “TEMP0°C” (Low Point Correction), let the incubator run for at least one hour– until the temperature is constant.
- 11.3 Read the temperature on the external thermometer; calculate the difference with actual displayed temperature.
- 11.4 Press the SET button in the Home Page; enter the page of “Temperature Corrections”.
- 11.5 The “Low Point Correction” shows the current correction relative to the actual temperature. If necessary- according to the difference calculated above, change this correction temperature (with up and/or down keys) until the actual display value equals to the calibrated thermometer value.
- 11.6 Press “OK” to confirm and save the “Low Point Correction” value.
- 11.7 Repeat the above procedure, on a high temperature- somewhere around 60°C- to perform the TEMP100°C (High point correction).
- 11.8 Press “OK” key to confirm and save the new corrected values.
- 11.9 Press “BACK” to exit.

12. Clock—Clock Settings



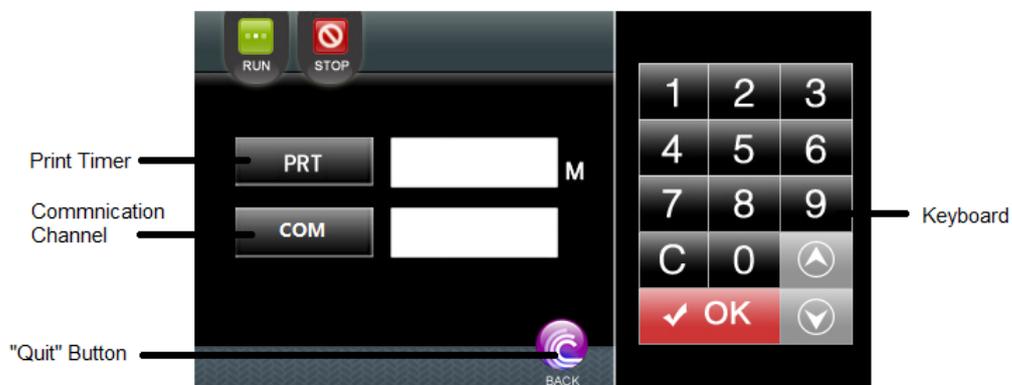
Clock Settings

Press the display box and use the keyboard to set date and clock, and then press “OK” to confirm and save.

BACK—“Back” Button

Press it to exit the current page after all settings are finished.

13. Print/Communication—Print and Communication Settings



PRT—Print Timer

This function indicates the time interval between two printing records. Use the keyboard to enter set value between 0-240 and press “OK” to confirm and save.

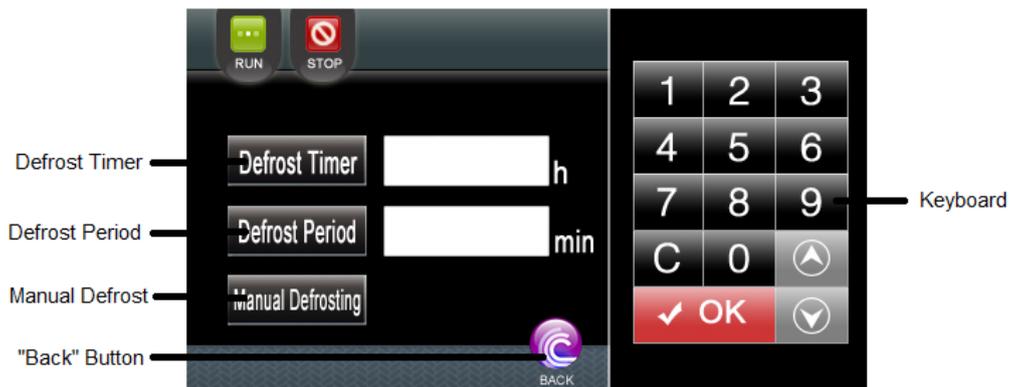
COM—Communication Channel Setting for RS-485 (Optional)

This function indicates the communication channel ID for RS-485 connections. Use the keyboard to enter and press “OK” to confirm and save.

RET—“Quit” Button

Press it to exit the current page after all settings are finished.

14. Defrost Setting—Auto Defrosting Cycle Settings



This unit is equipped with automatic and manual defrosting functions.

For automatic defrost, it is effective only when setting temperature value is lower than 10°C. The unit will run auto defrosting cycle according to the following two parameters settings,

Defrost Timer—Auto Defrost Cycle

This function indicates the time interval between two defrosting cycles. Use the keyboard to enter the set value between “1-240” hours and press “OK” to confirm and save. Set it as “0” to disable the auto defrosting function. Once the “defrost timer” is set, the unit will automatically perform the defrosting cycle accordingly.

To find out the suitable “defrost timer” setting, the frosting time duration should be counted from start of the low-temperature operation to the point that the actual temperature start bouncing up due to the frosting inside the evaporation chamber. Then set the “defrost timer” as somewhere between 1/10-1/5 of the frosting time duration. For example, if the frosting time duration is 20 hours, the “defrost timer” can be set from 2-4 hours. High relative humidity will require more frequent defrosting cycle.

Defrost Period/Time

This function indicates the time duration for each single defrost cycle both under auto and manual operations. Use the keyboard to enter the set value between “1-24” mins and press “OK” to confirm and save. Set it as “0” to disable the defrosting function.

When the ambient temperature is higher than 25°C, like in summer, the recommended setting is 30 seconds, otherwise, 1 min is considered as adequate. As ambient conditions may vary, therefore, always try to find the most appropriate settings for your own particular ambient condition.

Alternatively, if the set temperature is not so low as critical, in most cases, manual defrosting will be adequate.

Defrost—Manual Defrost

Alternatively, during the operation, press this key to manually start defrosting cycle, press again to stop. Minimum time interval between two manual defrost cycles is 1 mins.

BACK—“Back” Button

Press it to exit the current page after all settings are finished.



Attention:

1. The cooling system keeps running during defrosting cycle, while the motor fan stops.
2. The temperature will silently overshoot during defrosting, and then be stabilized when defrosting terminates.
3. **For better temperature control during continuous low temperature operations, for example, below 10.0°C, the following operations are recommended:**
Set Defrost Timer: “4” hr, Defrost Period: “1” min;
Weekly maintenance: Open the door and wipe off the condensation, set the temperature at top value “65°C” and let it run for at least 1 hour to further evaporate the condensations inside

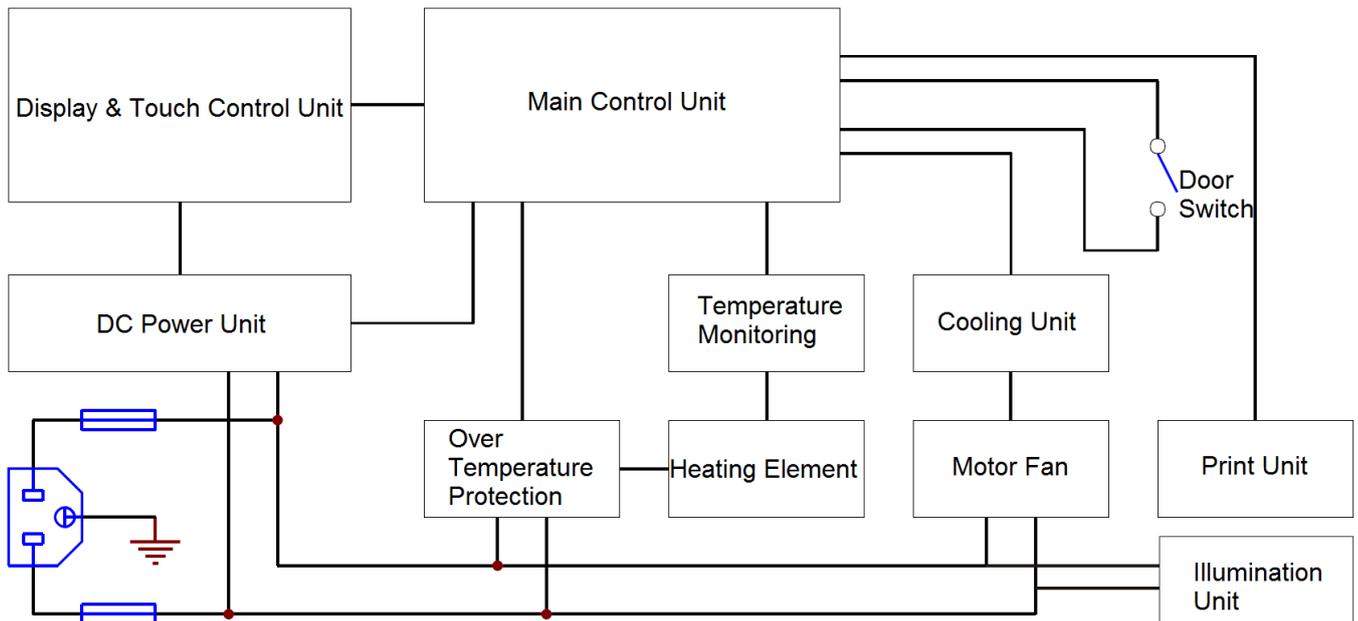
15. Temperature Calibration (Factory Default)



Attention:

1. This is only be performed by an authorized engineer with certified equipment, with password limited access.
2. Detailed instructions are to be offered upon request.

16. Electronic Control System



17. Trouble Shootings

If there is a need to access the (top) control panel, use an Allen wrench of 6mm (Included). Push the Allen screw in and turn at the same time. The cover will be raised a little – enough to lift it and take it out.



Observed symptoms	Possible cause	Corrections
Incubator does not work / No display	1. Power supply is not connected	Check supply system to see if there is power on the outlet.
	2. The power switch has not been switched on.	Turn on the power switch on the right side of the incubator
	3. The (inside) fuse is	Replace fuse with new one of same

	broken	specification
	4. Malfunction of power box circuit occurs	Notify distributor to repair the unit.
Incubator temperature alarm	1. Unit has not yet reached the required (constant) temperature	Keep waiting and observe for a while
	2. Setting of the alarm parameter is wrong.	Refer to the operating procedure and change or re-set alarm parameter
	3. Malfunction of heating system.	Notify your distributor for repair
Real temperature (PV) is lower than the set (SV) temperature. This activates low temperature alarm	1. Equipment has not yet entered into the state of constant temperature	Keep waiting and observe for a while
	2. Temperature deviation alarm value is too small	Reset the alarm value
	3. Abnormal conditions occur with the heater.	Notify your distributor for repair
	4. In the programmable mode, the difference between preset value and measured value keeps changing.	In the programmable mode, turning off the alarm function is strongly recommended.
Screen display shows nothing or just strokes and or distortions	1. Equipment is disturbed by high frequency.	Eliminate the source of disturbance and restart the operation.
	2. Microprocessor failure	Notify your distributor for repair
Fluorescent lamp does not work	1. The lamp tube is broken.	Replace the lamp tube
	2. The starter is loose or broken.	Check or replace the starter