ELITEX



# THERMOCYCLER, SPARK T96

*Please read the User Manual carefully before use, and follow all operating and safety instructions*

**User Manual**

English

# User Manual

EN

GRADIENT THERMOCYCLER, SPARK T96

## Preface

Thank you for purchasing our product. Users should read this manual carefully, follow the instructions and procedures, and be aware of all preventive measures when using this instrument.

## Service

If help is needed, you can always contact your dealer or Letslab via **www.letslab.com**.

Please provide the customer service representative with the following information:

- Serial number
- Description of the problem
- Your contact information

## Warranty

This instrument is guaranteed to be free from defects in materials and workmanship under normal use and service for a period of 24 months from the date of invoice. The warranty is extended only to the original purchaser and shall not apply to any product or parts that have been damaged due to improper installation, improper connections, misuse, accidents, or abnormal conditions of operation.

For claims under the warranty, please contact your supplier.

# Safety Warnings and Guidelines

## 1. Important information about the security operation

Before operation, please have a perfect conception of how to use the Instrument. Read this manual carefully before using it.

## 2. Common safety precautions

Please read carefully and fully understand the following safety matters.

- Please use the Thermocycler Spark T96 to strictly follow the operating instructions in this manual to ensure safety.
- Please read all the security information in this manual carefully.
- The safety prompt symbol in the manual is explained, and the "warning" and "attention" are unified. The operation or event indicated by this diagram may cause danger, so pay attention to the operation method.
- Do not operate the Thermocycler Spark T96 in a manner not guided or described in any operation manual but contact the original equipment manufacturer.

⚠warnings:

- Basic operating conditions:
  ① Voltage: 100-240VAC 50/60Hz
  ② Ambient temperature: 5-40℃
  ③ Relative humidity: 80%
  ④ No surrounding vibration or airflow that would affect performance
  ⑤ There is no conductive dust, explosive gas and corrosive gas in the surrounding air

⚠warnings:

- The instrument must be installed on a solid, flat and level table, and ensure that the four feet of the instrument are in contact with the table. Do not install the instrument on a sliding surface.
- There should be no heat source or water leakage near the instrument, otherwise it may easily cause the sample temperature to rise or the instrument to malfunction. Avoid direct sunlight and keep away from heaters, stoves and other heat sources.
- The room should be well ventilated, without corrosive gas or strong magnetic field interference, and with less dust.
- Be sure not to block or cover vents. When using a single instrument, the distance between the ventilation hole of the instrument and the nearest object should be no less than 50cm.
- If not in use for a long time, unplug the power plug and cover the instrument with a soft cloth or plastic paper to prevent dust from entering.
- The rated current of the power strip should be above 10A, and it should meet local electrical safety requirements and ensure a good protective ground terminal.

⚠Notice:

In the following situations, you should immediately unplug the instrument from the power socket and contact the manufacturer:

① Liquid spilled into the instrument.
② The instrument has been exposed to rain or water.
③ The instrument is not working properly, especially if there are any unusual sounds or smells.
④ The instrument has dropped, or the case has been damaged.
⑤ Instrument functions have changed significantly.

- If there is any violation of the above matters, the consequences shall be borne by themselves.

**3. Maintenance**

Frequent use of the instrument will inevitably lead to wear and potential malfunctions. Therefore, regular maintenance and troubleshooting are essential to ensure proper operation and extend the instrument's service life. Before servicing or cleaning the equipment, please read the following safety instructions:

- Always disconnect the power supply before performing any maintenance or cleaning.
- If the instrument will not be used for an extended period, store it in its original packaging to protect it from dust and moisture, which could affect its performance.
- Avoid direct contact between the instrument and water or other liquids to prevent moisture from entering the device and causing short circuits.
- For cleaning, use a sponge or towel lightly moistened with a suitable cleaning solvent to wipe the painted and exterior surfaces. Rough materials or excessively wet cloths may damage the instrument.
- Clean the instrument regularly. Use ethanol with a concentration of at least 70% as the cleaning solvent. Do not use corrosive liquids or detergents.

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# 01 Introduction

The Thermocycler Spark T96 is a general instrument in molecular laboratories and is mainly used for gene amplification in scientific research and clinical area, qualitative PCR gene amplification, gene chip or other gene analysis applications. The gradient thermal cycler has gradient function, which can quickly increase and decrease the temperature. It can achieve temperature uniformity in a single process and can quickly and stably complete polymerase chain reaction (PCR) experiments.

Please undergo professional training before using this instrument and operate it in strict accordance with the instructions.

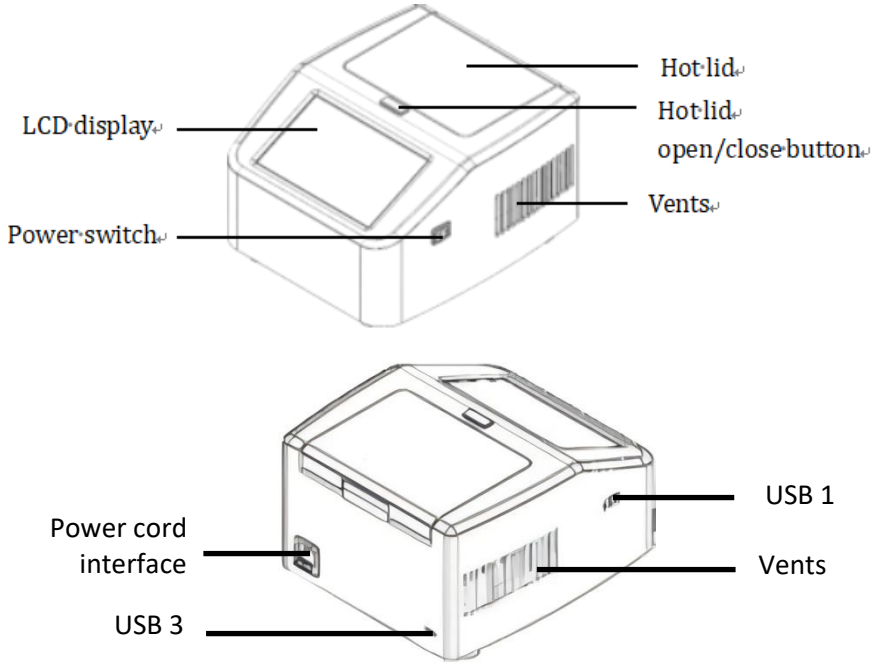
## 1.1 Features

- Small size, portable and convenient;
- Hot lid adopts elastic structure design, adaptable to 96-well microplate （except full-skirted） or 0.1/0.2ml PCR tube;
- Using imported semiconductor refrigeration chips, the module temperature uniformity is excellent to avoid uneven heat transfer in the module;
- The fastest heating and cooling rate is 5°C/s, saving valuable experimental time;
- Humanized standard program file template, which can quickly edit experimental files;
- Automatic fault detection and alarm function;
- Power-off protection function.

## 1.2 The basic parameters and function

| 1. Model | TC96G |
|---|---|
| Application container | 96×0.1/0.2ml PCR tube/12*8-strip tubes /96-well microplate（except full-skirted） |
| Module temp control range | 4-105℃ |
| Hot lid temp control range | 30-110℃ |
| Temp Display Accuracy | ±0.1 |
| Temp control accuracy (at 55°C) | ±0.3 |
| Temp uniformity (at 55°C) | ±0.3 |
| Max temp change rate | 55.℃/sec |
| Gradient setting range | 30-105℃ |
| Gradient step | 1-42℃ |
| Module material | Aluminium |
| Display | 7’’LCD 800*480 |
| Input method | Touch screen |
| User defined file | Save file 676 |
| Power failure protection | Yes |
| Input voltage | 100-240V/50/60Hz |
| Dimension(L×W×H) | 270*240*150mm |

### 1.3. Appearance introduction




**LCD display:** parameter display, program operation display and parameter setting.
**Power switch:** turns the device on or off.
**Hot lid:** heating area.
**Hot lid open/close button:** open or lock the hot cover.
**Ventilation vents:** ventilation and heat dissipation.
**Power cord interface:** connect the power cord.
**USB 1:** For calibration.
**USB 2:** For calibration.

## 02 Use instruction

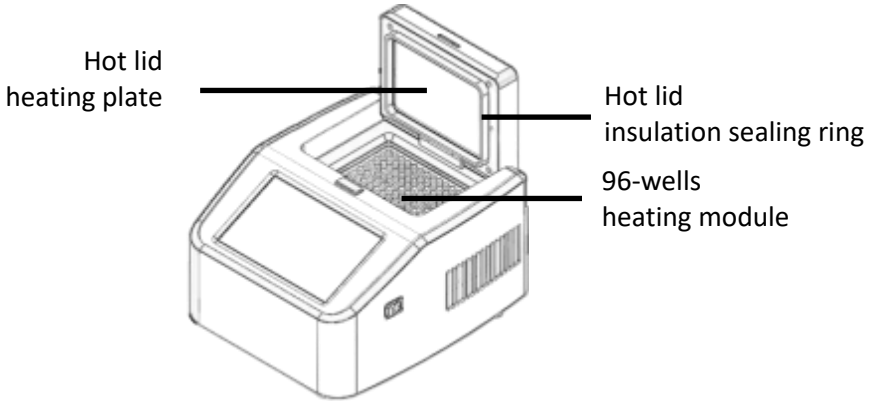
### 2.1 Instrument preparation

Take out the instrument from packages and place it on the workplate. Connect the power plug to a suitable grounded outlet.

### 2.2 Instrument installation

#### 2.2.1Heating module installation

The heating module is installed and fixed inside the instrument.

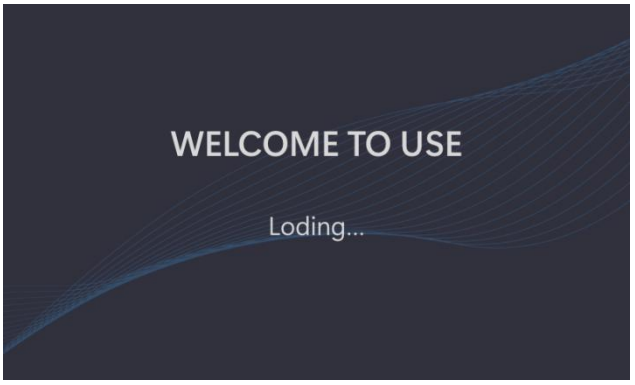



#### 2.2.2 Check before power on instrument

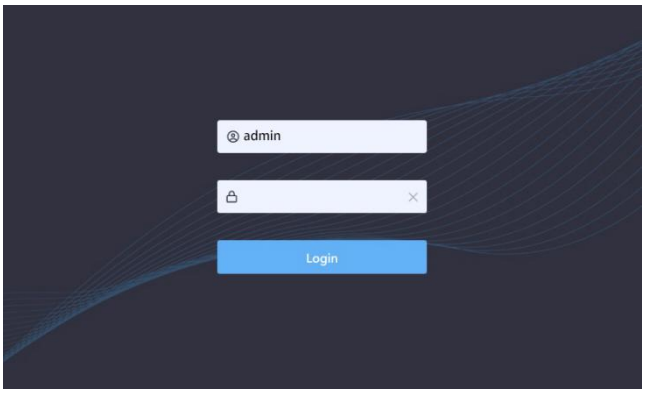
① Whether the power supply complies with the voltage required by the instrument;
② Confirm that the power cord plug is reliably inserted into the power socket;
③ The power cord is reliably grounded;
④ The module is in good contact.

#### 2.2.3 Power on

① Turn on the power switch and the instrument will make a beep sound, indicating that the power is on.
② The instrument starts self-test. The self-test takes about 1-2 minutes, please be patient.



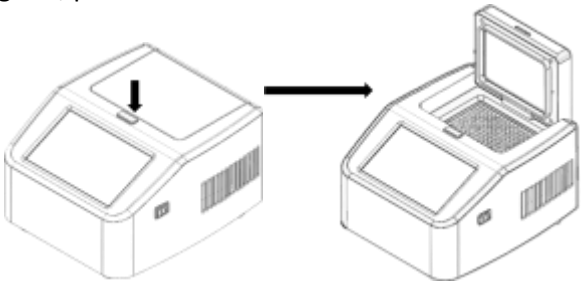

③ After passing the self-test, enter the user login interface, enter the initial password (1234) and click login to proceed to the next operation.




⚠*Warning!*
*If there is an abnormal sound or abnormal display after the instrument is power on, or a fault alarm and prompt (error item) appears during the instrument self-test, please turn off the power immediately and contact the manufacturer.*

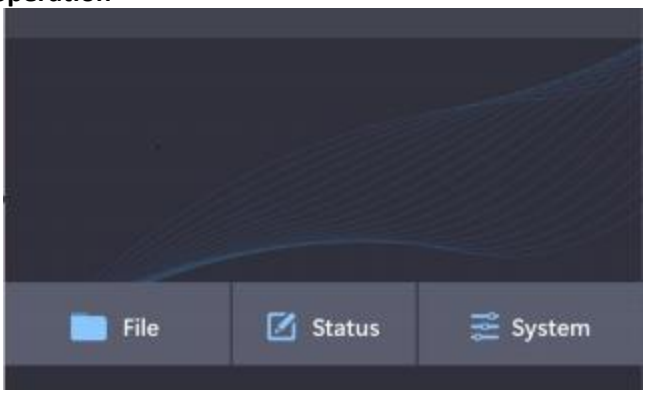
### 2.2.4 Hot lid

Before running the program, please close the hot lid. Make sure the lid lock is locked well:



⚠*Notice:*
*When the hot lid is opened after the instrument is finished running, the hot lid heating plate still retains high temperature. Do not touch immediately or directly to avoid burns.*

### 2.3 Display operation



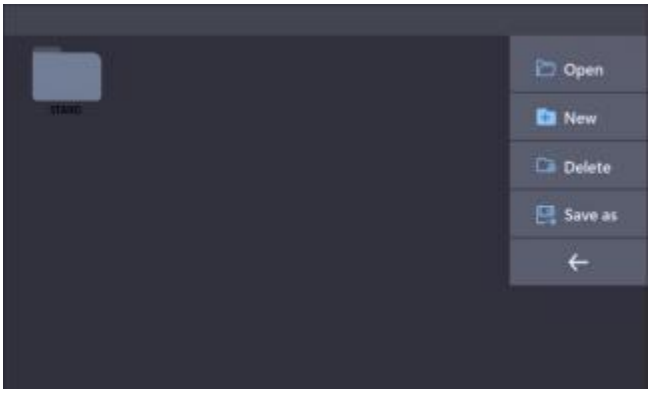

**After self-test:**

① By pressing the "File" button to enter the file management interface, you can create and edit folders and files, etc;

② Press the "Status" button to enter the program running interface and view the status of the running program.

### 2.3.1 File management

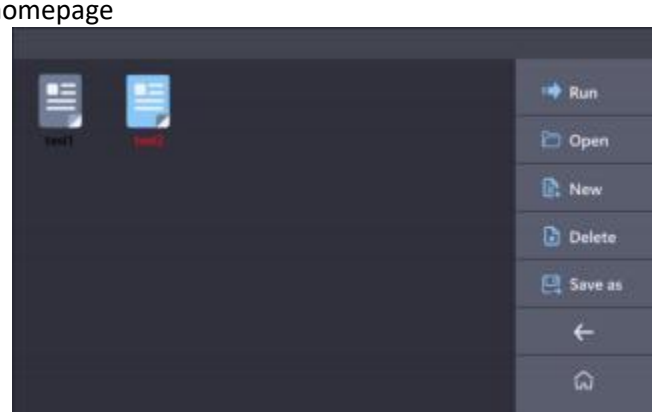
Click the “File” button to enter the interface shown below




③ **Open:** Open the folder. Select the folder and click Open to open the folder.
④ **New:** New folder. Click New, enter the file name on the keyboard, and press Enter to create a new folder.
⑤ **Delete**：Delete the folder. Select the folder, click the Delete button, the Attention interface will pop up, select Yes/No.
⑥ **Save as:** Save the folder. Select the folder, enter the new folder name in the pop-up keyboard, press Enter, and execute the save command.
⑦ **:** Back to Home page.

#### 2.3.1.1 Creation of experimental methods

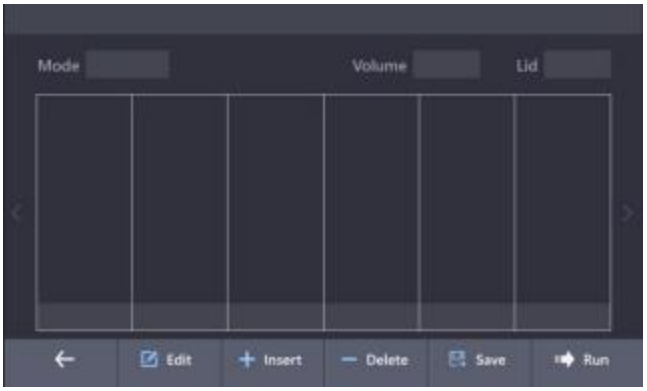
Select the folder (the colour changes to blue) and click Open：
① Run: Run selected file
② Open: Open selected file
③ New: Create new file
④ Delete: Delete selected file
⑤ Save as: Save selected files with different names
⑥ : Back to last interface
⑦ : Back to homepage




⚠*Notice:*
*The relevant files must be created and saved in the selected folder.*

#### 2.3.1.1.1 How to create/edit files

Click New or Open buttons to create a new file or edit the selected file.
1） Create a new file. Click the New button, enter the file name in the pop-up keyboard, and click the Enter to create a new file. Click ESC to exit the new interface.
2） In the file creation interface, select the required file.
Click Open to enter the program editing interface:




Function buttons：
① Edit: Edit STEP
② Insert: Insert a new STEP after the selected STEP Delete: Delete selected STEP
③ Save: save file
④ Delete：Delete currently selected STEP
⑤ Run: run file
⑥ “< “”>”: You can scroll forward or backward through 3 STEPs
⑦ ⟸: Back to last interface

#### 2.3.1.1.2 Edit STEP

**Parameter setting：**
**TempL:** Temperature control low temperature set value (for ordinary PCR, this value should be consistent with TempH. If the gradient function is used, this value is the temperature set value in the leftmost column)
**TempH:** Temperature control high temperature set value (for ordinary PCR, this value should be consistent with TempL. If the gradient function is used, this value is the temperature set value in the rightmost column)
**Time:** Current STEP running time
**Goto:** Back to setting STEP
**Cycle:** The number of STEPs returned and the total number of loops between STEPs
**+Temp/c:** The current STEP temperature modification value in each cycle can be positive or negative.
**+Time/c:** The current STEP time modification value in each cycle can be positive or negative.




⚠*Notice:*
*Click the parameter that needs to be modified, enter the required value, and click the Enter to confirm the input. ESC exits the input interface.*
⚠*Notice:*
*Gradient range: 30-105°C, gradient span:1-42°C, the TempL value is consistent with TempH for ordinary PCR*
⚠*Notice:*
*The rate control parameters of heating and cooling cannot exceed the maximum heating and cooling rate of the instrument.*

#### 2.3.1.2 Examples of typical PCR input methods

##### 2.3.1.2.1 Common PCR program settings




① **Pre-denaturation 95℃, 5 minutes:** In column 01, enter 95 for TempL, TempH will automatically input 95, enter 500 for Time setting, and the STEP setting is completed.
⚠*Note: The time is displayed in the form of (minutes *: seconds**). If you need to enter 5 minutes, enter 500. If you need to enter 5 minutes and 30 seconds, enter 530.*
② **95℃ 30s:** Click the Insert button to add a 02. Enter 95 into TempL, 95 will be automatically input to TempH, then Time input 30. The STEP setting is completed.
③ **55℃ 30s:** Click the Insert button to add a 03. Enter 55 into TempL, 55 will be automatically input, then time input 30. The STEP setting is completed.
④ **72℃ 30s cycle 30 times:** Click the Insert button to add a 04. Enter 72 into TempL, 72 will be automatically input, then time input 30. Type 30 into Cycle setting.
⑤ **Continue to extend 72℃ for 10 minutes**： click the Insert button to add a 05. Enter 72 into TempL, 72 will be automatically input, then time input 1000. This STEP setting is completed. *The steps above describe the complete PCR program. After preheating at 95 °C for 5 minutes and completing 30 PCR cycles, proceed with a final extension at 72 °C for 10 minutes.*
⑥ Click to save

#### 2.3.1.2.2 Gradient PCR program settings

After setting TempL as above, click TempH and enter the maximum temperature of the gradient in the corresponding column. The TempL is the temperature in the leftmost column, and the TempH is the temperature in the rightmost column. After the maximum and minimum temperatures of the gradient finish setting, the temperature of the heating module corresponding to each column will be displayed in the red marked in the figure below.




**1) Temperature modification and time modification:**

Settings for PCR programs including modification temperature or time: For example input "1.5 degrees" at Temp/c, click " +/-" to switch positive and negative, and then input "1.5"; input "1 second" at Time/c , click " +/-" to switch positive and negative, and then input "1", then in each cycle, it will increase or decrease according to the modified value.

⚠*Note:*

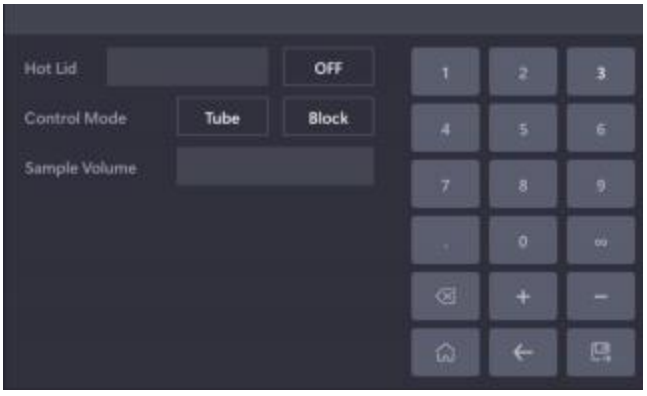
*Temp/c input range -9.9℃ to 9.9℃*

*Time/c input range: -599s to 599s*

#### 2.3.1.3 File saving and system parameter setting

**File saving:** After the program setting is completed, click SAVE to save (click RUN will also prompt you to save). After inputting the file name, click SAVE to confirm.

**Run the file:** Open a folder and select the file you want to run, click "RUN", and then enter the parameter setting interface such as the hot lid. After inputting the hot lid parameters, click "OK" to start running the program.




**Hot lid:** It is turned on by default. The default temperature is 110℃. You can also directly input the hot lid temperature that needs to be set. The setting range is room temperature - 110℃. After clicking off, the hot lid will be closed. If the Block temperature is lower than 30℃, the hot lid will be turned off by itself.

**Control mode:** The default is tube, and it is recommended to set it to tube mode

**Sample Volume:** The default is 10ul. Please fill in the real reaction system according to the actual situation.

**←:** Return to file display interface

: Return to the homepage

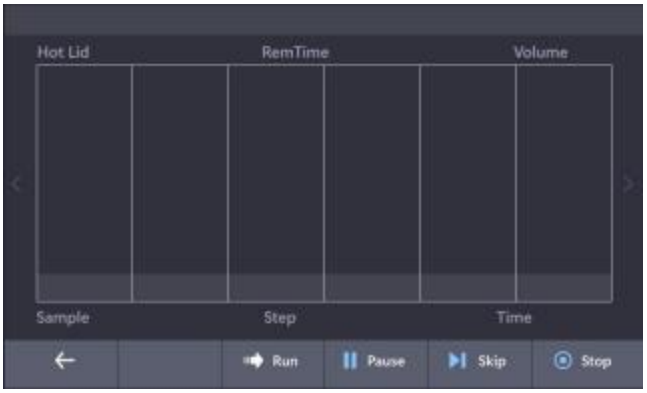
: After the setting is completed, click OK to enter the running interface.

#### 2.3.1.4 Run

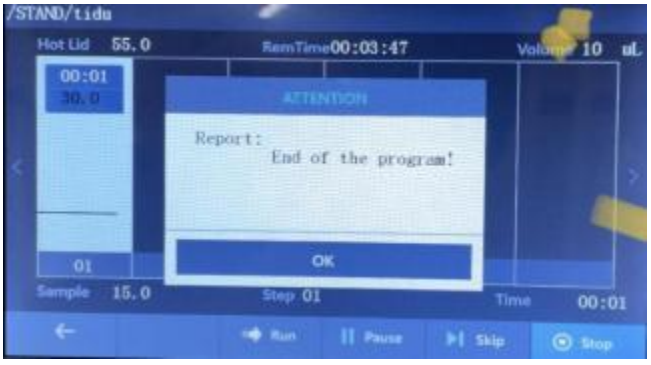
After the setting is completed, click OK to enter the run interface.

⚠ *Notice: In the running interface, you will see the module temperature decrease initially while the hot lid temperature increases. Please note that, to ensure optimal experimental performance, the main module will not begin heating until the hot lid reaches its set temperature. This helps reduce sample loss.*

When the hot lid reaches the set temperature, the host module starts to enter the cycle:




**RUN:** Run the last run program
**PAUSE:** Pause button. After clicking, the system keeps the temperature of the current Step.
**SKIP:** Jump button, you can directly skip the current Step section and enter the temperature of the next Step.
**STOP:** Stop button, when clicked, the program stops running. Click OK in the pop-up prompt and the program will stop.



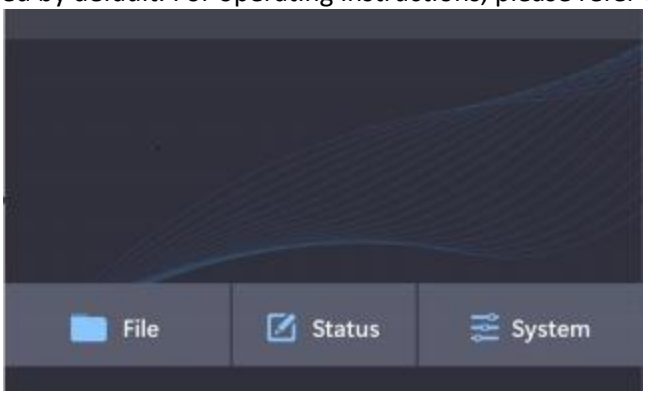

**←:** Back to homepage

⚠*Note:*

*Since different brands and each instrument have their own temperature control characteristics, including temperature rising and cooling speed, stability and volatility, and due to the uncertainty of the biological experiment itself and its susceptibility to external influences, if a PCR program that can run successfully on one instrument may not necessarily achieve the same results on another. Therefore, when you change the instrument, it's better to adjust the PCR operating program to achieve the ideal state.*

### 2.3.2 Status quick start

Click “Status” to enter the program running interface directly. At this point, the last executed program will be loaded by default. For operating instructions, please refer to “Run.”




System setting:

After clicking “System” on the homepage, you can enter the system configuration parameter setting interface.




**Auto Test:** Can self-test again after powering on. The self-test items will be displayed one by one in Test Info

**:** Back to homepage

**SN:** Product Serial Number. Each product with its own serial number before leave factory

**Test Info:** Display self-test information

**Date:** The current date can be entered or adjusted. Click to enter the current date on the pop-up keyboard. For example, on October 15, 2014, enter 141015

**Time:** The current time can be entered or adjusted. Click this item to enter the current time on the pop-up keyboard. For example, 13:40:48, enter 134048

**KEY Sound:** Can turn on/off

**EN/CN**：Operate language switch

## Troubleshooting

| No. | Failure | Reason | Solution |
|---|---|---|---|
| 1 | After turning on the power switch, the display does not light up and no beep sound is heard | Power is not connected | Check the power supply and connect it |
| | | Other | Please contact supplier |
| 2 | During the power-on self-test process, Sensor1, Sensor2, and Sensor3 items display error | Module sensor is damaged or has poor contact | After power off, pull out the module and reinstall it |
| | | | Please contact supplier |
| 3 | During the self-test, the Fan Sensor item displays error | Radiator sensor is damaged or has poor contact | After power off, pull out the module and reinstall it |
| | | | Please contact supplier |
| 4 | During the self-test process, the Cap Sensor item displays error | The hot lid sensor is damaged or has poor contact | After power off, pull out the module and reinstall it |
| | | | Please contact supplier |
| 5 | During self-test, TE1 Ref, TE2 Ref, TE3 Ref item displays error | Ventilation holes are blocked | Clear obstructions from vents |
| | | Semiconductor refrigerating chips damaged | Please contact supplier |
| 6 | During the self-test, TE1 Heat, TE2 Heat, TE3 Heat item displays error | Module heating component is damaged | Please contact supplier |
| 7 | During the self-test, the Cap Heat item displays error | The heating part of the hot lid is damaged | Please contact supplier |
| 8 | The hot lid cannot be heated | In the system parameter setting interface, the hot lid status is set to "OFF" | Set the hot lid status to a certain temperature value |
| | | Parts damaged | Please contact supplier |
| 9 | Reagent evaporation in reaction tube | Hot lid temperature is not set, heating lid is set to "OFF" | Please refer to the relevant chapter of this manual |
| | | Reaction tubes are placed unevenly | Adjust the hole position of the reaction tube to ensure symmetrical placement as much as possible |
| | | The lid of the reaction tube is not tightly closed | Please close the reaction tube tightly and put it into the instrument |

## Annex A. Packing list

| No. | Item | Unit | Qty | Note |
|---|---|---|---|---|
| 1 | Main case | unit | 1 | |
| 2 | Power cord | pcs | 1 | |

**Nota importante para los aparatos electrónicos vendidos en España**

Instrucciones sobre la protección del medio ambiente y la eliminación de aparatos electrónicos:



Los aparatos eléctricos y electrónicos marcados con este símbolo no pueden ser eliminados en forma de residuos urbanos.

De conformidad con la Directiva 2012/19/UE, los usuarios de la Unión Europea de aparatos eléctricos y electrónicos, tienen la posibilidad de devolver sus RAEE para su eliminación al distribuidor o fabricante del equipo después de la compra de uno nuevo. La eliminación ilegal de aparatos eléctricos y electrónicos es castigada con multa administrativa.

**Remarque importante pour les appareils électroniques vendus en France**

Informations sur la protection du milieu environnemental et élimination des déchets électroniques :



Les appareils électriques et électroniques portant ce symbole ne peuvent pas être jetés dans les décharges.
En réponse à la règlementation, Labbox remplit ses obligations relatives à la fin de vie des équipements électriques de laboratoire qu'il met sur le marché en finançant la filière de recyclage de ecosystem dédiée aux DEEE Pro qui les reprend gratuitement (plus d'informations sur www.ecosystem.eco).
L'élimination illégale d'appareils électriques et électroniques est punie d'amende administrative.

**Nota importante per le apparecchiature elettroniche vendute in Italia**

Istruzioni sulla protezione ambientale e sullo smaltimento dei dispositivi elettronici:



Le apparecchiature elettriche ed elettroniche contrassegnate con questo simbolo non possono essere smaltite come rifiuti urbani.
In conformità con la Direttiva 2012/19 / UE, gli utenti dell'Unione Europea di apparecchiature elettriche ed elettroniche hanno la possibilità di restituire i propri RAEE per lo smaltimento al distributore o al produttore di apparecchiature dopo averne acquistato uno nuovo. La rimozione illegale di apparecchiature elettriche ed elettroniche è punibile con una sanzione amministrativa.