

## Disclaimer and Copyright

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### **Medical Device Manufacturing Enterprise License:**

Shaanxi FDA Production License No. 20123142

### **Medical Device Product Registration No.:**

Shaanxi FDA (Approved) 20152400059

# Safety and Regulatory Compliance

## 1. Overview

The operation, maintenance, repair and transportation of **Genesy PCR Thermal Cycler** (hereinafter referred to as **Genesy thermal cycler**) shall strictly follow the basic safety specifications listed in this section and through this manual. Nonobservance of the instruction provided or performing any operations not stated in the manual may affect the safety protection provided by the Genesy thermal cycler, and may also destroy the safety standards of design and manufacture as well as the expected application range of the instrument.

### Special Declaration

Before install and use the Genesy thermal cycler, please read this manual carefully and observe the warnings and non-recommended functions. Also bear mind the potential scope for misuse; it is advisable to draw attention to the possible consequences.

**Caution:** users must be aware of the possible hazards of this instrument and its accessories. For correct operations that are complied with the specifications and the matters needing attention mentioned in this manual, the Genesy thermal cycler will not cause any danger to operation personnel.

*XATL Co., Ltd. will not be responsible for any possible consequence caused by the violation of following safety specifications.*

## 2. Safety Labels

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### Caution



Warning the operation personnel pay attention to a certain operation. Operate the instrument in any manner unspecified in this manual may results in instrument damage or abnormal function.

---

**Biohazard**

This symbol is used to indicate that certain precautions must be taken while working with potential infectious materials.

---

**Reminding**

Providing important information that critical to instrument operation or usage, including the information explained in further detail elsewhere in this manual.

---

**Prohibit**

Prohibiting the operation personnel from a certain dangerous operation. Otherwise it may results in instrument damage or abnormal function, even constitutes a personal injury hazard.

---

**High-Temp**

This symbol is used to label potential hot instrument surfaces, reminding the operation personnel pay attention to avoid high temperature hazard.

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### 3. Installation and Environment Safety

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**Prohibit**

Never place the instrument in places that have or may have flammable and explosive gas.

---

**Prohibit**

Never use instrument's handle to lift or move the instrument, the handle is only intended for the opening and closing of the hot lid.

---

**Caution**

Do not place the instrument in soft cushion, the instrument base may sink into the cushion and block up the air vent beneath.

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**Caution**

Do not directly touch the thermal cycle block and the hot lid while the instrument is still running, they may generate enough heat to cause serious burns. Please wait the thermal cycle block to return to idle temperature before opening the lid and removing samples.

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**Caution**

Do not place the instrument adjoin against the wall or place other items behind it, this may affect the instrument cooling.

---

**Caution**

The instrument should be placed in the room with low humidity, less dust and away from water source, the room should be well ventilated and without corrosive gas. Please avoid directly sunshine and heating furnace, stoves and other heat sources during utilization.

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## 4. Power Supply Safety

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**Caution**

Please check the power connection carefully. Hold the plug when you plug the power cord and make sure the plug is perfectly inserted into the socket, do not pull the power cord to pull out the plug.

---

**Caution**

In case of electric leakage, immediately unplug the instrument and stop using.

---

**Caution**

Never touch the plug or the power switch with wet hands.

---

**Caution**

Please cut off the power before move the instrument.

---

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**Caution**

Please keep the power cord away from heater or other high temperature objects.

---

**Caution**

In case the instrument will not be used for a long time, unplug it, and cover the instrument with soft cloth or plastic bag to prevent dust from entering.

---

## 5. Instrument Operation Safety

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**Caution**

No person except the **XATL Co., Ltd.** professional maintenance personnel is allowed to open the instrument, replace any part or disassemble machine. Do not replace any part while the instrument is connected to the power supply

---

**Caution**

Do not drop or damage the instrument, please handle it carefully.

---

**Reminding**

Please cut off the power and restart the system if the instrument is not working properly.

---

**High-Temp**

The temperature of hot lid may raise up to 105°C during the process of experiment, please pay attention to avoid high-temperature hazards.

---

**Prohibit**

Never open the hot lid while the instrument is still running, which may affect the experiment result.

---

## 6. Other Details

### 6.1 Grounding

For protection against electric shock hazards, the Genesy thermal cycler must be grounded properly. The power cord provided is with a standard three pin plug, please plug it into an appropriate three-wire grounded receptacle for operation safeties.

### 6.2 Power Supply

Before connecting the AC power supply, please ensure the consistent of the Genesy thermal cycler required voltage and the power supply voltage, and make sure that the rated load of receptacle is no less than the requirement of the instrument.

### 6.3 Power Cord

Under normal circumstances, please use the instrument attached power cord. If the original power cord is destroyed, please substitute it with an equal one. Please do not put anything on the power cord and keep it away from places where people usually move around. Please hold the plug when you plug the power cord and make sure the plug is perfectly inserted into the socket, do not pull the power cord to pull out the plug.

### 6.4 Replacement of Fuse Tube

The backup fuse tube (type 220V/10A) is located at the back of the instrument. For replacement, please cut off the power supply and unplug the power cord, open the fuse box with slotted screwdriver and replace the fuse.

### 6.5 Placing Requirements

The Genesy thermal cycler should be placed in the room with low humidity, less dust and away from water source (such as water pool, water tube etc.), the room should be well ventilated and without corrosive gas. Please do not put the instrument in wet or dusty place.

For protection against overheating hazards, the openings on the instrument are designed for ventilation. Please do not block or cover these ventilation openings. For single instrument running, the distance between adjacent objects and the surrounding ventilation openings shall be no less than 30cm. Do not place the instrument in soft surface, the instrument base may sink into the soft surface and block up the air inlet beneath.

If ambient temperature is too high, the performance of the Genesy thermal cycler may be affected and lead to the breakdown of the instrument. Please avoid directly sunshine, heating furnaces, stoves and other heat sources during the running of the Genesy thermal cycler.

In case the Genesy thermal cycler will not be used for a long time, please unplug the power plug and cover the Genesy thermal cycler with soft cloth or plastic bag to prevent dust from entering.

### **Remarks**

In case of any following conditions, immediately cut off the power supply and contact the distributor or the manufacturer to ask for professional maintenance personnel for processing.

- Instrument is soaked with water or rain;
- Any liquid has entered into the instrument;
- Abnormal sound or smell occurred while the instrument is running;
- The instrument has fell off and with housing damage;
- Obvious functional changes of the instrument.

### **6.6 Unpacking and Acceptance**

The Genesy thermal cycler and its accessories are packaged in a packing case. Please check for the quantity and quality of the instrument and the accessories according to packing list. Report the distributor or the manufacturer in case there is any damage or lack.

After acceptance, please fill in the installation feedback table with related information, and send it back to **XATL Co., Ltd.** for documentation and warranty.

Please keep the packing materials for future use, for damages as consequences of improper packaging that incurred during the transportation back to maintenance department, **XATL Co., Ltd.** will not be responsible for the warranty.

### **6.7 Instrument Clean and Consumables Disposal Suggestion**

Please regularly disinfect the surfaces of instrument and thermal cycle block with external UV equipment. The disposal of abandoned experimental consumables should be treated as biological waste.


## Important Notification


Without the authorization of **XATL Co., Ltd.** operation personnel are not allowed to open the apparatus, to replace any component or to debug the Genesy thermal cyclers. Such as the need to open the Genesy thermal cyclers must be approved by the manufacturers and be performed by professional maintenance personnel, otherwise **XATL Co., Ltd.** will not be responsible for warranty.

## Electromagnetic Compatibility Specification

The electromagnetic compatibility classification of Genesy thermal cyclers belongs to Class A, Group I.

- a) The Genesy thermal cyclers confirm to the emission and immunity requirements of **GB/T 18268.1** and **GB/T 18268.26** regulations.
- b) The Genesy thermal cyclers are designed and tested as Class A equipment. It may cause radio interference in family environment, which requires certain protective measures to be taken.
- c) It is suggested to evaluate the electromagnetic environment before using the Genesy thermal cyclers.
- d) It is prohibited to use the Genesy thermal cyclers close to strong radiation source (for example, unshielded radio source), which may affect the normal work of the Genesy thermal cyclers.

 **Reminding:** It is manufacturer's responsibility to provide the instrument electromagnetic compatibility information to customers or users.

 **Reminding:** It is users' responsibility to provide the suitable electromagnetic compatibility environment for Genesy thermal cyclers.



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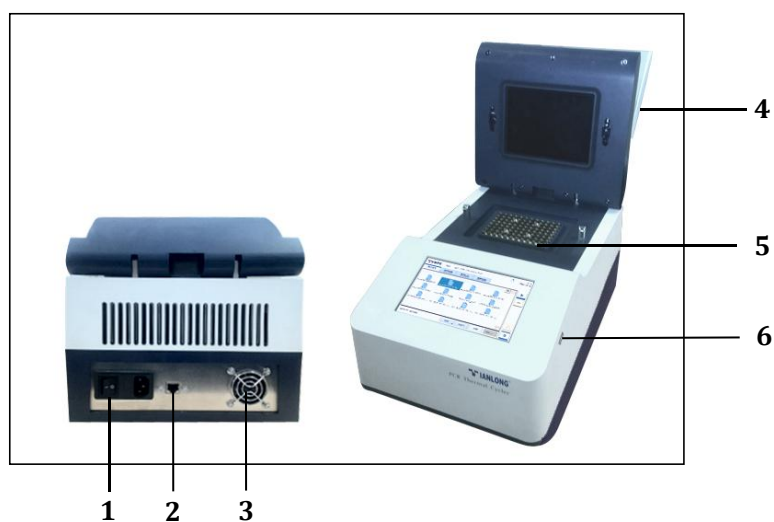
# 1. Overview

## 1.1 Application Fields

Genesy thermal cyclers are intended for pathogen detection and gene analysis through rapid, accurate polymerase chain reaction. It could be used in the fields of molecular biology, biotechnology, microbiology, medical science, forensic science, environmental science, food industry, clinical diagnosis, epidemiology, genetics, gene chip, gene detection, gene clone, gene expression, etc.

## 1.2 Instrument Structure

Fig 1-1 Thermal cycler structure diagram



1	Power port and switch
2	Internet access
3	Power air outlet
4	Hot lid handle
5	Thermal cycle block
6	USB interface

## 1.3 Instrument Features

<b>Touch Screen Operation</b>	Full colored LCD touch screen + Chinese/English display
<b>Precise Control</b>	Possess built-in engineering computer, support stand-alone operation, independent from control computer, save more space and energy, provide high stability automatic control system.
<b>Gradient Control</b>	12 gradient temperatures precise control, wide gradient control range of 30.0°C~99.9°C, gradient temperature span 1.0°C ~30.0°C.
<b>Free Programming</b>	Powerful programming function allows flexible and efficient application define, which can meet different reagents requirements.
<b>Safe and Reliable</b>	Hot lid is accompanied with opening prompt, guarantee the operation safety.
<b>Silent Running</b>	Running noise is less than 55db.

## 1.4 Instrument Performance Index

### 1.4.1 Technical Features

- **Reaction System:** 0-100ul
- **Plate Type:**

Genesy thermal cycler (96T) - 0.2mL or 8-strip PCR tube,; 0.2mL 96-well PCR plate (no skirt, semi-skirt and full-skirt).

Genesy thermal cycler (48T/64T) - 0.2mL single or 8-strip PCR tube.

- **Operation Interface:** full colored LCD touch screen + Chinese/English display
- **Experimental Program:** more than 1000 experimental programs can be created.
- **Experiment Management:** create, edit or delete experiment files.
- **Power-off Protection:** protect all configuration settings in case of power off and the interrupted experiment can continues after power on.
- **Heating/Cooling Ramp:**  
From 50.0°C~90.0°C, max heating ramp no less than 3.5°C/s;  
From 90.0°C~50.0°C, max cooling ramp no less than 2.5°C/s;
- **High Homogeneity:**  $\pm 0.2^{\circ}\text{C}$
- **High Temperature Accuracy:**  $\pm 0.1^{\circ}\text{C}$

## 1.4.2 Instrument Specifications

- **Power supply:** AC voltage of  $220 \times (1 \pm 10\%)\text{V}$ ,  $50 \times (1 \pm 2\%)\text{Hz}$ ; Rated power no more than 600VA.
- **Instrument Dimension:** 400mm  $\times$  260mm  $\times$  260mm
- **Instrument Weight:** 11Kg

## 1.4.3 Package Specification

- **Package Dimension:** 500mm  $\times$  360mm  $\times$  350mm
- **Package Weight:** 13Kg

## 2. Installation and Utilization

### 2.1 Instrument Installation

#### 1) Open-case Inspection

Please check the integrity of the product package before open it. Report the transportation department and the manufacturer in case there is any sign of defects, collisions or water marks. After this, please open the package and check the instrument and accessories according to the packing list, ensure that all components are present and intact, report any missing items to our company or the distributors that assigned by our company. Please keep the packing materials for future use, for damages as consequence of improper packaging that incurred during the transportation back to maintenance department, **XATL Co., Ltd.** will not be responsible for the warranty.

#### 2) Instrument Placement

The Genesy thermal cycler should be placed in the room with low humidity, less dust and away from water source (such as water pool, water tube etc.), the room should be well ventilated, without corrosive gas and intense magnetic field. Please do not put the instrument in wet or dusty place; do not place the instrument in soft surface, the instrument base may sink into the soft surface and block up the air inlet beneath; the openings on the instrument are designed for ventilation, please do not block or cover these ventilation openings. While the instrument is running, distance between adjacent objects and the surrounding ventilation openings shall be no less than 30cm; please prevent the instrument away from directly sunshine, heating furnaces, stoves and other heat sources.

#### 3) Grounding

For protection against electric shock hazards, the Genesy thermal cycler must be proper grounded. The power cord provided is with a standard three pin plug, please plug it into an appropriate three-wire grounded receptacle for operation safeties.

#### 4) Power Supply

Before connecting the AC power supply, please ensure the consistent of

the Genesy thermal cyclers required voltage and the power supply voltage (allowable deviation  $\pm 10\%$ ). And make sure that the rated load of receptacle is no less than the requirement of the instrument.

#### 5) Power Cord

Under normal circumstances, please use the instrument attached power cord. If the original power cord is destroyed, please substitute with the power cord whose type and size are identical to the original one. Please do not put anything on the power cord and keep it away from places where people move around.

#### 6) Power Cord Plug

Please hold the plug when you plug the power cord and make sure the plug is perfectly inserted into the socket, do not pull the power cord to pull out the plug.

## 2.2 Environment Requirements

Considering the security and performance of the instrument, the installation and working environment of the Genesy thermal cyclers should comply with the following conditions:

- 1) Unexplosive environment;
- 2) General working environment temperature should be between  $15^{\circ}\text{C}$  to  $35^{\circ}\text{C}$ . If the temperature demand of experiment is high, the working environment temperature should be between  $20^{\circ}\text{C}$  to  $30^{\circ}\text{C}$ .
- 3) The relative humidity should be greater than 20% and less than 70%, Non-condensing.
- 4) Power voltage:  $220 \times (1 \pm 10\%) \text{V AC}$ ,  $50 \times (1 \pm 2\%) \text{Hz}$ ; Rated power no more than 600VA. UPS power supply is recommended.

## 3. Operation Instructions

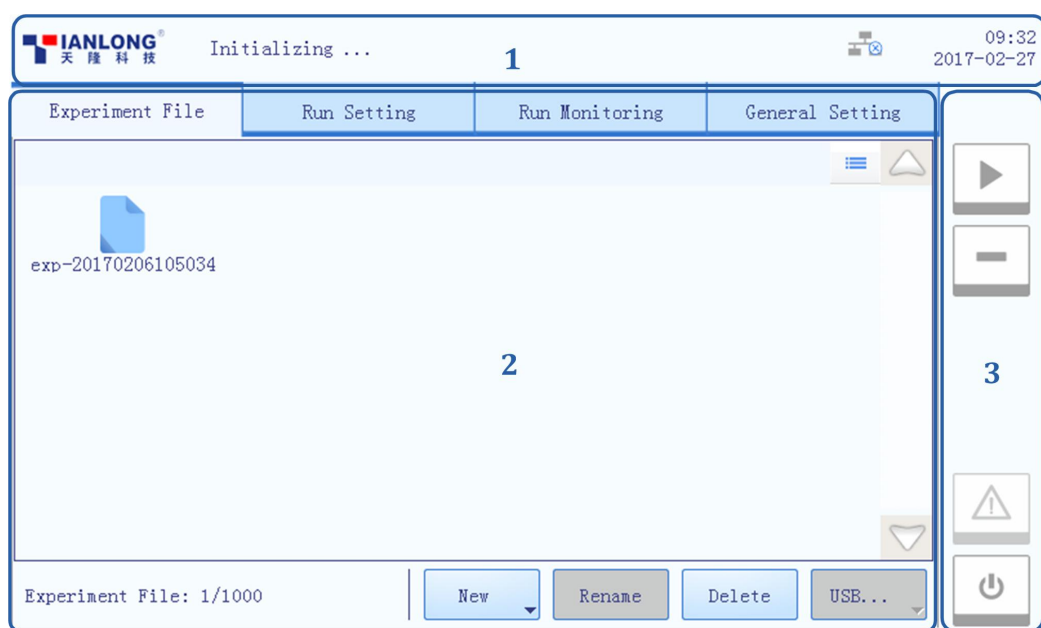
### 3.1 Start Up

Switch on the power switch at the back of the Genesy thermal cycler, the instrument will perform self-inspection, its screen will light up and display startup interface.

### 3.2 Main Interface

After the self-inspection, the instrument software system will automatically enter the main interface, which is consisted of three parts: status bar, operation area, and main function keys, as shown in figure 3-1.












Figure 3-1 Main Interface








#### Interface Introduction & Parameter Descriptions

1. **Status Bar:** display the system status, current file name, instrument status and system time.
  - ▶ **System Status:** display the current system status.
    - **Initializing:** the system is in process of initialization;
    - **Ready:** the system initialization is completed, ready for running;



- **Running**: the instrument is in process of experiment running;
  - **Pause**: the current running experiment is paused;
  - **Error**: instrument hardware or software error, cannot execute any operation.
- ▶ **File Name**: display the current experiment file name and its file path.
- ▶ **Instrument Status**: display the current instrument status.
- <  **Not Connected** >: the instrument is not connected to the network;
  - <  **Connected** >: the instrument is connected to the network;
  - <  **USB** >: the instrument is connected with USB device;
  - <  **Hot Lid Used**>: the hot lid heating function is enabled;
  - <  **Hot Lid Unused** >: the hot lid heating function is not enabled;
  - <  **Hot Lid Open**>: the hot lid is open;
  - <  **Error** >: hardware or software error, cannot execute any operation.
- ▶ **System Time**: display the current system date and time.
2. **Operation Area**: includes **Experiment File**, **Run Setting**, **Run Monitoring**, **General Setting** four tabs, for more operation details, please refer to [3.2 Software Operation](#).
3. **Main Function Keys**:
- ▶ <  **Run Experiment** >: run the current experiment. This function key is activated when the system status is **Ready** or **Pause**.
  - ▶ <  **Pause Experiment** >: pause the current running experiment. This function key is activated when the system status is **Running**.
  - ▶ <  **Stop Experiment** >: stop the current running experiment. This function key is activated when the system status is **Running**.
  - ▶ <  **Shutdown / Restart** >: shutdown or restart the instrument. This function key is inactivated (grey icon) when the system status is **Running**.

- ▶ <  /  /  **Warning** >: This function key is inactivated (grey icon) under normal system status, however it will turn yellow or red when a certain system error happened, press this key, the system will display the warning information.
-  Yellow icon: the instrument can still execute the current operation;
-  Red icon: the instrument cannot execute the current operation;

## 3.2 Software Operation

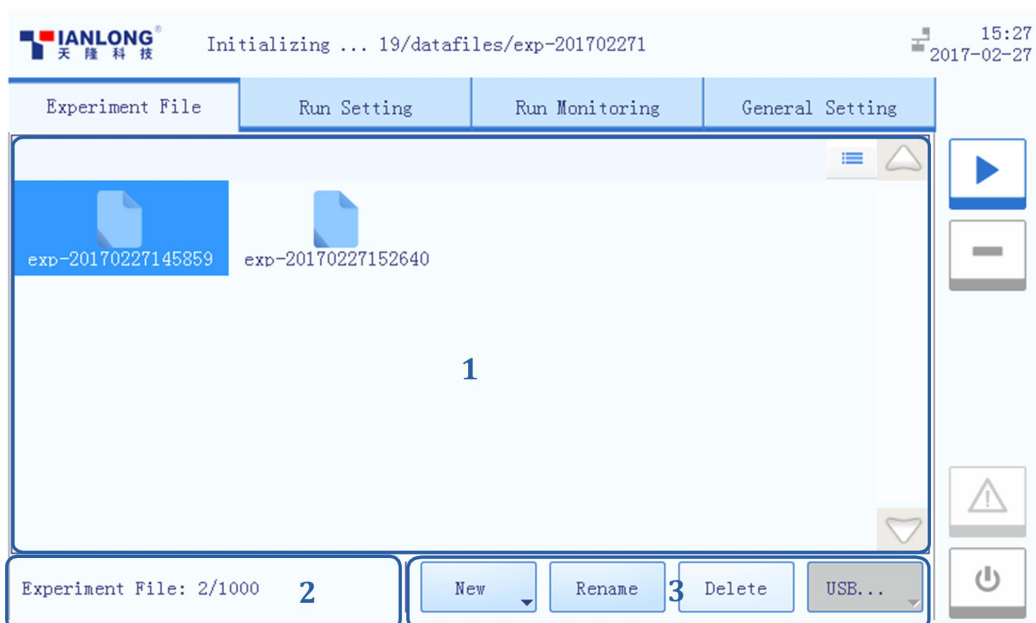
The operation area of the system software includes **Experiment File**, **Run Setting**, **Run Monitoring**, **General Setting** four tabs. Users could perform relevant operations and set the corresponding contents according to the specific experimental requirements.

- ▶ **Experiment File**: display experiment files and provide the relevant experiment file operations;
- ▶ **Run Setting**: provide the experiment temperature, cycle, reaction volume and hot lid setting operations;
- ▶ **Run Monitoring**: display real-time running information of the current experiment;
- ▶ **General Setting**: provide general setting operations of the current system and instrument.

### 3.2.1 Experiment File

The experiment file tab is selected on the main interface by default, as shown in figure 3-2. The experiment file interface is consisted of three parts: experiment file displaying area, experiment file information area and experiment file operation area.

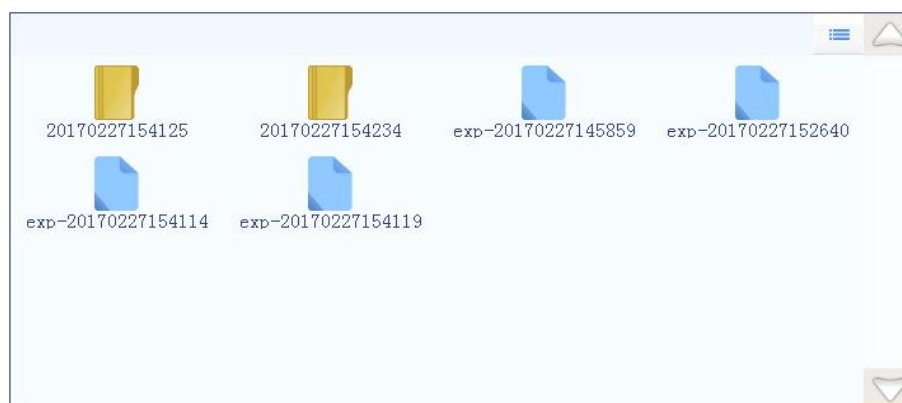
Figure 3-2 Experiment File Interface







### Interface Introduction & Parameter Descriptions

1. **Experiment File Displaying Area:** display the pre-existed experiment files or file folders within the instrument system, as shown in figure 3-2-1.

Figure 3-2-1 Experiment File Displaying Area



- ▶ Users could slide the slider or press the  and  icons to view all the experiment files or file folders;
- ▶ Press  icon, it will turn into  icon, and the display mode of the experiment file displaying area will be converted from file icons to file list.

2. **Experiment File Information Area:** display the pre-existed experiment quantity within the instrument system, as shown in figure 3-2-2.

**Figure 3-2-2 Experiment File Information Area**




Experiment File: 4/1000

3. **Experiment File Operation Area:** includes **New**, **Rename**, **Delete** and **USB...** four operation keys, as shown in figure 3-2-3.

**Figure 3-2-3 Experiment File Operation Area**




- ▶ **< New >:** create new experiment file or file folder, this operation key is inactivated when the system status is **Running**. Press the  icon, there are three options in the pull down menu.

- **New Folder:** create a new experiment file folder.
- **New Experiment:** create a new experiment file.
- **New Experiment From Selected Experiment:** users could press and select a pre-existed experiment file in the experiment file displaying area, and create a new experiment based on the selected experiment settings.

- ❗ **Reminding:** The system will pop up a keyboard for users to name the new experiment file or file folder, as shown in figure 3-2-4.



**Figure 3-2-4 Experiment File Operation Area - Keyboard**



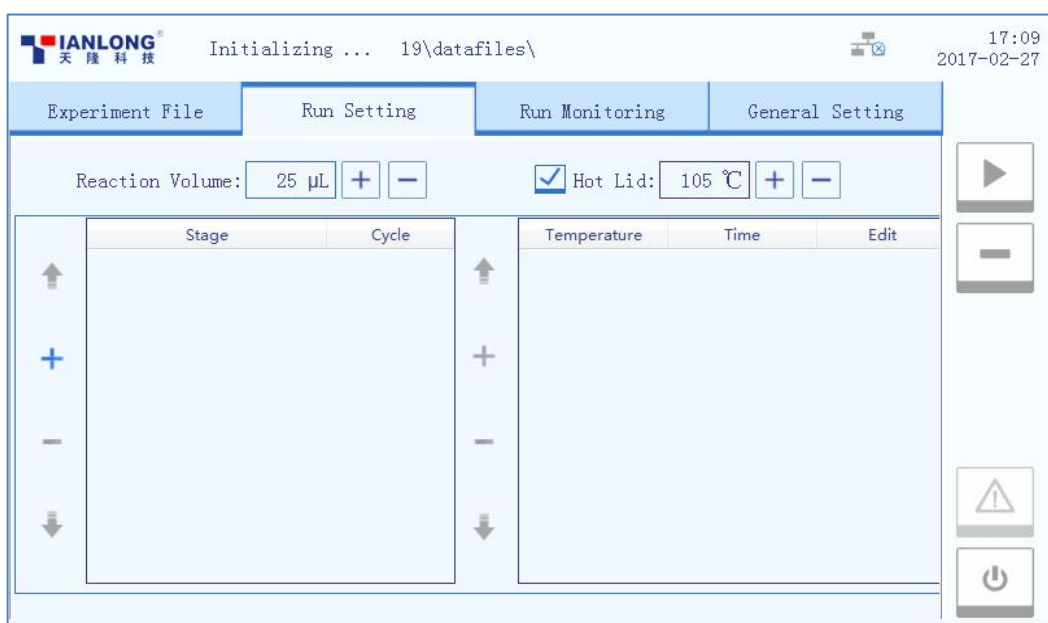
- Users could press < **Enter** > to confirm the new experiment file or file folder name and exit the keyboard, or press < **Close** > to directly exit the keyboard.
- ▶ < **Rename** >: rename the selected experiment file or file folder.
- ▶ < **Delete** >: delete the selected experiment file or file folder.
- ▶ < **USB...** >: execute file transmission between the instrument and USB device.
- **Export Experiment**: export the selected experiment file or file folder from the instrument to the USB device.
- **Import Experiment**: import the selected experiment file or file folder from the USB device to the instrument.
- 🚨 **Reminding**: If there are more than one USB devices connected to the current instrument, please press the  icon on the < **USB...** > operation key to select the USB device.

### 3.2.2 Run Setting







Users could set the temperature program, cycle, reaction volume and hot lid temperature for the current experiment on the run setting interface, as shown in figure 3-3.

-  **Reminding:** the system will automatically enter the run setting interface after new experiment file creation;
-  **Reminding:** users could also select an experiment file, press **Run Setting** tab on the main interface, enter the run setting interface to view or edit the experimental settings.





**Figure 3-3 Run Setting Interface**









#### Interface Introduction & Parameter Descriptions

- ▶ **Reaction Volume:** users could press  or  icons to edit the reaction volume.
-  **Reminding:** the reaction volume setting range is 0µL~100µL.
- ▶ **Hot Lid:** users could press the check box of **Hot Lid** to decide whether utilize the hot lid heating function, and press  or  icons to edit the hot lid temperature.
-  **Reminding:** the hot lid temperature setting range is 40°C ~110°C.

► **Stage Setting:**


- **Stage:** display the stage type of the temperature program.
- **Cycle:** display the cycle number of the current stage.
- <  **Up** >: move up the selected stage.
- <  **Add** >: add a new stage.
- <  **Delete** >: delete the selected stage.
- <  **Down** >: move down the selected stage.

► **Step Setting:**

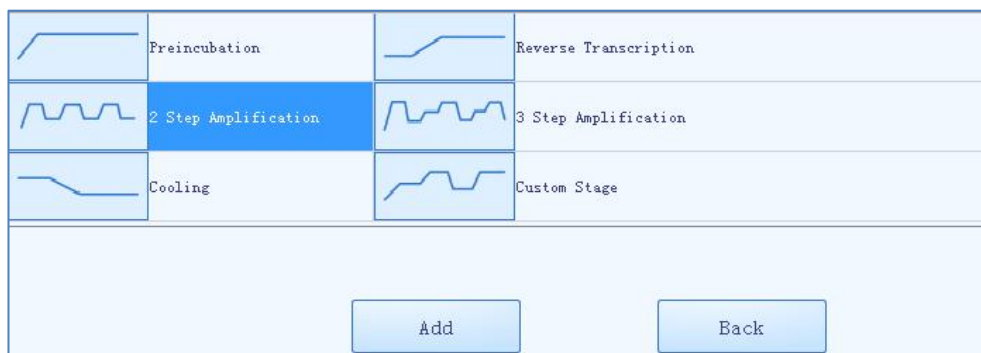
- **Temperature:** display the target temperature of the current step.
- **Time:** display the temperature holding time of the current step.
- <  **Edit** >: press  icon in **Edit** column to edit the corresponding step.
- <  **Up** >: move up the selected step.
- <  **Add** >: add a new step.
- <  **Delete** >: delete the selected step.
- <  **Down** >: move down the selected step.

## Temperature Program Setting Operation

### 1<sup>st</sup> Step: Add Stage

User could press the <  **Add** > icon in the stage setting box, the system will pop up the stage type selection window, as shown in figure 3-3-1.

**Figure 3-3-1 Stage Type Selection Window**



Five predefined stage types are provided by the system software: **Preincubation**, **Reverse Transcription**, **2 Step Amplification**, **3 Step Amplification** and **Cooling**. Users could press **Custom Stage** to define the stage setting according to specific experiment requirements.

- ▶ Users could press < **Add** > to add the selected stage to stage setting box.
- ▶ Users could press < **Back** > to return back to the run setting interface.
- ❗ **Reminding:** at least one stage should be included in the temperature program.

### 2<sup>nd</sup> Step: Edit Stage

- ▶ User could select a certain stage, delete it or change its order.
- ▶ User could select a certain stage and press its corresponding **Cycle** column, the cycle edit box will pop up as shown in figure 3-3-2.

**Figure 3-3-2 Cycle Edit Box**


- ▶ User could set the cycle number in the cycle edit box, press < **OK** > to confirm the cycle setting or press < **Cancel** > to cancel the setting.
- ❗ **Reminding:** the cycle setting range is 1~99.

### 3<sup>rd</sup> Step: Add or Delete Step

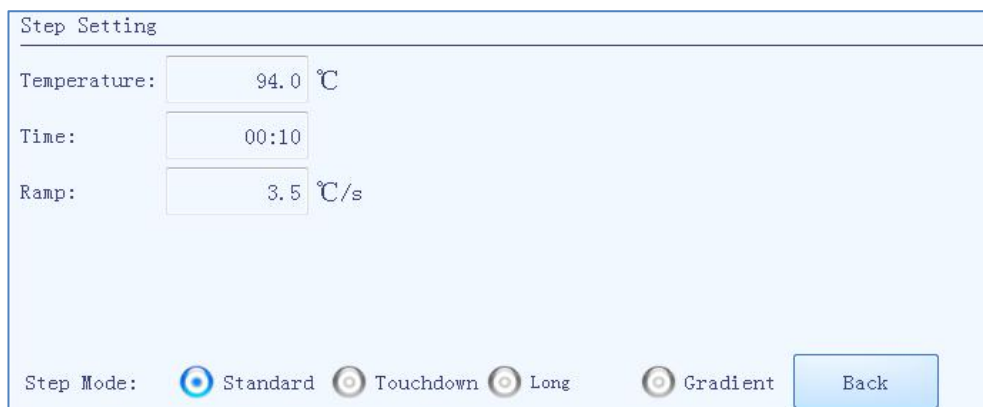
- ▶ Select a certain stage in the stage setting box, its corresponding steps will be presented in the step setting box on the right side.
- ▶ Users could add a new step, delete a step, or change the step orders.
- ❗ **Reminding:** at least one step should be included in one stage.



#### 4<sup>th</sup> Step: Edit Step

Users could select a certain step in the step setting box, and press the  icon in the corresponding **Edit** column, the step edit window will pop up, as shown in figure 3-3-3.


**Figure 3-3-3 Step Edit Window - Standard Step Mode**



The figure shows a 'Step Setting' window with the following parameters:

- Temperature: 94.0 °C
- Time: 00:10
- Ramp: 3.5 °C/s

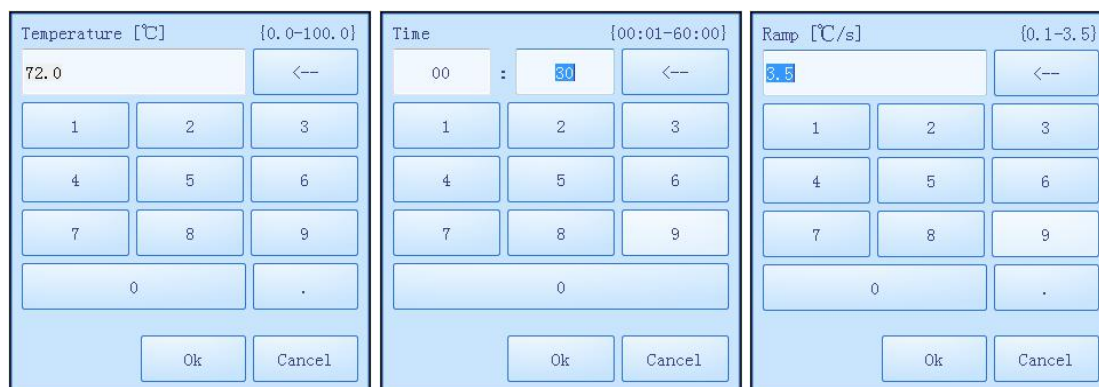
At the bottom, there are four radio button options for Step Mode: Standard (selected), Touchdown, Long, and Gradient. A 'Back' button is also present.

Four **Step Mode** options are provided by the system software: **Standard**, **Touchdown**, **Gradient** and **Long**. Users could select a certain step mode option by pressing  icon in front of it, and the icon will turn blue.

1) The **Standard** step mode option is selected by default.

- Users could press the input boxes of **Temperature**, **Time** and **Ramp** to edit the corresponding parameters for the current standard step, as shown in figure 3-3-4.

**Figure 3-3-4 Step Edit Window - Standard Step Mode Parameters Setting**



The figure shows three separate numeric input windows for editing parameters:

- Temperature [°C]** (range: {0.0-100.0}): Current value 72.0. Input fields for digits 1-9, 0, and a decimal point.
- Time** (range: {00:01-60:00}): Current value 00:30. Input fields for hours (00), minutes (30), and seconds (0).
- Ramp [°C/s]** (range: {0.1-3.5}): Current value 3.5. Input fields for digits 1-9, 0, and a decimal point.

Each window includes 'Ok' and 'Cancel' buttons at the bottom.

- **Temperature:** the temperature in °C, which is to be held for a defined time.
  - **Time:** the time for which the temperature is to be held.
  - **Ramp:** the rate of temperature change in °C per second.
  - ❗ **Reminding:** the temperature setting range is 0.0°C ~100.0°C.
  - ❗ **Reminding:** the time setting range is 1s~60min.
  - ❗ **Reminding:** the ramp setting range is 0.1°C/s~3.5°C/s.
- 2) If the selected option is **Touchdown** step mode, the step edit window will be shown as figure 3-3-5.

**Figure 3-3-5 Step Edit Window - Touchdown Step Mode**

Step Setting					
Initial Temp. :	<input type="text" value="94.0"/>	°C	Target Temp. :	<input type="text" value="50.0"/>	°C
Time:	<input type="text" value="00:10"/>		Delta Temp. :	<input type="text" value="1.0"/>	°C/Cycle
Ramp:	<input type="text" value="3.5"/>	°C/s	Start Cycle:	<input type="text" value="1"/>	
Step Mode:	<input type="radio"/> Standard	<input checked="" type="radio"/> Touchdown	<input type="radio"/> Long	<input type="radio"/> Gradient	<input type="button" value="Back"/>

- ▶ The touchdown step mode allows the temperature program to change the annealing step temperature from the initial temperature to the target temperature as the cycling proceeds.
  - ▶ Users could press the input boxes of **Initial Temp.**, **Target Temp.**, **Delta Temp.** and **Start Cycle** to edit the corresponding parameters for the current touchdown step, as shown in figure 3-3-6.
- **Initial Temp.:** the initial value of annealing temperature change.
  - **Target Temp.:** the target value of annealing temperature change.
  - **Delta Temp.:** the temperature change in °C per cycle.
  - **Start Cycle:** the cycle number after which the temperature change is started.

Figure 3-3-6 Step Edit Window - Touchdown Step Mode Parameters Setting

The figure shows four separate numeric keypad windows for parameter setting:

- Initial Temp. [°C]**: Range {35.0-100.0}, current value 72.0.
- Target Temp. [°C]**: Range {35.0-100.0}, current value 50.0.
- Delta Temp. [°C/Cycle]**: Range {0.1-5.0}, current value 1.0.
- Start Cycle**: Range {1-40}, current value 1.

Each keypad includes a numeric keypad (0-9, .) and 'Ok'/'Cancel' buttons.

- ❗ **Reminding:** the initial temperature setting range is 35.0°C ~100.0°C.
- ❗ **Reminding:** the target temperature setting range is 35.0°C ~100.0°C.
- ❗ **Reminding:** the delta temperature setting range is 0.1°C ~5.0°C.
- ❗ **Reminding:** the star cycle range is 1~ max cycle number of the current stage.

3) If the selected option is **Long** step mode, the step edit window will be shown as figure 3-3-7.

Figure 3-3-7 Step Edit Window - Long Step Mode

The Step Setting window displays the following parameters:

- Temperature: 94.0 °C
- Target Time: 02:00
- Initial Time: 00:10
- Delta Time: 00:05 /Cycle
- Ramp: 3.5 °C/s
- Start Cycle: 1

At the bottom, the Step Mode is set to **Long** (selected with a blue circle). Other options are Standard, Touchdown, and Gradient. A Back button is also present.

- ▶ The long step mode allows the temperature program to change the elongation step temperature holding time from the initial time to the target time as the cycling proceeds.
- ▶ Users could press the input boxes of **Initial Time**, **Target Time**, **Delta Time** and **Start Cycle** to edit the corresponding parameters for the current long step, as shown in figure 3-3-8.

**Figure 3-3-8 Step Edit Window - Long Step Mode Parameters Setting**

The figure displays four parameter setting windows:

- Initial Time** (Range: {00:01-60:00}): Shows '00' in the first box and '30' in the second box.
- Target Time** (Range: {00:01-60:00}): Shows '02' in the first box and '00' in the second box.
- Delta Time [°/Cycle]** (Range: {00:01-10:00}): Shows '00' in the first box and '05' in the second box.
- Start Cycle** (Range: {1-40}): Shows '1' in the input box.

- **Initial Time:** the initial value of the elongation time change.
- **Target Time:** the target value of the elongation time change.
- **Delta Time:** the temperature change in °C per cycle.
- **Start Cycle:** the cycle number after which the time change is started.
- ⚠ **Reminding:** the initial time setting range is 1s~60min.
- ⚠ **Reminding:** the target time setting range is 1s~60min.
- ⚠ **Reminding:** the delta time setting range is 1s~10min.
- ⚠ **Reminding:** the star cycle range is 1~ max cycle number of the current stage.

- 4) If the selected option is **Gradient** step mode, the step edit window will be shown as figure 3-3-9.

**Figure 3-3-9 Step Edit Window – Gradient Step Mode**

Step Setting

Time: 00:10 Temp. Center: 94.0 °C

Ramp: 3.5 °C/s Temp. Offset: 5.0 °C

Details

Step Mode:  Standard  Touchdown  Long  Gradient Back

- ▶ The gradient step mode allows the Genesy thermal cycler block to adopt different temperatures. After setting the temperature center value and the temperature offset value for the current gradient step, the system will automatically calculate the gradient temperatures.
- ▶ Users could press the input boxes of **Temp. Center** and **Temp. Offset** to edit the corresponding parameters for the current gradient step. Users could also and press < **Details** > to view the specific gradient temperatures of each column, as shown in figure 3-3-10.

**Figure 3-3-10 Step Edit Window - Gradient Step Mode Parameters Setting**

Temp. Center [°C] [35.5-99.5]

72.0 <--

1 2 3

4 5 6

7 8 9

0 .

Ok Cancel

Temp. Offset [°C] [0.5-20.0]

5.0 <--

1 2 3

4 5 6

7 8 9

0 .

Ok Cancel

Gradient Detail


Column 1	87.0°C
Column 2	87.5°C
Column 3	88.0°C
Column 4	89.0°C
Column 5	90.3°C
Column 6	91.5°C
Column 7	92.5°C
Column 8	93.8°C
Column 9	95.0°C
Column10	96.0°C
Column11	96.5°C
Column12	97.0°C

Close

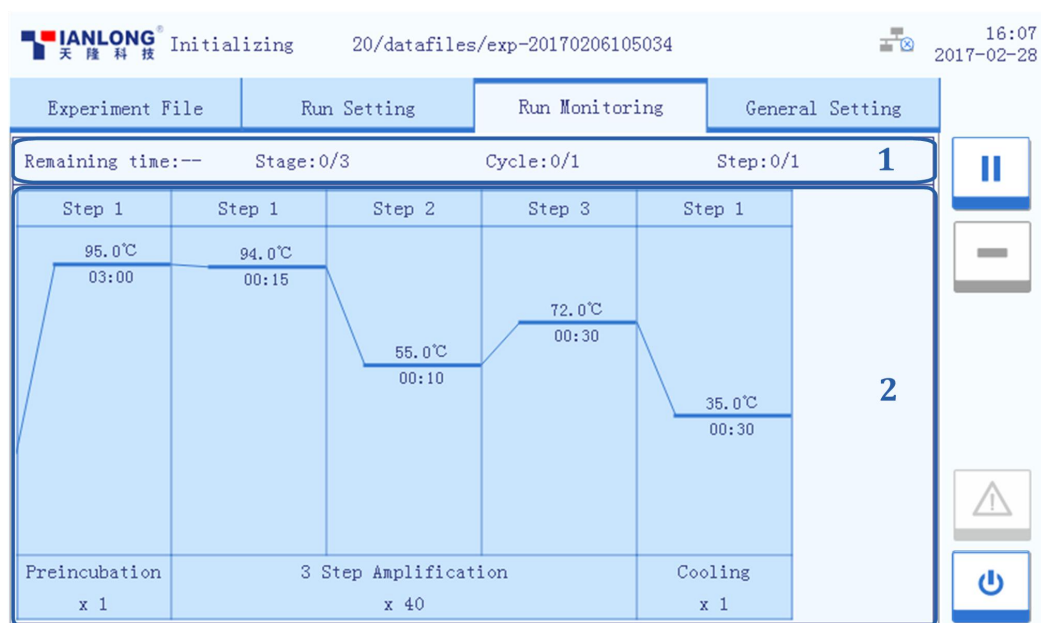
- **Temp. Center:** the center value of the temperature grading range.
- **Temp. Offset:** the offset value of the temperature grading range.

- ❗ **Reminding:** the temperature center setting range is 35.5°C ~99.5°C.
- ❗ **Reminding:** the temperature offset setting range is 0.5°C ~20.0°C.

### 3.2.3 Run Monitoring

After finishing the experiment setting, users could press the <  **Run Experiment** > function key to start running the current experiment, the system will enter the run monitoring interface, as shown in figure 3-4.

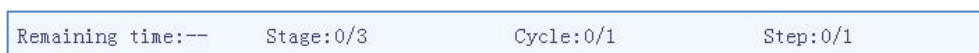
**Figure 3-4 Run Monitoring Interface**



The run monitoring interface is consisted of two parts: run status bar and run monitoring diagram. Users could monitor the real-time status of the current running experiment on this interface.

- 1) **Run Status Bar:** display the real-time status of the current running experiment, including the **Remaining Time**, the current **Stage**, **Cycle** and **Step**, as shown in figure 3-4-1.

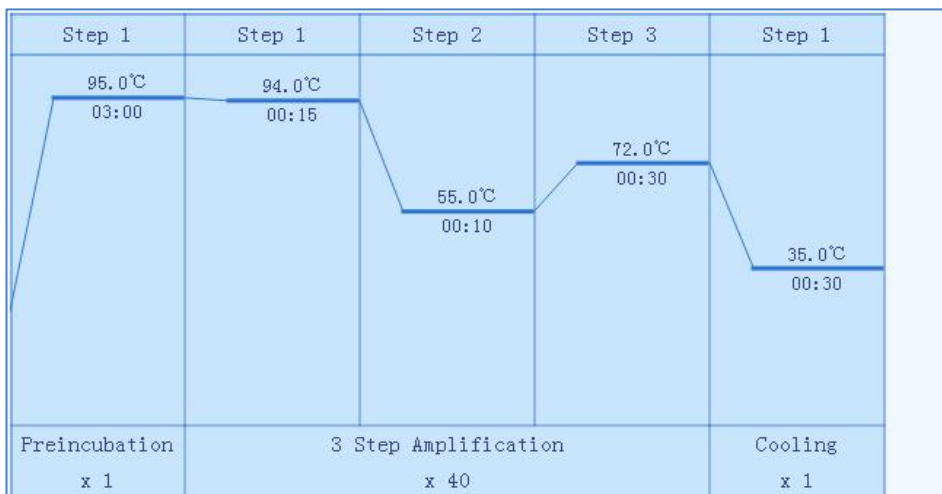
**Figure 3-4-1 Run Monitoring Interface - Run Status Bar**



2) **Run Monitoring Diagram:** display the temperature program of the current running experiment, as shown in figure 3-4-2.

**Reminding:** if users choose to use the hot lid heating function, the remaining time will start to count down after the hot lid reaches the defined temperature.

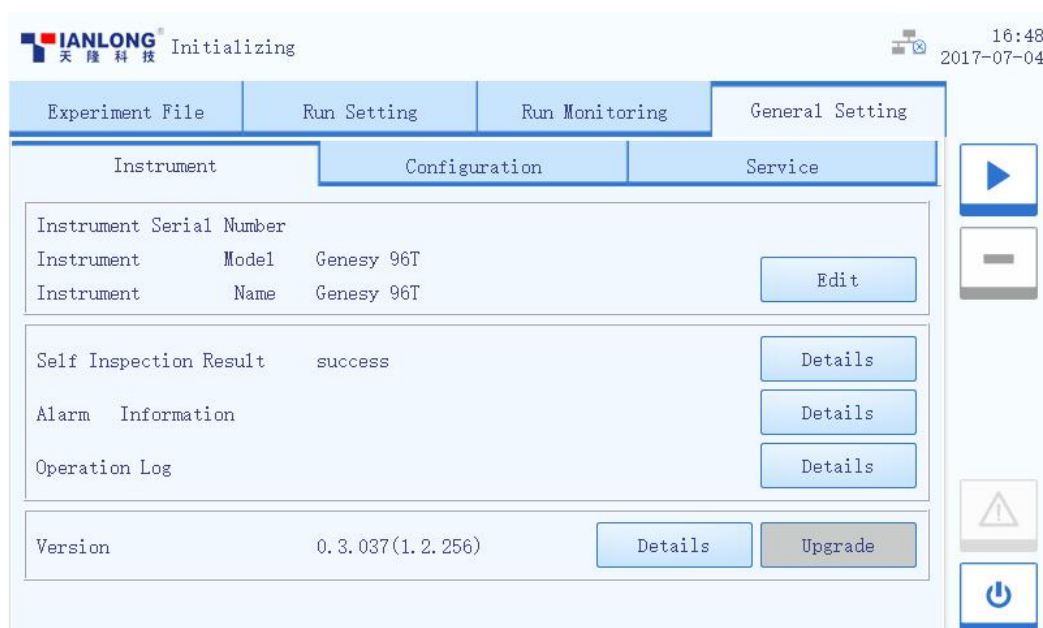
**Figure 3-4-2 Run Monitoring Interface - Run Monitoring Diagram**



### 3.2.4 General Setting

The general setting interface is consisted of **Instrument**, **Configuration** and **Service** three sub-tabs, as shown in figure 3-4-3.

**Figure 3-4-3 General Setting Interface – Instrument Sub-tab**



- 1) **Instrument Sub-tab:** the instrument tab is selected on the general setting interface by default, as shown in figure 3-4-3.
- ▶ **Instrument Serial Number:** display the serial number of the current instrument.
- ▶ **Instrument Model:** display the model of the current instrument.
- ▶ **Instrument Name:** display the current instrument name, users could press < **Edit** > to edit the instrument name, the system will pop up the instrument name edit window, as shown in figure 3-4-4.

**Figure 3-4-4 Instrument Name Edit Window**

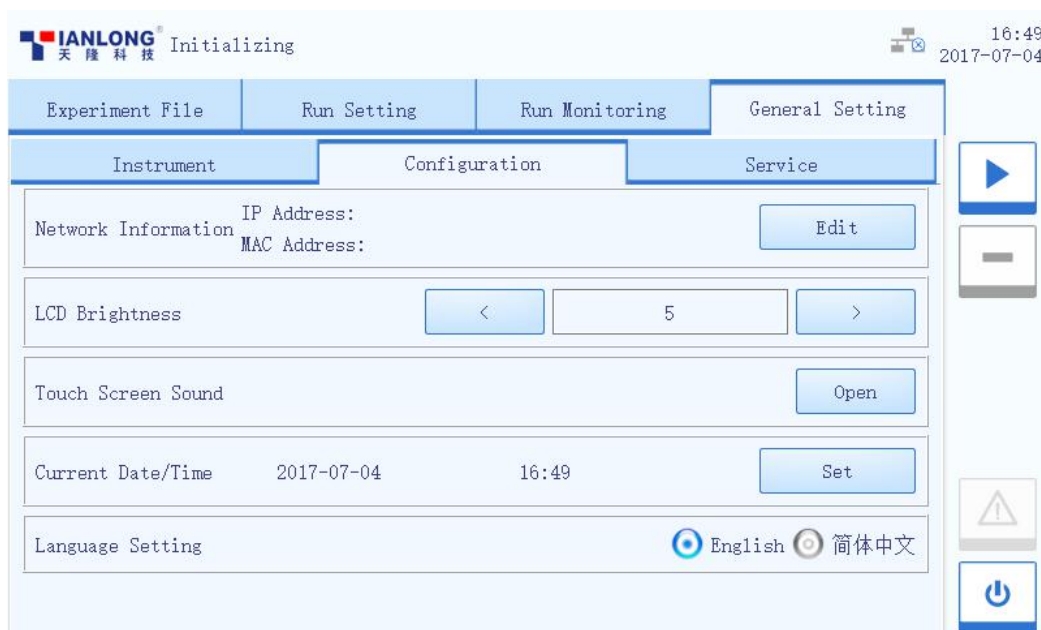


- ▶ **Self Inspection:** display the latest self inspection result, users could press < **Details** > to view the detailed self inspection information.
- ▶ **Alarm Information:** users could press < **Details** > to view the alarm information appeared during the self-inspection and experiment running processes of the current instrument.
- ▶ **Operation Log:** users could press < **Details** > to view all the operations have been executed on the current instrument.
- ▶ **Version:** users could press < **Version** > to view the system version information of the current instrument.
- ▶ **Upgrade:** used for instrument system upgrade.
- ▶ **Reminding:** the instrument system upgrade should be executed by professional engineer or under professional guidelines.



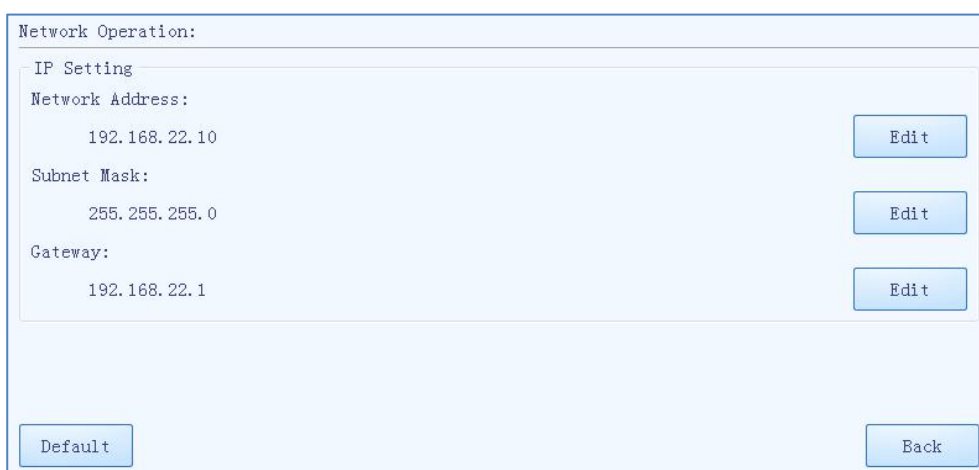
2) **Configuration Sub-tab:** as shown in figure 3-4-5.

**Figure 3-4-5 General Setting Interface – Configuration Sub-tab**





- ▶ **Network Information:** display the network address information of the current instrument. Users could press < **Edit** > to edit the network address, the system will pop up the network operation window, as shown in figure 3-4-6.

**Figure 3-4-6 Network Operation Window**

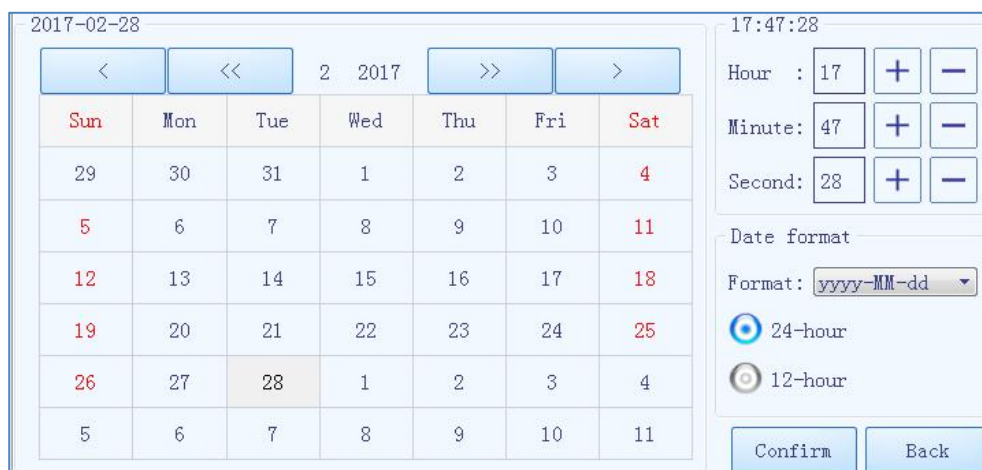


- In the **IP Setting** box, users could view all the network IP addresses, or press <

**Edit** > to modify the corresponding item.

- Users could press < **Default** > to recover the default network IP settings of the current instrument.
- Users could press < **Back** > to turn back to the configuration tab.
- ▶ **LCD Brightness:** users could press  and  icons to adjust the screen brightness (dark: 1 ~ bright: 5).
- ▶ **Touch Screen Sound:** users could press < **Open** > or < **Close** > to decide whether to enable the touch screen sound.
- ▶ **Current Date/Time:** users could press < **Set** > to set the date and time displayed on the current instrument system, the system will pop up the date/time setting window, as shown in figure 3-4-7.

**Figure 3-4-7 Date/Time Setting Window**



Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	1	2	3	4
5	6	7	8	9	10	11

17:47:28

Hour : 17 + -

Minute: 47 + -

Second: 28 + -







Date format

Format: yyyy-MM-dd

24-hour

12-hour

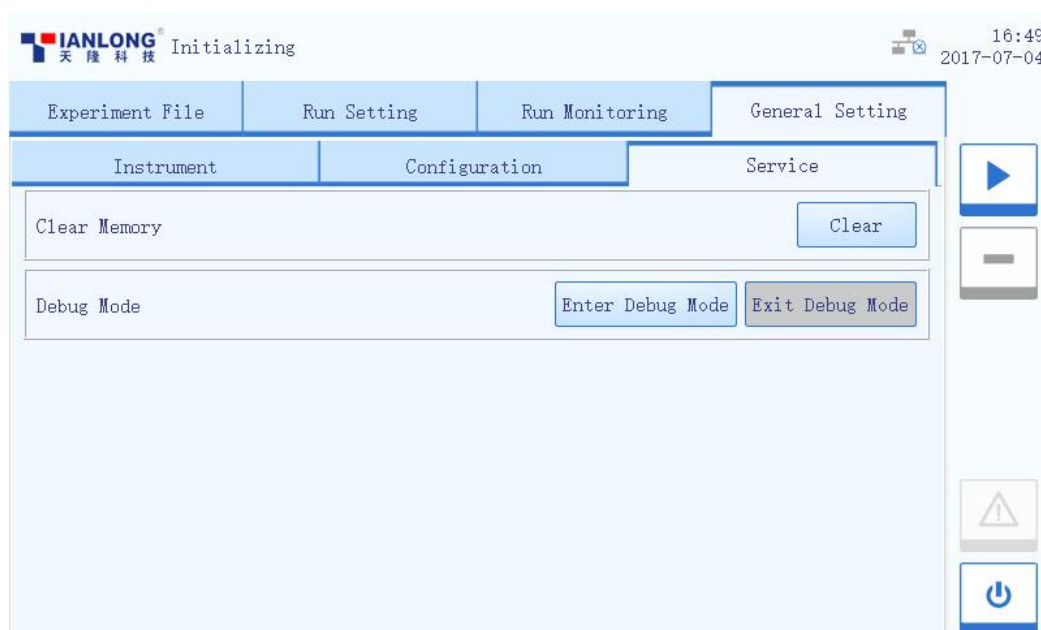
Confirm Back

- Users could press  and  icons to set the displayed year.
- Users could press  and  icons to set the displayed month.
- Users could set the displayed date on the calendar.
- Users could press  and  icons to set the displayed time, including **Hour, Minute and Second**.
- Users could set the displayed date format in the pull down menu of **Format**.
- Users could press **24-hour** or **12-hour** to select the displayed time format.
- Users could press < **Confirm** > to confirm the current date and time setting.

- Users could press < **Back** > to quit setting and turn back to the instrument tab.
- ▶ **Language Setting:** users could set the instrument system language, the two options provided are **English** and **Simplified Chinese**.

3) **Service Sub-tab:** as shown in figure 3-4-8.

**Figure 3-4-8 General Setting Interface – Service Sub-tab**



- ▶ **Clear Memory:** users could press < **Clear** > to remove all the experiment files.
  - ▶ **Debug Mode:** press < **Enter Debug Mode** > and input the password, the system will pop up the debug interface.
- ⚠ **Reminding:** no person except the professional engineers from our company is allowed to enter the debug mode.


## 4. Packaging and Transportation

### 4.1 Instrument Disinfection


In case the Genesy thermal cycler will be moved to another lab or needed to return to the after-sale service department for maintenance, please first disinfect the instrument and fill in the disinfection certificate.

The instrument disinfection process can be carried out in accordance with the conventional laboratory disinfection method as follows:

- ▶ Please wear protective clothing and medical disposable gloves;
- ▶ Get all samples or consumables out of the thermal cycle block, switch off the instrument and unplug the power cord;
- ▶ Prepare detergent (Lab routine disinfectant) and wet the cotton cloth and degreased cotton swabs with the prepared detergent;
- ▶ Clean the thermal cycle block with the cotton cloth and clean block well with the degreased cotton swabs, then leave the hot lid open until the thermal cycle block is dry;
- ▶ Clean the thermal cycle block and its well again with 75% ethanol;
- ▶ Clean the instrument housing with mild detergent;
- ▶ Open the hot lid and leave the instrument under UV light for 1 hour disinfection.

 **Caution:** Instrument disinfection should be carried out by special trained professionals. During the process of disinfection, please be sure to wear protective clothing and medical disposable gloves, the disinfection process need to operate in a well-ventilated environment.

## 4.2 Product Packaging

1. The Genesy thermal cyclers and their accessories are packed with plastic bags, protective foam and cartons for transportation. All instruments are carefully checked before delivery to ensure they are in good condition.
  2. Please check the integrity of the instrument package before opening it. Report to the transportation department or **XATL Co., Ltd.** in case there is any sign of defects, collisions or water marks.
  3. Please take the Genesy thermal cycler out of the box. Carefully check the instrument and the accessories according to the packing list, ensure that all components are present and intact, report any damage or loss to the distributor or **XATL Co., Ltd.**
  4. Installation Method:
    - a. Please place the Genesy thermal cycler according to the instrument placement requirements and other safety requirements mentioned in this manual. Plug the instrument as the power supply requirements mentioned in this manual. Power on and start for utilization.
    - b. Before the installation, please read the '**Safety and Regulatory Compliance**' carefully in order to use correctly!
-  **Reminding:** The package internal items should be in accordance with the packing list.






## 5. Terms and Acronyms

- **PCR:** Polymerase Chain Reaction;
- **mL:** volume unit;
- **uL:** volume unit;
- **mmolL:** concentration unit;
- **Tube mode:** simulate the temperature control mode of tube temperature;
- **Block mode:** simulate the temperature control mode of block temperature;

## 6. Maintenance


The Genesy thermal cycler requires little maintenance for proper operations. However the instrument should be cleaned and maintained on a regular schedule (every other month) for long time and constant utilization. This section includes the information on cleaning and maintenance of the instrument.


### 6.1 Instrument Cleaning Operation

-  **Prohibit:** never clean the instrument when it is plugged in.
-  **Prohibit:** never pour water or other solutions into the thermal cycle block or any interior parts of the instrument. Fluids can cause electrical shock when the instrument is plugged in.
-  **Caution:** ethanol is flammable and volatile liquid, ethanol exposure may irritate eyes, skin and respiratory tract, and could lead to central nervous system hypofunction and liver damage. Please wear appropriate protective goggles, clothing and gloves, when using ethanol to clean.
-  **High-Temp:** the thermal cycle block may produce high temperature during running, do not clean the thermal cycle block until it reaches the room temperature.
-  **Biohazard:** please regard all samples as they are with potential biological hazards, universal safety precautions should be taken when handling and processing samples. Spills should be immediately disinfected with an appropriate disinfectant solution to avoid contamination of operation personnel or equipment.

#### 6.1.1 Cleaning the Instrument Housing

- 1<sup>st</sup> step:** Switch off the instrument and unplug the power cord;
- 2<sup>nd</sup> step:** Clean the instrument housing with a piece of damp, soft cloth, and if needed, please rinse the cloth with mild commercial detergent for cleaning.

 **Prohibit:** Do not spray the detergent directly on the instrument, as malfunctions of the electronics or may occur.


 **Caution:** Please do not use organic or strong detergent to clean the instrument housing, which may ruin the surface coating.


## 6.1.2 Cleaning the Instrument Touch Screen

**1<sup>st</sup> step:** Switch off the instrument and unplug the power cord;

**2<sup>nd</sup> step:** Gently wipe the touch screen with a piece of dry, soft cloth to remove dust, oil or fingerprints.

**3<sup>rd</sup> step:** If the touch screen is still contaminated, use a piece of damp, soft cloth that moistened with low concentration isopropyl alcohol or ethyl alcohol to clean the screen in a gentle motion.

 **Prohibit:** Do not spray the detergent directly on the touch screen, as malfunctions of the electronics or may occur.


 **Caution:** Do not use abrasive detergent or rough material, as they may scratch the touch screen.


## 6.1.3 Cleaning Thermal Cycle Block

**1<sup>st</sup> step:** Switch off the instrument and unplug the power cord;

**2<sup>nd</sup> step:** Open the hot lid and clean the thermal cycler block surface with a piece of damp, soft cloth, and if needed, please rinse the cloth with mild commercial detergent.

**3<sup>rd</sup> step:** Clean the thermal cycler block wells with the degreased cotton swab moistened with ethanol to ensure the firm contact and good thermal conductivity between the consumables and the wall of block well.

 **Prohibit:** Do not spray the detergent directly on the thermal cycler block, as malfunctions of the electronics or may occur.

 **Caution:** Do not close the hot lid before the thermal cycler block is completely dry.



## 6.2 Instrument Maintenance Operation



### 6.2.1 Maintaining Sufficient Air Flow

The placing area of Genesy thermal cycler should be checked regularly, as it requires sufficient air flow to precisely reach the correct target temperature. Please ensure that air flow is unrestricted and other items around the instrument do not interfering with the air flow.

### 6.2.2 Maintaining Stable Power Supply

Genesy thermal cycler requires stable power supply for proper functioning, therefore its power supply should be checked regularly to ensure the consistent of instrument required voltage and the power supply voltage (allowable deviation  $\pm 10\%$ ). And make sure that the rated load of receptacle is no less than the requirement of instrument.

### 6.2.3 Maintaining Cleanliness

-  **Caution:** Never place a tube with open or leak cap on the sample block. The reagents may escape during heating and cover the sample block, hot lid and sample drawer.
-  **Caution:** In case the instrument will not be used for a long time, unplug it and cover the device with a soft cloth or plastic bags to prevent dust from entering.

## 6.3 Replace the Fuse Tube

The fuse tube (type 250V/10A) of Genesy thermal cycler is located in the fuse box near the power outlet at the rear of the instrument. Before replacing the fuse tube, please switch off the instrument and unplug the power plug, use a screwdriver to pry open the fuse box. Then substitute the old fuse tube with an equal one.

**Fig. 6-1 Replace Fuse Tube**




**i** **Reminding:** In case there is no display on the screen after starting up the Genesy thermal cycler, please check the fuse tube.

**⚠** **Caution:** Improper fuse tube may lead to circuit system damage, even fire.

## 7. Troubleshooting

### 1. Troubleshooting

NO	Error	Possible Cause	Corrective Instructions
1	No display on the screen	Power switch is on 'off' position	Switch on the power switch
		Unstable power cord connection	Connect the power cord again or renew the power cord
		Inappropriate power voltage	Adjust the scope of power voltage into a normal range
		Fuse tube damaged	Replace the fuse tube
		Others	Contact us
2	Startup interface displays error message	The activation of system failed or power voltage too low	Ensure there is no other appliance or circuit in the same electric circuit. Otherwise please contact us and consult the maintenance engineer
3	System crashed or out of control	Improper operation	Restart the instrument
		Others	Contact us
4	Temperature does not rise while hot lid heating	Check temperature control setting	Checked the hot lid option
		Others	Contact us
5	Abnormal ramp or incorrect temperature control	Air vent is blocked	Clean up the air vent.
		Unstable power cord connection	Connect the power cord again or renew the power cord

 **Caution:** In case any of following situation occurs, immediately cut off the power supply and contact us. We will arrange qualified maintenance personnel for processing.

- Any liquid has enter into the instrument;
- Any abnormal sound or smell appear inside the instrument;
- Instrument is soaked with water or rain;

- Any housing damage caused by accidently drop of the instrument;
- Obvious functional changes of instrument.

## 2. Contact Information

After-sale Service: + 86-29-82683675

Company Fax: + 86-29-82216680

Company Name: **Xi'an Tianlong Science and Technology Co., Ltd.**

Company Address: No. 389, Zhuhong Road, Xi'an, Shaanxi, China

Postcode: 710018