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## Automatic Nucleic Acid Extractor GeneRotex 48

User Manual



# **Automatic Nucleic Acid Extractor User Manual**

**Created by Xi'an Tianlong Science and Technology Co. Ltd.**

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## Trademark Registration Statement:



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## Intended Use Statement:

The intended use of GeneRotex Automatic Nucleic Acid Extractor (hereinafter referred to as **GeneRotex Extractor**) is to complete the automatic extraction and purification of nucleic acid in various samples by using magnetic bead nucleic acid extraction reagent. The high purity nucleic acid extraction products are suitable for polymerase chain reaction, gene chip, gene hybridization, gene sequencing and other technologies, and can be applied to scientific research, clinical applications, food safety, forensic medicine and other application fields.

## Special Statement:

Before installing and using the GeneRotex Extractor for the first time, please carefully read the instructions in this manual, fully consider the possible range of misoperation or non-recommended function, and pay special attention to the possible consequences.

## Contraindications:










**GeneRotex Extractor** is an IVD instrument without contraindications.

## User Requirements:


**GeneRotex Extractor** must be operated by laboratory professionals who have been trained in laboratory technology and have studied this user manual.

## Safety Symbols and Markings

### A. Safety Labels on Transport Package

Label	Description
	<b>Fragile:</b> the items inside are fragile, please handle with care.
	<b>This Side Up:</b> indicates the upward side of the transport package.
	<b>Keep Dry:</b> keep the transport package away from rain or any liquid.
	<b>IVD Instrument:</b> the product belongs to In Vitro Diagnostic equipment.
	<b>Temperature Limit:</b> indicates the temperature limits for the storage and transportation of package.
	<b>Humidity Limit:</b> indicates the humidity limits for the storage and transportation of package.
	<b>Atmospheric Pressure Limit:</b> indicates the atmospheric pressure limits for the storage and transportation of package.
	<b>Max 2 Packages:</b> it is prohibited to stack more than 2 layers for the storage and transportation of packages.
	<b>Recycle:</b> indicates the packaging materials are recyclable.

### B. Safety Labels on GeneRotex Extractor

Label	Description
	<b>Biohazard:</b> indicates that a certain area of the GeneRotex Extractor can be easily contaminated with biological reagents or samples. Reminding users to timely disinfect this area, keep necessary precautions during operation and take corresponding protective measures at the same time.



**High Temp.:** indicates that a certain area of the GeneRotex Extractor may produce high temperature. Reminding users to pay attention and be careful for burns.



**Moving Parts:** indicates that a certain moving part of the GeneRotex Extractor may cause personal injury. Reminding users to proceed with appropriate caution.



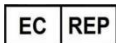
**Waste Disposal:** indicates that the GeneRotex Extractor belongs to electrical equipment, the abandoned instrument should not be disposed as unsorted municipal waste. Please follow local relevant applicable laws and regulations to deal with the instrument, which must be separately recycled.



The GeneRotex Extractor meets the requirements laid down in Council Directive 2014/30/EU relating to “Electromagnetic Compatibility” and Council Directive 2014/35/EU relating to “Low Voltage Equipment”. The following standards were applied: IEC/EN 61326-1 (EMC), IEC/EN 61010-1 (Safety) and IEC/EN 61010-2-081.



**IVD Equipment:** The GeneRotex Extractor belongs to In Vitro Diagnostic equipment.



**European Community Representative:** indicates the authorized representative of this instrument in European.



**Serial Number:** indicates the serial number of this instrument.



**Manufacturer:** indicates the manufacture of this instrument.



**Caution:** indicates the “caution” of this instrument.






**Manufacture Date:** indicates the manufacture date of this instrument.



**Consult Instructions for Use:** indicates the consult instructions for the use of this instrument.

## C. Symbols Used in This Manual

Symbol	Description
	<b>Caution:</b> reminding user pay attention to a certain operation. Operating the GeneRotex Extractor in any manner unspecified in this manual may results in instrument damage or abnormal function.
	<b>Reminding:</b> providing important information regarding the operation and successful application of GeneRotex Extractor, including the information explained in further detail elsewhere in this manual.
	<b>Prohibit:</b> prohibiting user from a certain dangerous operation. Otherwise it may results in instrument damage or abnormal function, even constitutes a personal injury hazard.


## D. Conventions Used in This Manual


Convention	Meaning
<b>Ordered list</b>	Procedure steps must be performed follow the list order.
<b>Press A</b>	Press <b>A</b> key on the system software.
<b>Bold</b>	Indicates the instructions/options of the system software.
<b>&lt; Bold &gt;</b>	Indicates the keys/icons of the system software.
<b>[ ]</b>	Indicates the keys on computer keyboard.
<i>italic + Blue</i>	Indicates the reference chapter.

## Safety and Precautions

The operation, maintenance and repair of GeneRotex Extractor shall strictly follow the safety specifications listed in this section and through this manual. The design of GeneRotex Extractor has fully considered its biological contamination protection, electrical safety protection and mechanical motion protection. Non-observance of the instructions or performing any operations not stated herein may affect the safety protection provided, and may also destroy the safety standards of design and manufacture as well as the expected application scope of the GeneRotex Extractor.

***XATL Co., Ltd.** will not be responsible for any possible consequence caused by either not read or violate the instructions mentioned herein.*

 **Caution:** please carefully read this manual before operating the GeneRotex Extractor. Incorrect understanding or operations may result in instrument damage or inefficiency usage, laboratory damage, even personal injury.


 **Reminding:** please pay attention to the descriptions with 'Caution', 'Reminding', 'Prohibit' symbols, and the safety labels on the instrument and transport package.

### I. General Safety and Precautions for Instrument


 **Caution:**

1. Before installing and using GeneRotex Extractor for the first time, please remove the transport lock in the experiment cabin according to the instructions of user manual and properly keep the transport lock;
2. Please confirm that the transport lock has been removed before the instrument is energized;
3. Please reinstall the transport lock before transporting or handling the instrument; otherwise, the Company will not be responsible for any damage to the instrument.


*Otherwise **XATL Co., Ltd.** will not be responsible for any instrument damage.*


 **Caution:** no person except the **XATL Co., LTD** professional engineers are allowed to open the instrument, to replace any component or to debug the GeneRotex Extractor.


 **Caution:** do not drop or damage the GeneRotex Extractor, please handle it with care.


 **Caution:** in case of the following situations, immediately cut off the power supply and contact the dealer or ask the Company's professional maintenance personnel for processing.


- Any liquid has entered into the GeneRotex Extractor;
- Abnormal sound or smell appears while the GeneRotex Extractor is running;
- GeneRotex Extractor is soaked with water or rain;
- Obvious functional changes of the GeneRotex Extractor.

 **Prohibit:** never handling or move the GeneRotex Extractor while it is running.


 **Caution:** for protection against overheating hazards, the openings on the instrument are designed for ventilation. Please do not block these openings nor cover the instrument with dust cover and other materials while it is running.

 **Caution:** the GeneRotex Extractor installation and transportation should be performed by professional engineer or under professional guidelines.


 **Caution:** do not open the experiment cabin forcibly during the operation of the instrument, otherwise the protective measures of the instrument such as biological safety and electromagnetic radiation will be damaged.


 **Caution:** do not forcibly place the consumables which are not matched with the instrument into the experiment cabin.

## II. Personal Safety and Precautions












 **Caution:** the GeneRotex Extractor is heavy, please adopt appropriate tools and methods, or cooperate with other people to complete the lifting or moving of the instrument. Move or lift the instrument in an improper way may result in bodily injury, pain, or instrument damage.

 **Prohibit:** never touch the plug, the power cord or the power switch with wet hands.






 **Prohibit:** the GeneRotex Extractor contains permanent strong magnetic field. Anyone who wears cardiac pacemaker or metal prosthetic device is prohibited to operate the instrument. The permanent magnet field may affect the functions of the cardiac pacemaker and metal prosthetic device, even result in damages.

 **High Temp.:** Do not directly touch the heating bars while the instrument is still running, they may generate enough heat to cause serious burns.






### III. Electrical Safety and Precautions

-  **Prohibit:** the voltage of GeneRotex Extractor can cause harms to human body, please cut off the power supply before opening the instrument shell, and it is prohibited to replace any part of the instrument while it is electrified.
-  **Caution:** the GeneRotex Extractor should be properly grounded, any damage of the internal or external grounding path may cause dangerous.
-  **Caution:** in case of electric leakage, immediately unplug the GeneRotex Extractor and stop using.
-  **Caution:** please unplug the power cord before moving the GeneRotex Extractor.
-  **Reminding:** under normal circumstances, please use the instrument attached power cord. If the original power cord is destroyed, please substitute it with an equal one.
-  **Caution:** for protection against electric shock hazards, the GeneRotex Extractor must be grounded properly. The power cord provided is a standard three-pin plug, please plug it into an appropriate three-wire grounded receptacle for operation safety.
-  **Caution:** the power grid environment of GeneRotex Extractor must have ground wire.
-  **Caution:** please check the power connection carefully. Hold the power plug when you plug the power cord and make sure the power plug is perfectly inserted into the socket, do not pull the power cord to pull out the plug.
-  **Caution:** please keep the power cord away from heater or other high temperature objects. Please do not put anything on the power cord and keep it away from places where people move around.
-  **Caution:** the fuse tube type of the GeneRotex Extractor is F10AH250V, located in the fuse tube box near the power outlet at the rear of the instrument. Use improper fuse tube may lead to circuit system damage. Please check and make sure that the fuse tube has been properly installed before switch on the instrument.
-  **Caution:** before replacing the fuse tube, please cut off the instrument power supply, unplug the power plug and use a screwdriver to pry open the fuse box. Then substitute the old fuse tube with an equal one.

## IV. Environmental Safety and Precautions

-  **Caution:** the GeneRotex Extractor is for indoor use only, the room should be well ventilated and without corrosive gas.
-  **Prohibit:** never run the GeneRotex Extractor in places that have or may have flammable and explosive gas.
-  **Prohibit:** spraying liquid on electrical parts may cause a short circuit and result in fire, do not use sprays in vicinity of the GeneRotex Extractor.
-  **Reminding:** the working environment temperature of GeneRotex Extractor should be between 10°C~30°C, and the relative humidity should be below 80%.
-  **Reminding:** the working environment of the GeneRotex Extractor should be under normal atmosphere (The altitude should be below 4000m).

## V. Biological Safety and Precautions

-  **Biohazard:** the sample objects of the GeneRotex Extractor are nucleic acids, please consider all samples are with potential biohazard, and please take applicable safety protection measures and wear appropriate protective goggles, clothing and gloves while processing the samples.
-  **Biohazard:** in case of any liquid overflows during the operation, please immediately disinfect the contaminated area with appropriate detergent to avoid the spreading of contaminant, prevent the laboratory or instrument from biohazards.
-  **Biohazard:** please comply with the local or national applicable regulations to complete the disposal of waste samples and contaminated materials.
-  **Biohazard:** users should consider the abandoned GeneRotex Extractor as biological contaminated material and comply with the local or national applicable regulations to complete the instrument disposal. Before disposal or recycle the instrument, please completely clean and disinfect the instrument.
-  **Biohazard:** users should only use reagents and consumables that are within their expiration date.

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# 1. Introduction

## 1.1 Intended Application Fields

The GeneRotex Extractor can be widely used in scientific research, clinical diagnosis, disease control, food safety, forensic medicine and other fields. The user only needs to add samples and magnetic bead nucleic acid extraction reagents and load reaction consumables, and then the instrument will complete all nucleic acid extraction operations according to the experimental program and rapidly extract DNA and RNA from animal and plant tissues, blood, body fluids, criminal materials and other samples by using different magnetic bead nucleic acid extraction reagents.

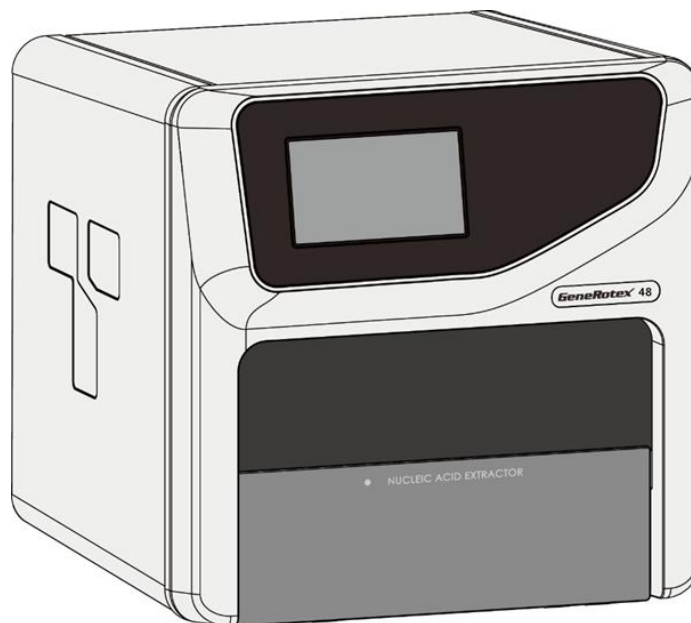


Figure 1-1. GeneRotex Automatic Nucleic Acid Extractor

The GeneRotex Extractor is equipped with the following status indicator lamps:



**Heating:** indicates GeneRotex Extractor is running the heating step;



**Stirring:** indicates GeneRotex Extractor is running the stirring step;



**Magnetic:** indicates GeneRotex Extractor is running the magnetic absorption step;



**Wait:** indicates GeneRotex Extractor is running the waiting step;

## 1.2 Operating Principle

The GeneRotex Extractor is designed as a high-tech product to extract the nucleic acid through magnetic beads method. It is characterized as high degree of automation, fast extraction speed, reliable results and easy operation. By utilizing of 48 deep well plates, it is capable of simultaneously deal with 1 to 48 samples.

The GeneRotex Extractor takes advantage of the magnetic rods that located on magnetic rod frame, automatically transfer the magnetic beads-nucleic acid mixture from one well to another, then through the movement of magnetic rods and mixing sleeves, the instrument quickly and repeatedly stirring the reagent, evenly mix the reagent with the magnetic beads. Through the cell lysis, nucleic acid adsorption, washing and elution processes, the instrument will complete the extraction of nucleic acids and obtain highly purified nucleic acids, as shown in the figure 1-2.

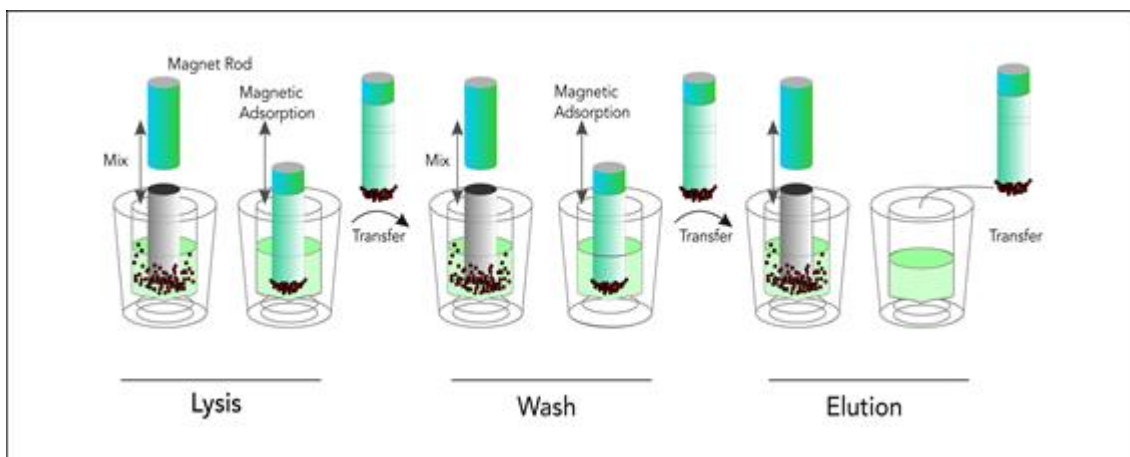


Figure 1-2. Principle steps of magnetic beads processing

## 1.3 Instrument Appearance and Composition

### 1.3.1 Instrument Structure

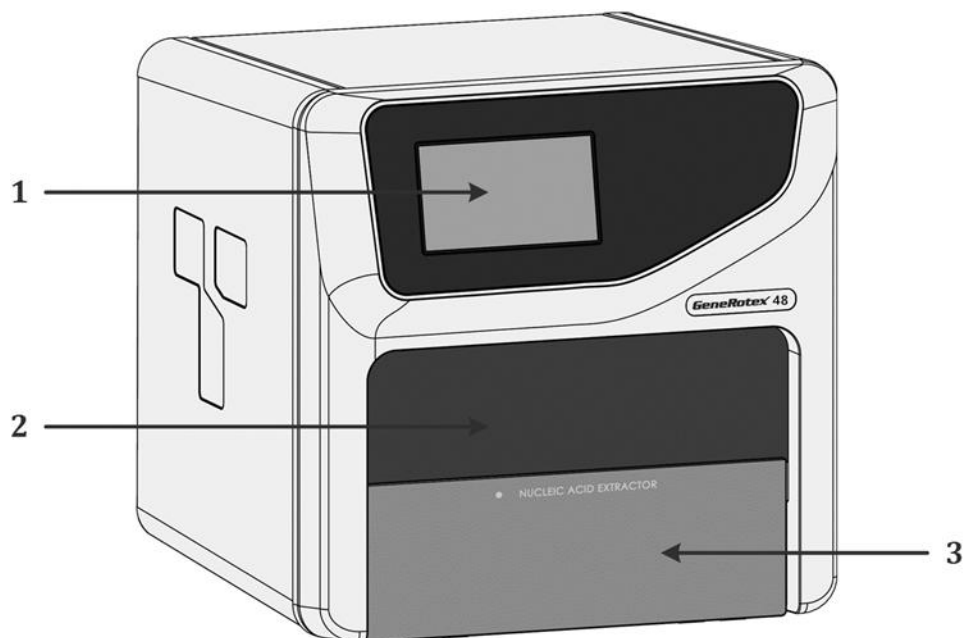


Figure 1-3. GeneRotex Automatic Nucleic Acid Extractor - Front View

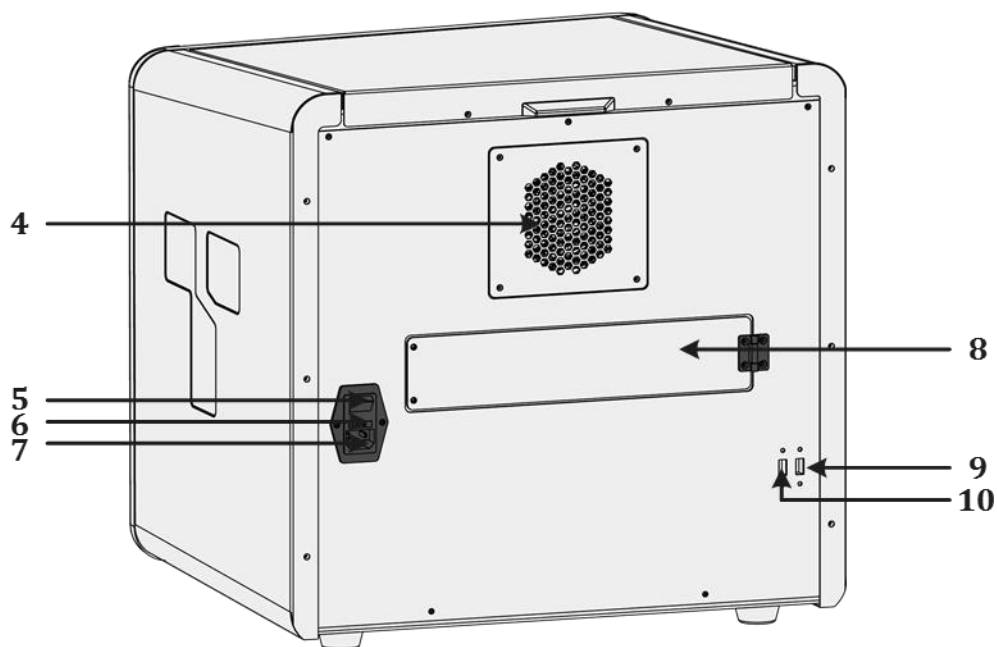


Figure 1-4. GeneRotex Automatic Nucleic Acid Extractor - Rear View

1.3.2 Experiment Cabin Structure

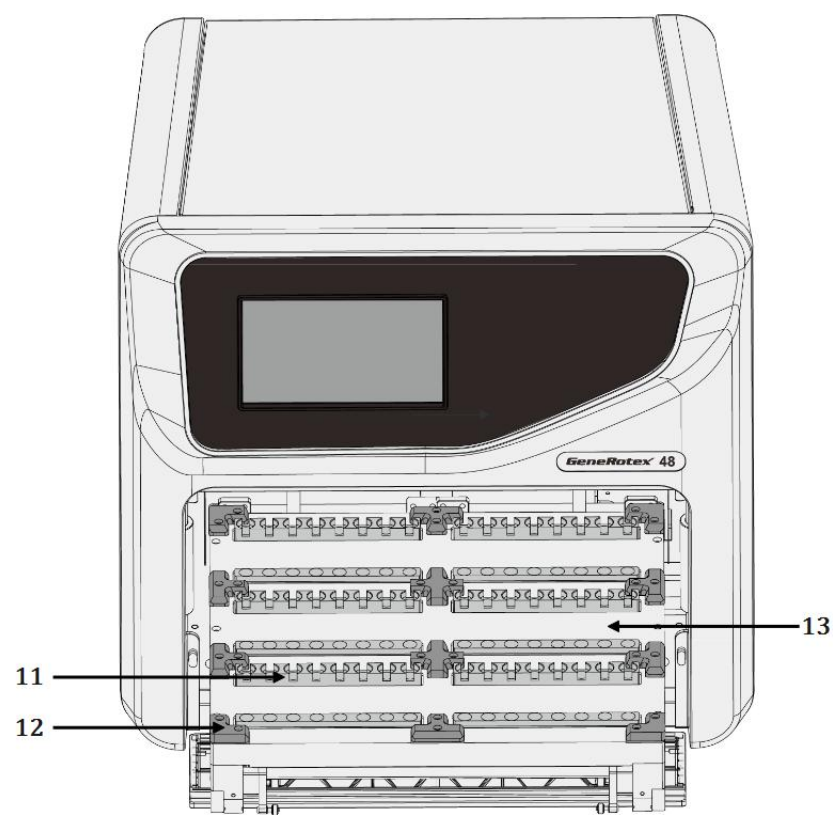


Figure 1-5. GeneRotex Extractor - Experiment cabin

- |                                       |   |
|---------------------------------------|---|
| 1. Operation screen                   | 2. Experiment cabin lifting window            |
| 3. Experiment cabin overhead door     | 4. Heat dissipation opening                   |
| 5. Power switch                       | 6. Fuse tube holder                           |
| 7. Power socket                       | 8. UV lamp replacement door                   |
| 9&10. USB interface                   | 11. Heating bar                               |
| 12. Deep-well plate positioning strip | 13. Experiment cabin movable loading platform |

## 1.4 Product Introduction

### 1.4.1 General Parameters of Instrument

▶ **Instrument Specification:**

Dimension: 490mm(L) × 510mm (W) × 480mm (H);

Weight: 45kg;

▶ **Package Specification:**

Dimension: 700mm(L) × 660mm (W) × 580mm (H);

Weight: 55kg;

▶ **Power Specification:**

Voltage: AC 100V-240V;

Frequency: 50/60Hz;

Rated power: 600VA;

▶ **Communication Specification:**

Network port: TCP/IP protocol;

Ethernet connection;

USB interface;

▶ **Application Environment:**

Temperature: 10°C ~30°C;

Relative humidity: ≤80%RH, non-condensing;

Atmospheric pressure: 56.0kPa~106.0kPa;

Altitude: below 4000m;

▶ **Storage and Transportation Environment:**

Temperature: -40°C~55°C, with transport package;

Relative humidity: 0~93% RH;

Atmosphere pressure: 26.4kPa~106.0kPa.

▶ **Operating Noise:**

The maximum operating noise is lower than 80 decibels.

### 1.4.2 Performance Parameters of Instrument

- ▶ **Processing Volume:**  
Well 1 is 50 $\mu$ L to 3000 $\mu$ L; Well 2-5 is 50 $\mu$ L to 1500 $\mu$ L; Well 6 is 30 $\mu$ L to 1000 $\mu$ L.
- ▶ **Sample Flux:**  
1-48 fluxes;
- ▶ **Inter-well Extraction Difference:**  
CV <3% (For identical concentration samples that are extracted in identical process).
- ▶ **Heating Temperature:**  
The heating module can be optionally configured to realize lysis heating (room temperature to 120 $^{\circ}$ C) and elution heating (room temperature to 120 $^{\circ}$ C);
- ▶ **Temperature Control:**  
Average Heating Rate:  $\geq 0.5^{\circ}\text{C/s}$ ;  
Temperature Uniformity:  $\leq 3^{\circ}\text{C}$ ;  
Temperature Accuracy:  $\pm 1^{\circ}\text{C}$ ;
- ▶ **Rotational Speed:** 100-3000rpm adjustable.

### 1.4.3 Instrument Characteristics

- ▶ **Screen Operation:**  
The GeneRotex Extractor is embedded with a 7-inch color operation screen, which is capable of independently operating and monitoring real-time running status.
- ▶ **Precise Control:**  
Built-in engineering computer, which can be operated alone without connection to a computer.
- ▶ **Temperature Control:**  
User can customize the lysis and elution temperatures on demand.

- ▶ **Rapid Extraction:**  
30-60 minutes per time (depending on the reagent used), at most 48 samples can be extracted simultaneously.
- ▶ **Extraction Efficiency:**  
The extraction protocol can be optimized according to the reagents for more precise incubation time. Truly realize the high efficiency extraction. The high purity extracted DNA/RNA can be directly used for PCR and RT-PCR.
- ▶ **Stability and Reliability:**  
Automatic operation system could avoid the deviations and errors that caused by manual operation, ensuring the stability and reliability of experimental results.
- ▶ **Power-off Protection:**  
Continue to run the uncompleted experiment after accidental power-off and restart.
- ▶ **UV Disinfection:**  
With built-in UV lamp disinfect function, it is capable of performing regularly disinfection for the experiment cabin.
- ▶ **Contamination Control:**  
By means of precision motion control, self-cleaning and using disposable material, the inter-well and inter-batch contamination are strictly controlled to prevent cross-contamination.

#### 1.4.4 Software System Characteristics

- ▶ **Software Interface:**  
Wizard interface, intuitive sample layout and program setting, easy to operate.
- ▶ **Free Programming:**  
The system control software has the powerful program editing function, meeting the different reagent requirements.
- ▶ **Experimental Storage:**  
More than 1000 sets of experiment program files can be created/stored in the instrument.

► **System Language:**

Multiple languages can be dynamically switched, and the default languages are Chinese and English.

### 1.4.5 Reagent Characteristics

- **Open Platform:** various magnetic bead nucleic acid extraction reagents can be used.

### 1.4.6 Consumable Specification

- **48 wells:** 48-deep well plate, stirring sleeve.

## 2. Unpacking and Installation

### 2.1 Unpacking Instructions

The GeneRotex Extractor and its accessories are well preserved in a carton case. In order to prevent the collision and oscillation during transportation, the GeneRotex Extractor is sealed with plastic bag and well supported by protective foams.



**Reminding:** in order to prevent the formation of condensation water, please do not open the transport package until it reaches the room temperature.



**Reminding:** please check the package integrity before open it. In case there is any damage, collision or water mark, please contact the transport department or our company.



**Reminding:** please check the instrument and accessories according to the packing list and ensure that all components are present and intact, report any missing items to **XATL Co., Ltd.**



**Reminding:** please fill in the relevant content on installation information feedback table after acceptance, and send it back to our company for document and warranty.



**Caution:** please reserve the original packing materials for future use. The transport package of GeneRotex Extractor is designed to reduce the instrument damage and ensure its transportation safety. Adopt other packaging materials will break the warranty, and **XATL Co., Ltd.** will not be responsible for damages as consequences of improper packaging that incurred during the transportation. Please also keep instrument related documents provided by our company for future use too.

### 2.1.1 Unpacking Steps

- 1<sup>st</sup> Step:** Transfer the GeneRotex packaging to the work place, as shown in Figure 2-1a.
- 2<sup>nd</sup> Step:** Open the upper cover of the packing box, take out the instrument accessories and documents accompanied by the instrument, and remove the protective foam on the top of the instrument, as shown in Figure 2-1b and Figure 2-1c.
- 3<sup>rd</sup> Step:** Remove the plastic buckles (4 in total) on both sides of the packing box, as shown in Figure 2-1d.
- 4<sup>th</sup> Step:** Take the instrument out of the packing box by both hands and place the instrument on a stable plane, as shown in Figure 2-1e and Figure 2-1f.

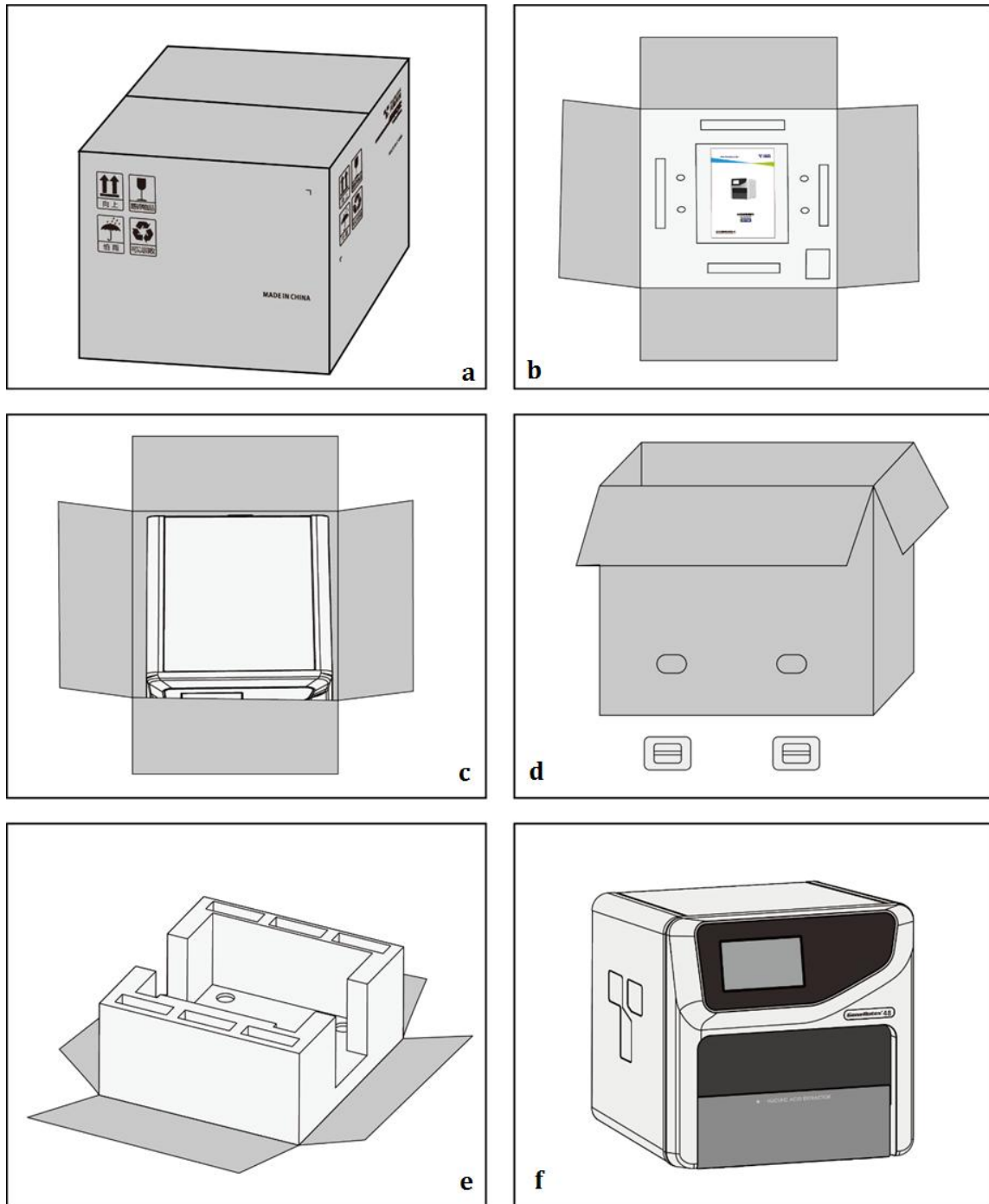


Figure 2-1. GeneRotex Extractor - Instrument Unpacking

## 2.2 Working Environmental Requirements

### 2.2.1 Space Requirements of Instrument

- 1) The GeneRotex Extractor should be placed in the room with low humidity ( $\leq 80\%RH$ ) and appropriate temperature (between  $10^{\circ}C \sim 30^{\circ}C$ ). The room should be well ventilated and without corrosive gas.
- 2) The GeneRotex Extractor should be placed on steady lab work bench and leave enough space for placing the attachments, cables and reagent bottles, etc.
- 3) Please keep the GeneRotex Extractor away from heat sources (directly sunshine, heater, stoves) and water sources (such as water pool, water tube etc.).
- 4) The working environment of GeneRotex Extractor should be without electromagnetic interference, vibration and high frequency wave electrical equipment.
- 5) For single GeneRotex Extractor running, the distance between adjacent objects and the surrounding ventilation openings shall be no less than 30cm. In case that multiple instruments are running at same time, the distance between adjacent instruments should not be less than 60cm.
- 6) For protection against overheating hazards, the openings on the GeneRotex Extractor are designed for ventilation. Please do not block or cover these ventilation openings while it is running.
- 7) Do not place the GeneRotex Extractor on soft surface, the instrument base may sink into the soft surface.
- 8) Do not place the GeneRotex Extractor close to the wall or pile up other goods at the rear of the instrument, this may affect heat dissipation.

### 2.2.2 Power Requirements of Instrument

- 1) The power grid environment of GeneRotex Extractor should possess ground wire and the instrument should be properly grounded.
- 2) Please ensure the power strip of GeneRotex Extractor has 3~4 three-phase plugs in order to meet the demands for the instrument, control computer and printer.

- 3) The power specifications of GeneRotex Extractor are listed in *"A3.1 Instrument Parameters and Characters - 3.1.1 Instrument General Parameters"*, use improper power may damage the circuit system and cause fire, it is recommended to use UPS power supply.



**Reminding:** before connecting the AC power supply, please ensure the consistency of the GeneRotex Extractor 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.



**Reminding:** if the power supply system of the GeneRotex Extractor working environment is unstable, please do not connect other electrical equipment at the same power circuit, and it is required to equip with over 900VA AC regulated power supply.



**Prohibit:** spraying liquid on electrical parts may cause a short circuit and result in fire, do not use sprays in vicinity of the instrument.



**Caution:** do not put anything on the power cord and keep it away from places where people move around. Hold the power plug when you plug the power cord and make sure the power plug is perfectly inserted into the socket, do not pull the power cord to pull out the plug.



**Reminding:** under normal circumstances, please use the instrument attached power cord.



**Reminding:** please check the power cord periodically, substitute with an equal one in case it is found to be damaged.



**Caution:** the net weight of GeneRotex Extractor is about 31.5 kg, which may be too heavy for one person. In order to avoid instrument damage, it is suggested to carefully carry the instrument by two people with safe guard.

## 2.3 Instrument Installation

### 2.3.1 Remove Transport Lock

After unpacking, please do not directly power on the GeneRotex Extractor, it is fixed by transport lock during transportation. Please remove the transport lock in accordance with the instructions as below before running the GeneRotex Extractor.

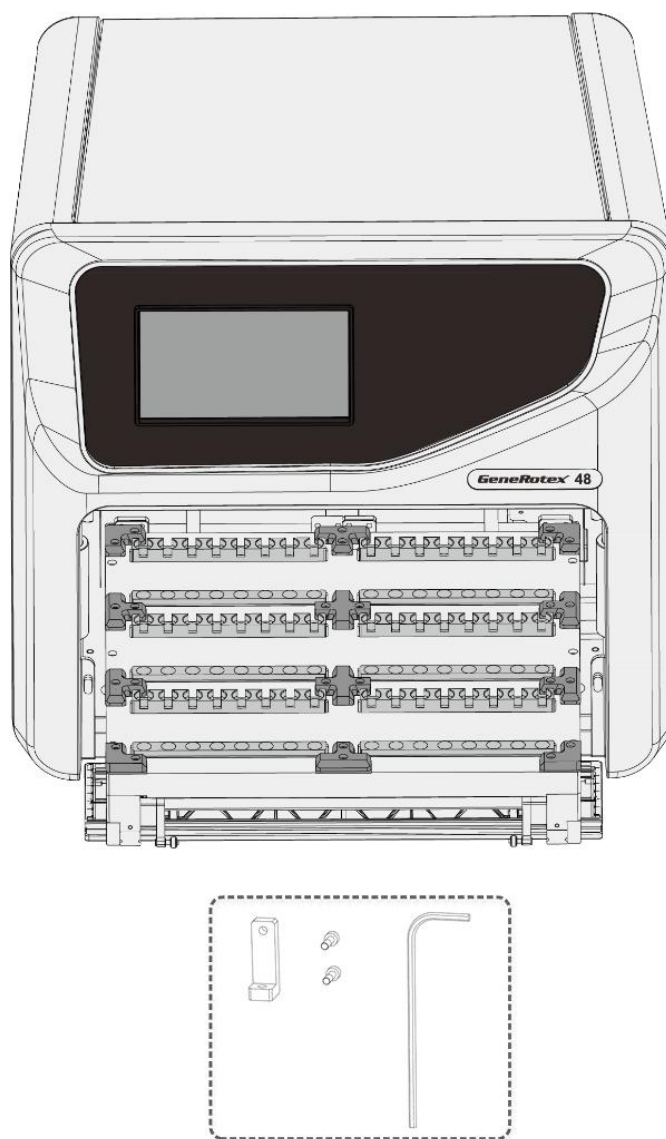




Figure 2-2. GeneRotex Extractor - Removal of Transport Lock


**1<sup>st</sup> Step:** Please open the experiment cabin. There are two transport locks fixed under the movable loading platform, as shown in Figure 2-2.

**2<sup>nd</sup> Step:** Remove two screws on each transport lock with a screwdriver and remove the transport lock, as shown in Figure 2-2.

**3<sup>rd</sup> Step:** Please close the experiment cabin and keep the transport locks and screws properly.

 **Caution:** please do not remove any screws or other parts, unless it is specifically mentioned in this manual. This kind of behavior violates the warranty and may cause the instrument out of alignment.

 **Caution:** the GeneRotex Extractor should be installed by professional engineer or under the guidance of professional engineer.

 **Caution:** it is necessary to re-fix the transport locks to avoid damage to the instrument in case the GeneRotex Extractor needs to be transported again. Please refer to [“4.3.3 Installation of Transport Locks”](#) for detailed steps.

### 2.3.2 Instrument Self Inspection

The GeneRotex Extractor possesses self-inspection function, it is recommended to let the instrument conduct the self-inspection before running any experiment, to ensure that it can work normally. The specific operation steps are as follows:

**1<sup>st</sup> Step:** connect the instrument power supply and turn on the power switch on the back of the instrument.


**2<sup>nd</sup> Step:** the GeneRotex Extractor will automatically conduct the self-inspection after power on, which will inspect the instrument version, whether the electric system is in normal working state, whether the power supply is normal and initialize the motor positions, etc.

**3<sup>rd</sup> Step:** after the self-inspection, the GeneRotex Extractor will enter the standby state.

**4<sup>th</sup> Step:** before carrying out the experiment, it is suggested to Run the “demo experiment program” first, in order to observe whether the instrument can run normally. After it is normal, the user experiment program can be run.

 **Caution:** before power on the GeneRotex Extractor, please ensure:

- The transport lock of the GeneRotex Extractor is removed.
- The external devices of the GeneRotex Extractor properly connected.
- The power supply of GeneRotex Extractor is properly connected.

 **Caution:** in case the GeneRotex Extractor fails to pass the self-inspection, do not slap or shake it, please contact the distributor or **XATL Co., Ltd.**

## 3. Instrument Operation Instructions

The GeneRotex Extractor can be operated independently with the instrument operation screen and requires no computer. This section includes the function descriptions of the GeneRotex Extractor and its operational process. Please carefully read the instructions provided herein to achieve related experimental operations. Incorrect operation may cause instrument damage or abnormal running phenomena.

### 3.1 Instrument Start-up

The power switch on the back of the GeneRotex Extractor is turned on, and the instrument will start up and make two a short beep sound. At the same time, the instrument operation screen will light up automatically enter the self-inspection interface. Then the GeneRotex Extractor starts to self-inspection and initialization, and during this process the instrument will inquire the firmware version, test the power supply, temperature control device, motion device, switching device, communication device and the external interface. After the initialization, the motion device of the instrument will be at zero position.



**Caution:** Before connecting the power supply, please ensure the consistency of the instrument required voltage and the power supply voltage.



**Reminding:** The instrument required voltage is marked on the name plate located at lower left corner on the back side of the instrument.

### 3.2 System Software Operation

#### 3.2.1 Main Interface

The GeneRotex Extractor will automatically enter the main interface of the system software after the initialization, as shown in Figure 3-1.

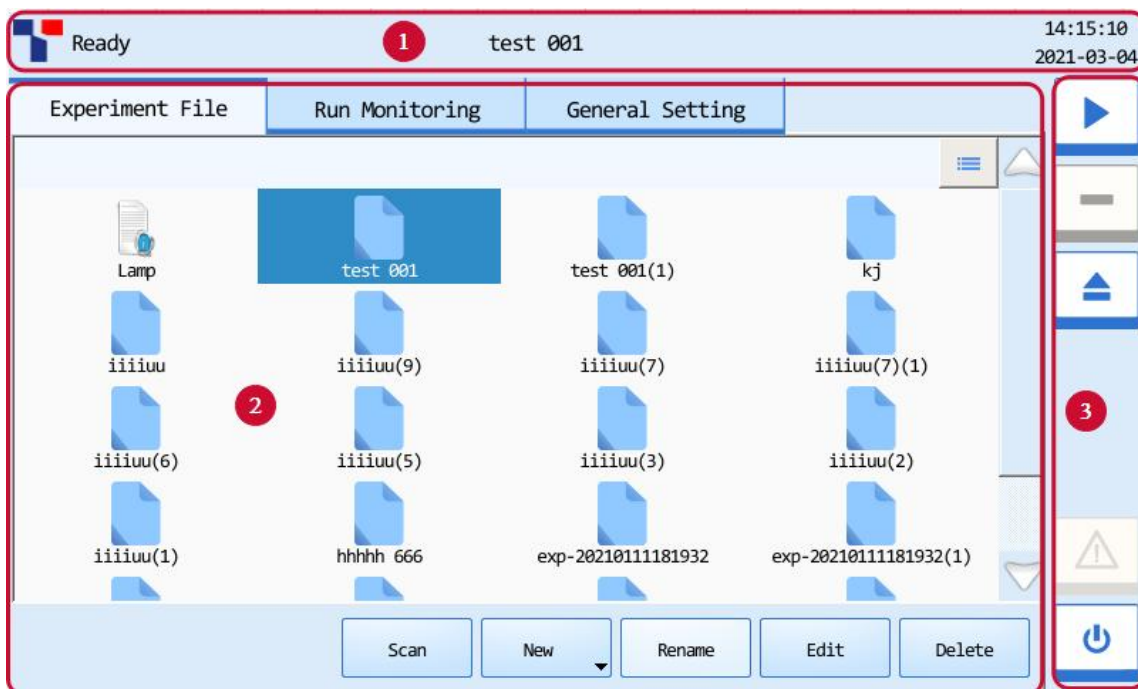



Figure 3-1. GeneRotex System Software - Main Interface


### Interface Introduction & Parameter Descriptions



1. **Status Bar:** display the system status, current experiment file name, instrument status and system time.
  - ▶ **System Status:** display the current instrument system status.
  - **Initializing:** the instrument system is in the process of initialization;
  - **Ready:** the instrument system initialization is completed, ready for running;
  - **Running:** the experiment is running;
  - **Error:** instrument hardware or software error, cannot execute any operation.
  - ▶ **Instrument Status:** display the current instrument status.
  - <  **USB** >: the instrument is connected with USB device;
  - ▶ **File Name:** display the current experiment file name and its file path.
  - ▶ **System Time:** display the current system date and time.









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

- ▶ **Experiment File:** display experiment file icons and provide the relevant experiment file operations;
- ▶ **Run Monitoring:** provide the real-time running state of the experiment;
- ▶ **General Setting:** provide general setting operations of the current instrument system.

### 3. Main Function Keys:

- ▶ <  **Run Experiment** >: start running the current experiment. This function key is activated when the instrument system is under **Ready** or **Pause** status.

⚠ **Reminding:** when the instrument system is under **Running** status, the <  **Run Experiment** > function key will be converted to <  **Pause Experiment** > function key, users can press this function key to pause the current running experiment.

- ▶ <  **Stop Experiment** >: stop the current running experiment. This function key is activated when the instrument system is under **Running** status.
- ▶ <  **Open / Close** >: open or close the experiment cabin overhead door and the movable loading platform will be moving out or in accordingly.
- ▶ <  **Shutdown / Restart** >: shutdown or restart the instrument. This function key is inactivated when the instrument system is under **Running** status.
- ▶ <  /  /  **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;

### 3.2.2 Experiment File Tab

The main interface of the instrument system software displays experiment file tab by default. The experiment file interface will display file name, file icon and operation function buttons, as shown in Figure 3-2.

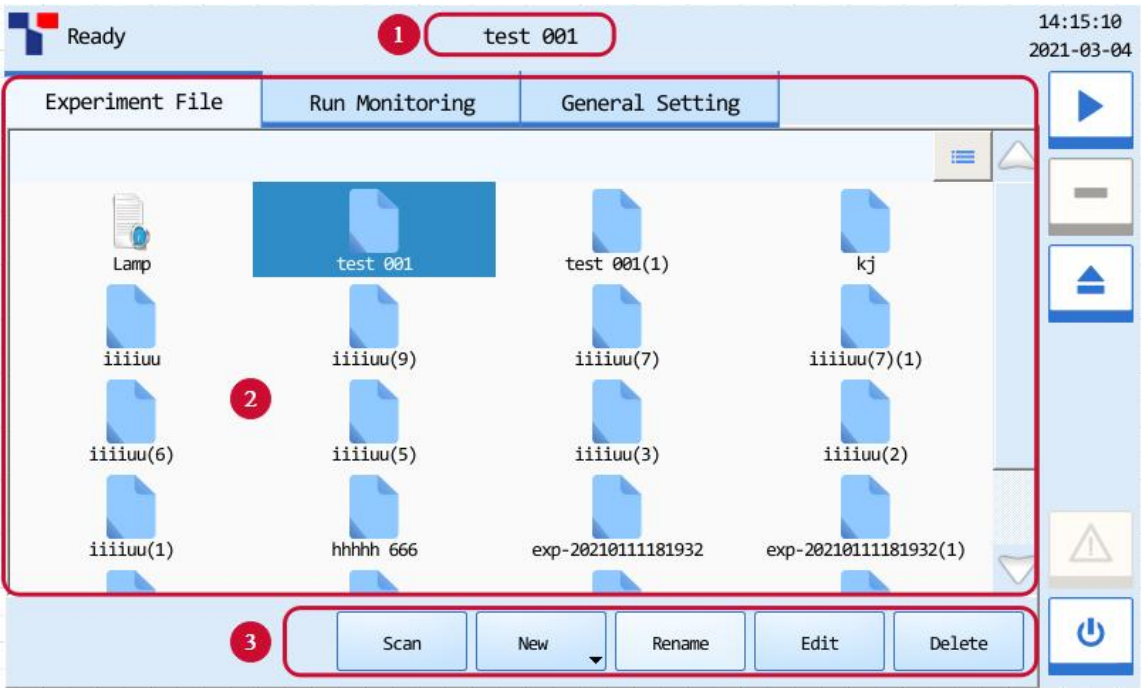


Figure 3-2. GeneRotex System Software - Experiment File Interface

#### Interface Introduction & Parameter Descriptions

- 1. **File name:** display the name of the file selected by the user, as shown in Figure 3.2a.

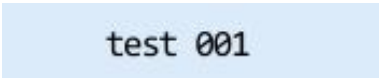


Figure 3.2a Experiment File Interface - File Name

- 2. **File Displaying Area:** display the pre-existed files within the instrument system, as shown in figure 3.2b

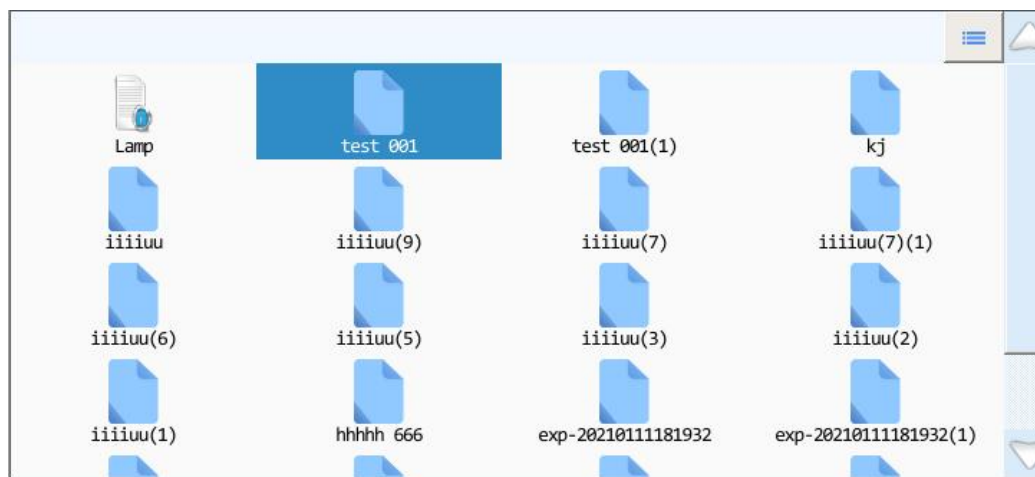








Figure 3.2b Experiment File Interface - Experiment file display area

❗ **Reminding:** the GeneRotex System Software include following two types of files:

- <  **Lamp** >: this icon indicates the UV disinfection file, which is provided by default and cannot be deleted by user. The user can click this icon to edit the corresponding UV disinfection program. Please refer to [“4.3.2 UV Disinfection”](#) for detailed steps.
  - <  **Experiment file** >: this icon indicates the experiment name, which includes the experiment program, log and other relevant experiment information;
    - ▶ Users can press the icon of a certain file in the file display area to open it.
    - ▶ Users can slide the slider or press  and  icons to view all the experiment files in the experiment file display area.
    - ▶ Users can press the  icon on the top left corner of the experiment file display area and it will turn into  icon, and the display mode of the experiment file displaying area will change from icons to file details list.
3. **File action bar:** consists of < **Scan** >, < **New** >, < **Rename** >, < **Edit** > and < **Delete** > five function keys, as shown in figure 3.2c.

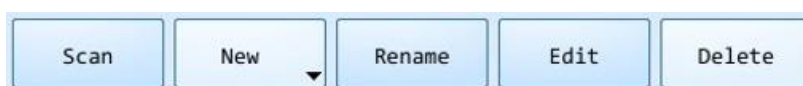


Figure 3.2c Experiment File Interface - File action bar

- ▶ **< Scan >**: the GeneRotex Extractor instrument can be connected to the two-dimensional code scanner through the USB Interface. Before starting the experiment, click **< Scan >** to scan the two-dimensional code of the reagent kit, for detail operation please refer to ***“6.2.1 Scan Reagent Kit Code”***.
- ▶ **< New >**: create a new experiment file, for detail operation please refer to ***“3.2.2.1 Create New Experiment File”***.
- ▶ **< Rename >**: rename the selected experiment file, this key is inactivated when the instrument system is under **Running** status.
- ▶ **< Edit >**: delete the selected experiment file, this key is inactivated when the instrument system is under **Running** status, for detail operation please refer to ***“3.2.2.2 Edit Experiment File”***.
- ▶ **< Delete >**: delete the selected experiment file, this key is inactivated when the instrument system is under **Running** status, for detail operation please refer to ***“3.2.2.3 Delete Experiment File”***

### 3.2.2.1 Create New Experiment File

- ▶ There are two options for users to create a new experiment file:
  - **New Experiment**: directly click **< New >** create a new experiment file.
  - **New Experiment from Selected Experiment**: users could press and select a pre-existed experiment file in the file displaying area, and click **< New >** create a new experiment based on the selected experiment settings.
- ⓘ **Reminding**: **< New >** key is inactivated when the instrument system is under **Running** status.
- ⓘ **Reminding**: the system will pop up a keyboard for users to name the new experiment file or file folder, as shown in figure 3.2d. Users can press **< Close >** to exit the keyboard.
- ⓘ **Reminding**: the instrument software will name the new experiment file with creation date and time by default.



Figure 3.2d Experiment File Interface - Keyboard

### 3.2.2.2 Edit Experiment File

The user can click < **Edit** > key to edit the selected experiment file, and then the system software will automatically enter the experiment edit interface, as shown in Figure 3-3.

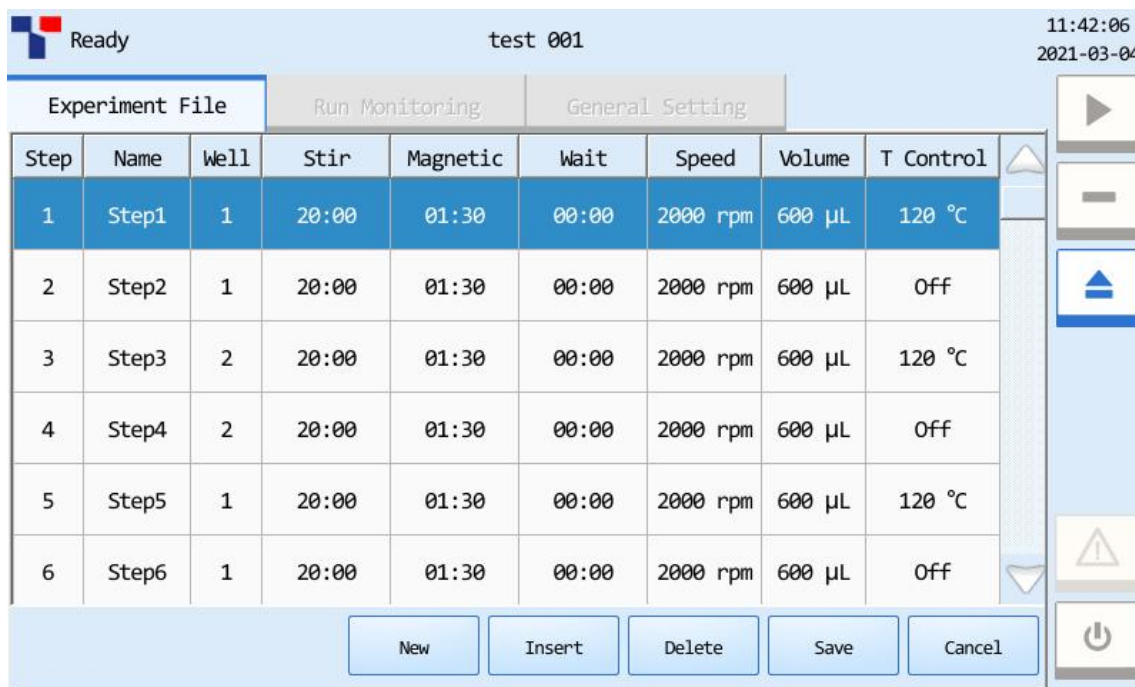


Figure 3.3 GeneRotex System Software - Experiment File Edit Interface



**Reminding:** < **Edit** > key is inactivated when instrument is under **Running** status.

## Interface Introduction & Parameter Descriptions

- ▶ **Experiment Step Parameters:** display the parameter information of all steps of the current experiment program, including:
  - **Step:** displays the sequence of current step.
  - **Name:** displays the name of the current step.
  - **Well:** displays the well of deep well plate corresponding to the current step.
  - **Stir:** displays the liquid stirring time in the current step.
  - **Magnetic:** displays the magnetic absorption time of the current step, which is the time for magnetic rods to adsorb magnetic beads. It is generally recommended that the magnetic absorption time should be more than 30 seconds;
  - **Wait:** displays the waiting time of the current step, which is the time for liquid to volatilize after the mixing sleeves are suspended in air of each step. It is generally suggested that the waiting time should be no more than 30 minutes.
  - **Speed:** displays the rotation speed of stirring sleeve of the current procedure step.
  - **Volume:** displays the liquid volume in the well of deep well plate corresponding to the current step. The system software will adjust the parameters such as rotation speed and the altitude of stirring sleeves according to the liquid volume.
  - **T Control:** displays the temperature status of the current step.
- ▶ User can double-click the parameters of **Step**, **Name**, **Well**, **Stir**, **Magnetic**, **Wait**, **Speed**, **Volume** and **T Control**, the corresponding parameter setting window will pop up on the system software interface, as shown in Figures 3.3a-3.3f. The user can edit and set the above parameters in the corresponding parameter setting box.

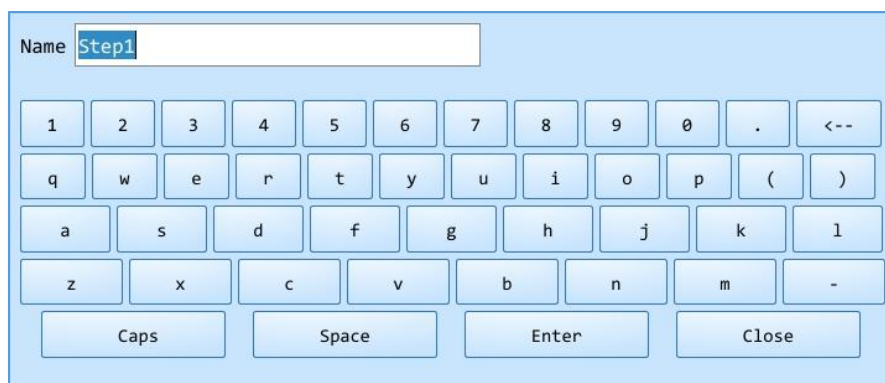
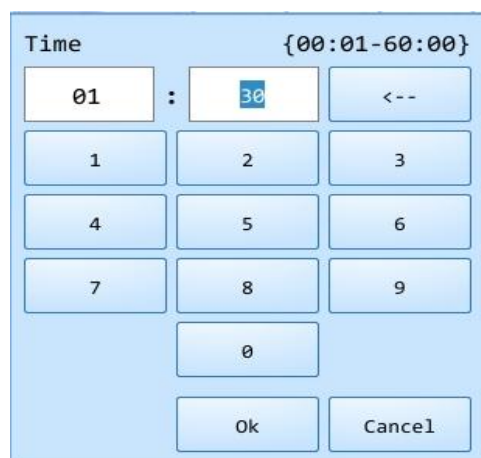
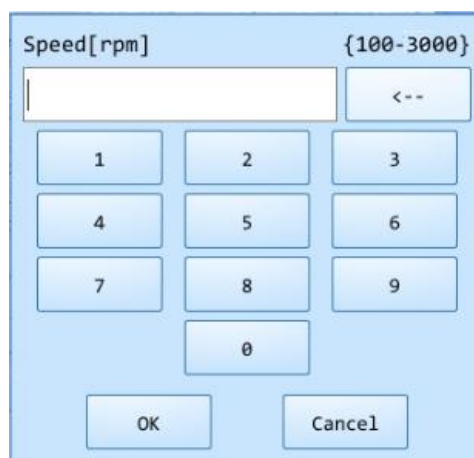
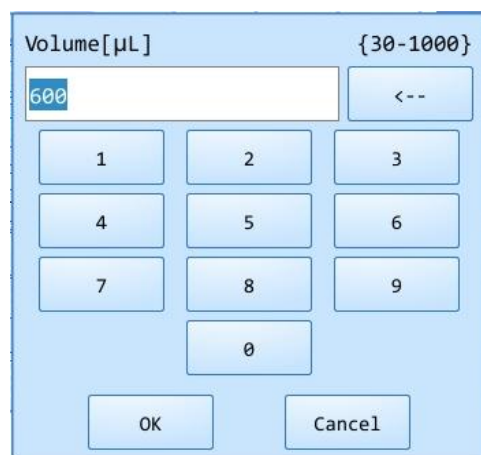
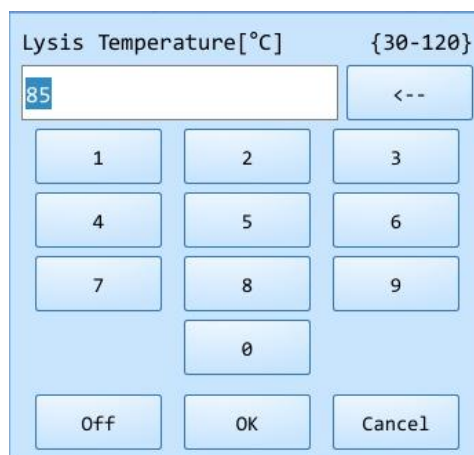


Figure 3.3a Experiment File Edit Interface - Name Setting



Figure 3.3b Experiment File Edit Interface - Well Setting

Figure 3.3c Experiment File Edit Interface  
Time SettingFigure 3.3d Experiment File Edit Interface  
Stirring Speed SettingFigure 3.3e Experiment File Edit Interface  
Volume SettingFigure 3.3f Experiment File Edit Interface  
Temperature Setting

- ① **Reminding:** the wells in the experimental procedure step can be set to 1-6 wells;
- ① **Reminding:** the setting range of stirring, magnetic and waiting time of the experiment step is 1s to 60min;
- ① **Reminding:** the setting range of stirring speed of the experiment step is 100-3000rpm;


- ❗ **Reminding:** the setting range of volume of the experiment step is 30-1000μL;
- ❗ **Reminding:** the setting range of lysis or eluting temperature of the experiment step is 30-120℃;
- ▶ User can click any step number to select the corresponding experiment step, and click **< New >** to create a new step.
- ▶ User can click any step number to select the corresponding experiment step, and click **< Insert >** to insert a step in front of the selected step.
- ▶ User can click any step number to select the corresponding experiment step, and click **< Delete >** to delete the selected step.
- ▶ User can click **< Cancel >** to cancel the parameters setting and editing of the current experiment step.
- ▶ User can click **< Save >** to save the parameters setting and editing of the current experiment step.

### 3.2.2.3 Delete Experiment File

Users can select a experiment file in the file displaying area and click **< Delete >** to delete the selected experiment file.

- ❗ **Reminding:** **< Delete >** key is inactivated when the instrument system is under **Running** status.

### 3.2.3 Run Monitoring Tab

Users can select an experiment file in the file displaying area and click **<  Run Experiment >** to run the selected experiment file. When experiment starts running, the system software will automatically enter the run monitoring interface and real time display the relevant running information of the current experiment, as shown in Figure 3-4.

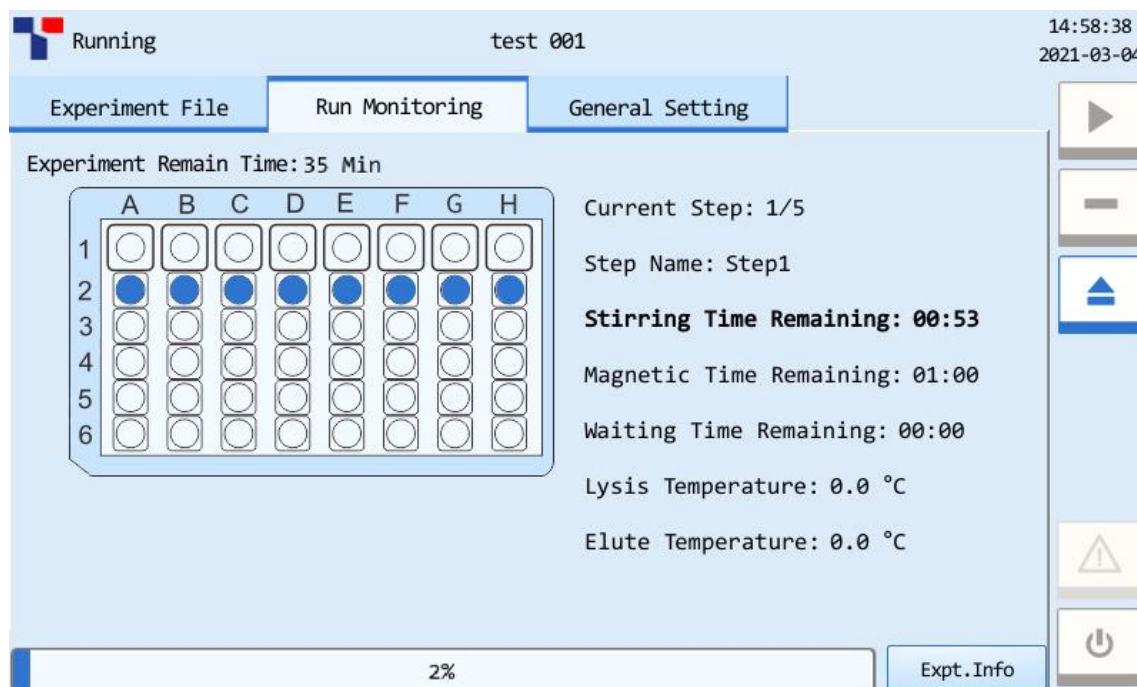


Figure 3-4. Run Monitoring Tab - Experiment Information

### Interface Introduction & Parameter Descriptions

1. **Real-time Status:** displays the real-time status of the current experiment.
  - **Current Step:** displays the current running step number;
  - **Step Name:** displays the current running step number;
  - **Stirring Time Remaining:** displays the remaining stirring time of the current running step;
  - **Stirring Time Remaining:** displays the remaining stirring time of the current running step;
  - **Magnetic Time Remaining:** displays the remaining magnetic absorption time of the current running step;
  - **Waiting Time Remaining:** displays the remaining waiting time of the current running step;
  - **Lysis Temperature:** displays the lysis temperature of the current running step;
  - **Elute Temperature:** displays the elute temperature of the current running step;

2. **Running Information:** displays the progress of the current running experiment in the form of percentage progress bar.
3. **Experiment Information:** Click < **Expt. Info** > the run monitoring interface will display the remaining experiment time of the current experiment file, the experimental procedure, the parameters of each procedure step and other corresponding experiment information, as shown in Figure 3-4a.

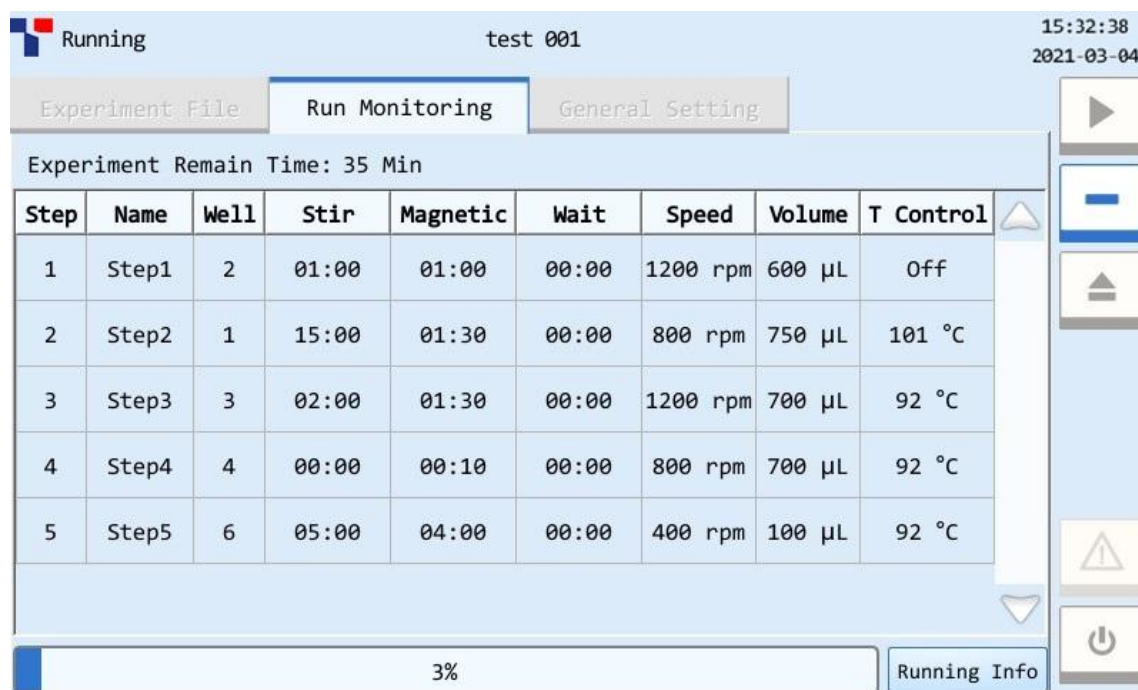


Figure 3-4a. Run Monitoring Tab - Running Information



**Reminding:** the < **Expt. Info** > will switch to < **Running Info** > after click, then click < **Running Info** > the run monitoring interface will display the real-time running information of the current experiment again.

## 3.2.4 General Setting Tab

### 3.2.4.1 Instrument Setting Sub-tab



When the user clicks **General Setting** tab on the system software interface, the system software will automatically enter the general setting interface and display the relevant information and system parameters of the current instrument.

The general setting interface consists of **Instrument** and **Service** two sub-tabs, and displays the **Instrument** sub-tab by default, as shown in figure 3-5.



Figure 3-5. General Setting Tab - Instrument Setting Sub-tab

### Interface Introduction & Parameter Descriptions

- ▶ **Instrument Serial No.:** display the factory serial number of the current GeneRotex Extractor.
- ▶ **Instrument Model:** display the current GeneRotex Extractor model.
- ▶ **Screen Brightness:** users could press  and  icons to adjust the screen brightness (dark: 1 ~ bright: 5).
- ▶ **Touch Tone:** users could press < **Open** > or < **Close** > to decide whether to enable the touch screen sound.

- **Date and Time:** users can press < **Set** > to set the date and time displayed on the current GeneRotex Extractor, the date/time setting window will pop up as shown in Figure 3.5a.

2021-03-04

<	<<	3	2021	>>	>	
Sun	Mon	Tue	Wed	Thu	Fri	Sat
28	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	29	30	31	1	2	3
4	5	6	7	8	9	10

18:42:05

Hour : 18 + -

Minute: 42 + -

Second: 5 + -

Confirm Back

Figure 3.5a Instrument Setting Sub-tab -- Date/Time Setting

- Users can press << and >> icons to set the displayed year.
- Users can press < and > icons to set the displayed month.
- Users can set the displayed date on the calendar.
- Users can press + and - icons to set the displayed time, including **Hour**, **Minute** and **Second**.
- Users can press < **Confirm** > to confirm the date and time setting;
- Users can press < **Back** > to return to the Instrument sub-tab interface.
- **Language Setting:** users could set the instrument system language. The two options provided are **English** and **Simplified Chinese**.
- **Version:** users could view the system version information of the current GeneRotex Extractor and the < **Upgrade** > is used for instrument system upgrade.
- ❗ **Reminding:** the instrument system upgrade should be executed by professional engineer or under professional guidelines.

### 3.2.4.2 Services Setting Sub-tab

Click **Services** sub-tab in the general setting interface, and the system software will automatically enter the services setting sub-tab, as shown in Figure 3-6.

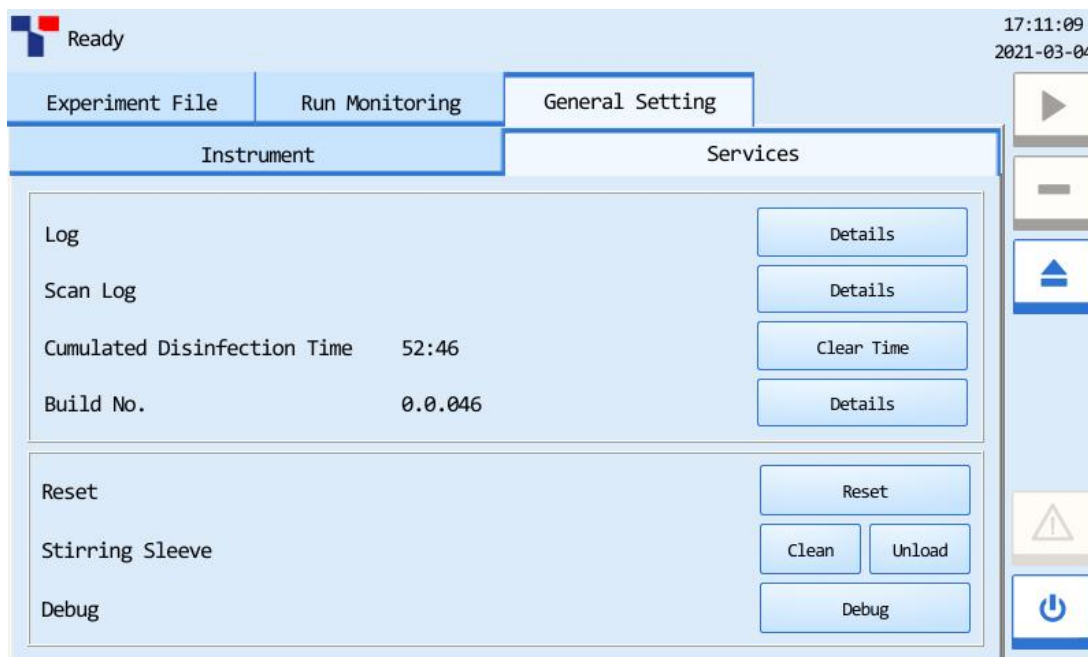


Figure 3.6 General Setting Tab -- Services Setting Sub-tab

### Interface Introduction & Parameter Descriptions

- **Log:** user can click < **Details** > to view the detailed log of the current instrument, as shown in Figure 3.6a.

Instrument			Services	
No.	Operation	Date/Time	Type	Descr
1	Close gate	2018-11-09 17:49:26	User Operation	
2	Open gate	2018-11-09 17:49:19	User Operation	
3	Stop experiment	2018-11-09 17:48:36	User Operation	stop exper
4	Start experiment	2018-11-09 17:48:26	User Operation	start exper
5	Stop experiment	2018-11-09 17:44:57	User Operation	stop exper
6	Start experiment	2018-11-09 17:43:52	User Operation	start exper
7	Open gate	2018-11-09 17:43:29	User Operation	
8	Close gate	2018-11-09 17:42:04	User Operation	

Figure 3.6a Services Setting Sub-tab - Details of Instrument Log

- **Scan Log:** user can click < **Details** > to view the detailed scan log of the current instrument, as shown in Figure 3.6b.

Instrument			Services	
No.	Batch No.	Serial No.	Name	Expiration_I
1	E0018071355	00001	DNA-RNA3940	2019-03-31
2	E0018071355	00000	DNA-RNA3940	2019-03-31
3	E0018071355	00040	DNA-RNA3850	2019-03-31
4	E0115120101	00753	DNA-RNA	2019-06-25


Figure 3.6b Services Setting Sub-tab - Details of Instrument Scan Log

- **Cumulated Disinfection Time:** displays the cumulated disinfection time of the current instrument. After the UV lamp replacement, user can click < **Clear Disinfection Time** > to clear the cumulated disinfection time of the current instrument.
- **Build No.:** displays the build number of the current instrument, user can click < **Details** > to view, as shown in Figure 3.6c.

Control Module:	1.0.034
Thermal Module:	0.1.114
Application Software:	0.0.047
Resources:	0.0.002
System:	1.0.300
Close	

Figure 3.6c Services Setting Sub-tab - Details of Instrument Build No.

- **Reset:** user can click < **Reset** > to reset all running mechanism components of the instrument to the original position.

- ▶ **Stirring Sleeve:**
    - users can click < **Clean** >, and the stirring sleeve will descend to the lowest position, which is convenient for users to clean the stirring sleeve. After finishing the cleaning, users can click < **Confirm** > to make the stirring sleeve reset to the original position automatically.
    - user can click < **Unload** > to unload the stirring sleeve.
  - ▶ **Debug:** user can click < **Debug** > to enter the instrument debugging interface.
-  **Reminding:** the instrument debugging shall be completed by the professional engineer of our company.

## 4. Instrument Cleaning and Maintenance

Under proper use condition, the GeneRotex Extractor requires little maintenance. However, the GeneRotex Extractor should be cleaned and maintained on a regular schedule for long time and constant use. This section includes the information on cleaning and maintenance of the GeneRotex Extractor.

### 4.1 Instrument Cleaning Operation Instructions

The GeneRotex Extractor should be cleaned on a regular schedule (every other month), please carefully read the following instructions before cleaning the instrument.



**Prohibit:** never clean the instrument when it is electrified.



**Prohibit:** never pour water or other solutions in into the sample block, loading platform or any interior parts of the instrument. Fluids can cause electrical shock when the instrument is electrified.



**Caution:** ethanol is a flammable and volatile liquid, it's exposure may irritate eyes, skin and respiratory tract, and may 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 sample block may produce high temperature during running, do not clean the sample block until it reaches the room temperature.



**Biohazard:** please regard all samples as potential biohazard materials, universal safety precautions should be taken when handling or processing samples. Samples pills should be immediately disinfected with an appropriate disinfectant solution to avoid equipment contamination or users' personnel injury.





**Biohazard:** Do not treat or operate any potential biohazard samples without taking any safety precautions.

### 4.1.1 Clean Instrument Shell

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

**2<sup>nd</sup> step:** clean the instrument shell 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 shell, which may ruin the surface coating.


### 4.1.2 Clean Operation 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 not clean, use a piece of damp, soft cloth moistened with low concentration isopropanol or ethanol to clean the touch 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.


### 4.1.3 Clean Experiment Cabin

**1<sup>st</sup> step:** open the experiment cabin door, turn off the instrument and unplug the power cord.

**2<sup>nd</sup> step:** clean the well plate area and the substrate in the experiment cabin with wet absorbent cotton or cotton cloth dipped in SDS solution, 75% ethanol or soapy water.

**3<sup>rd</sup> step:** clean magnetic bar, magnetic bar frame and stirring sleeve support in the experiment cabin with absorbent cotton or cotton cloth dipped in SDS solution, 75% ethanol or soapy water.

 **Caution:** do not clean the magnetic bar with metal instruments to protect the bar from damage.

 **Prohibit:** the instrument contains permanent strong magnetic field. Persons with pacemakers and metal prostheses are not allowed to clean or maintain the instrument. Strong magnetic field will affect the function of pacemakers or metal prostheses, and even cause damage.

## 4.2 Instrument Maintenance Operation Instructions

### 4.2.1 Maintain Sufficient Air Flow

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

### 4.2.2 Maintain Stable Power Supply

The GeneRotex Extractor requires stable power supply for proper functioning, therefore its power supply should be checked regularly to ensure the consistency 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.

### 4.2.3 Maintain Instrument Cleanliness

- 1) Please keep the instrument free of dust and liquid residue. Although the instrument is of good quality, immediately wipe off any salt, acid or alkali solution or organic solvent on the instrument to protect it from damage.
- 2) Please keep the experiment cabin free of dust and liquid residue and clean it regularly.



**Caution:** Although the instrument has passed the safety certification and test, when the experiment cabin is cleaned, it is strictly forbidden for the cleaning personnel to clean the instrument while it is running or in standby state, so as to avoid damaging the instrument or injuring the cleaning personnel.

#### 4.2.4 Other Maintenance

- 1) When the instrument is not used for a long time, please unplug the power plug and prevent dust from entering the instrument.
- 2) When the instrument is not used for a long time, it is recommended to turn on the instrument, place consumables and select the test procedure for dry running every 30 days in order to ensure stable performance of the instrument.

### 4.3 Transport and Return for Maintenance

#### 4.3.1 Instrument Disinfection

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

The disinfection process of GeneRotex Extractor is listed as follows:

- ▶ Please wear protective clothing and medical disposable gloves;
- ▶ Open the experiment cabin door and get all consumables out;
- ▶ Switch off the instrument and unplug the power cord;
- ▶ Prepare the detergent (lab routine disinfectant), wet the cotton cloth and degreased cotton swabs with the prepared detergent;
- ▶ Wipe the interior of the experiment cabin with wet cotton cloth or absorbent cotton.




- ▶ After wiping with disinfectant and drying the disinfectant inside the experiment cabin, clean the inside of the experiment cabin with 75% ethanol again, and clean the surface of the instrument with conventional cleanser.
- ▶ After the ethanol in the experiment cabin and the cleanser on the surface of the instrument are dried, disinfect the instrument with UV for 2 hours as suggested. See [“4.3.2 UV Disinfection”](#) for specific operation.
- ▶ Fill in the disinfection attachment or disinfection certificate.



**Caution:** instrument disinfection must be carried out by trained professionals. Please wear protective clothing and disposable medical gloves during disinfection. The whole disinfection process shall be carried out in a well-ventilated environment.

### 4.3.2 UV Disinfection

The user can set and edit the UV disinfection procedure of the instrument. The specific operation process is as follows:

- 1) Connect the power supply and turn on the instrument power switch.
- 2) Enter the experiment file interface of the instrument system software, as shown in Figure 3.2.
- 3) Click <  **Lamp** > to select the UV disinfection file provided by the instrument system and then click < **Edit** >, the system software will automatically pop up the disinfection time setting box, as shown in Figure 4-1.
- 4) After completing the UV disinfection procedure setting, click <  **Lamp** > icon and then click <  **Run Experiment** > to start the UV disinfection of the instrument.



**Reminding:** the setting range of UV disinfection time for the instrument is 0-300min.



Figure 4-1 UV Disinfection Time Setting

### 4.3.3 Installation of Transport Locks

When the instrument is required to be transported again, please pack and transport the instrument in strict accordance with the requirements for instrument transportation in order to avoid or reduce instrument damage in the process of transportation. The specific requirements and operations are as follows:

- 1<sup>st</sup> Step:** open the experiment cabin, turn off the instrument and unplug the power cord.
- 2<sup>nd</sup> Step:** respectively install transport locks at the corresponding position under the experiment movable loading platform, one on the left and another on the right, and fix them with screws.

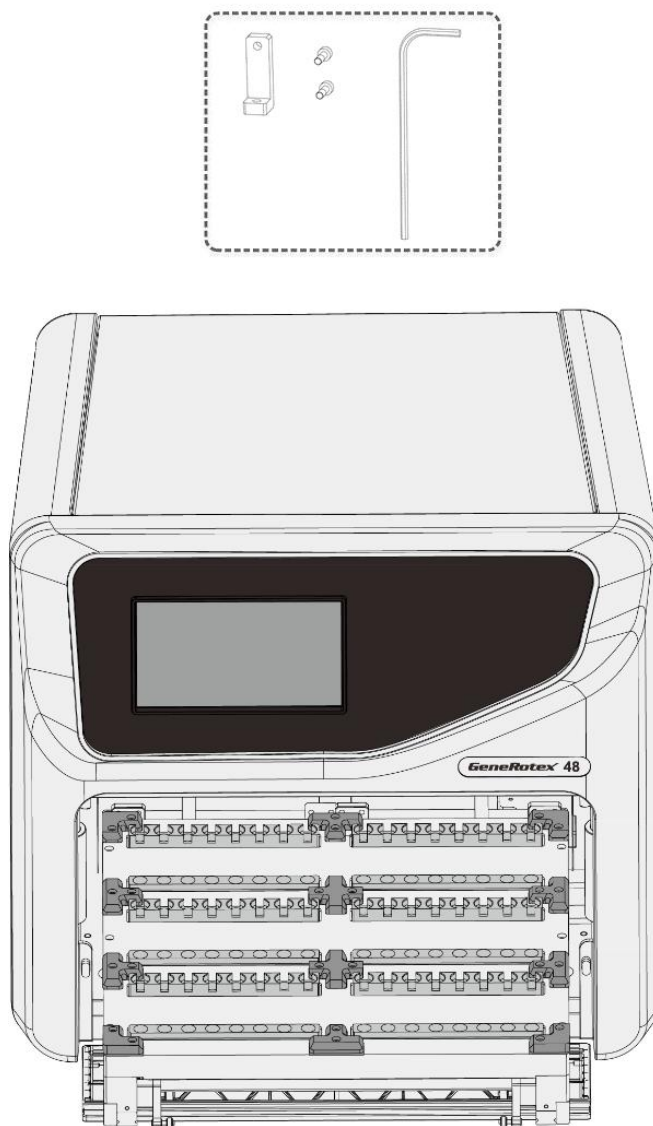



Figure 4-2 Installation of Transport Locks

 **Caution:** unless it is noted in this manual, please do not loosen or remove any internal and external screws or other parts, otherwise it will break the instrument warranty and result in instrument misalignment.

#### 4.3.4 Product Packaging and Return for Maintenance

If the instrument is required to be returned to the agent or after-sales service department, please pack and return it according to the following procedures:

- 1) Please thoroughly clean the instrument.
- 2) Please fully disinfect the interior of the experiment cabin according to instructions mentioned in this user manual and provide disinfection certificate.
- 3) Install transport locks.
- 4) Wrap the instrument in the plastic bag.
- 5) Please inform the return department of the used biohazards.
- 6) Please inform the return department of any failure of the instrument or parts to be maintained.
- 7) Please use the original packaging of the instrument to ensure that it will not be damaged during transportation. Any damage during transportation will incur additional costs.
- 8) See ***“1.4.1 General Parameters of Instrument”*** for transportation and storage conditions.



**Caution:** before returning the instrument to the agent or after-sales service department, please confirm that the instrument has been strictly disinfected.



**Caution:** the original transport package of GeneRotex Extractor is designed to reduce the instrument damage and ensure its transportation safety. Adopt other packaging materials will break the warranty, and **XATL Co., LTD.** will not be responsible for damages as consequences of improper packaging that incurred during the transportation back to maintenance department.







**Reminding:** the transportation of GeneRotex Extractor can adopt general transport (with awnings).

## 5. Troubleshooting

In general, corrective instructions will be display along with the error messages by the application or instrument software. And under normal circumstances the software running errors can be solved by restarting the computer or the instrument system.

This section describes the main possible errors of the GeneRotex Extractor together with possible causes and corrective instructions.

No.	Phenomenon	Cause	Action
1	After turning on the power supply, there is no display on the operation screen.	Whether the power cord is inserted	Reinsert the power cord
		Whether the fuse is intact	Replace the fuse
		Others	Contact our company or agent
2	The instrument cannot operate when powered on	Main interface displays the  or  icon	Click  or  icon the main interface to view details
3	The instrument fails to upgrade	USB flash disk cannot be recognized	Repeatedly insert USB flash disk to upgrade or replace it to upgrade the instrument
4	The instrument makes abnormal sounds	Whether the transport locks are removed	Remove the transport locks
		Whether the 48-deep well plate is placed correctly	Place the deep well plate again
5	The temperature does not rise	View the temperature setting option of the experiment procedure	Set the temperature of the experiment procedure again and download it in the instrument
		Others	Contact our company or agent
6	UV lamp is not on	Whether UV lamp tube is in good contact	Reinstall the lamp tube
		Whether UV lamp tube is damaged	Replace the lamp tube
		The safety door of the experiment cabin is not closed	Close the safety door again

7	The magnetic bar drops		Contact our company or agent
8	The system is halted or out of control	Misuse or misoperation	Cut off the power supply and restart the instrument
		Others	Contact our company or agent



**Reminding:** The fuse tube of GeneRotex Extractor is a F10AH250V fuse tube and it is installed between the power socket and the switch at the backside of the instrument. Users could change the fuse tube following the steps below:

- a. Turn off the instrument
- b. Unplug its power cord.
- c. Open the fuse tube socket and take out the fuse tube.
- d. Check the integrity of the fuse tube and change the fuse tube if it is broken.
- e. Insert the fuse tube socket and plug the power cord.

## 6. Experiment Operation Guide

### 6.1 Overview of Experiment Operation Guide

The purpose of this experiment operation guide is to guide users to combine the use of the Automatic GeneRotex Extractor with its reagents, quickly understand and be skilled at the operation procedure.

### 6.2 Experiment Preparation

The GeneRotex Extractor should be used cooperatively select the appropriate magnetic beads nucleic acid extraction reagent. This experiment operation guide takes ZTLVB-Y64 Ex-DNA/RNA Viral Nucleic Acid Extraction Kit (64T) from **XATL Co., LTD.** as an example.

#### 6.2.1 Scan Reagent Kit Code

The instrument can be connected to a code scanner, after connection, the main interface of the instrument system software will activate < **Scan** >, as shown in Figure 6.1.

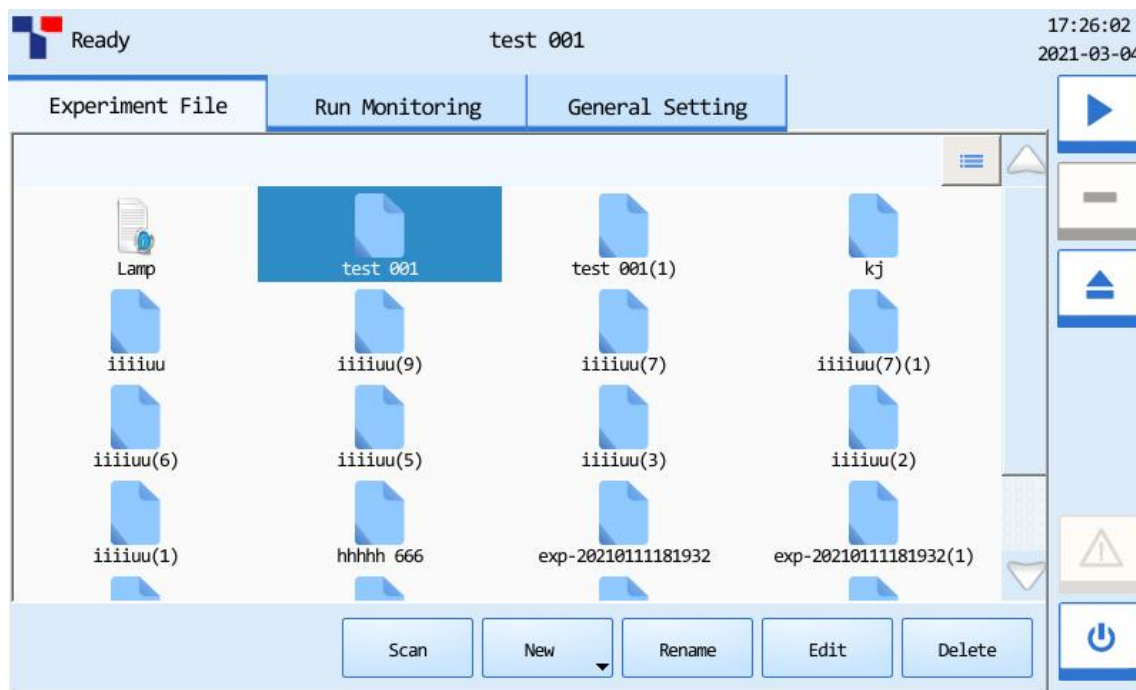


Figure 6.1 Main Interface of System Software

Before starting the experiment, click < **Scan** > and the main interface will pop up the dialog box, as shown in Figure 6.2. User can use the code scanner to scan the QR code on the nucleic acid extraction reagent kit. The system software will automatically enter the kit information and call the corresponding experiment program.

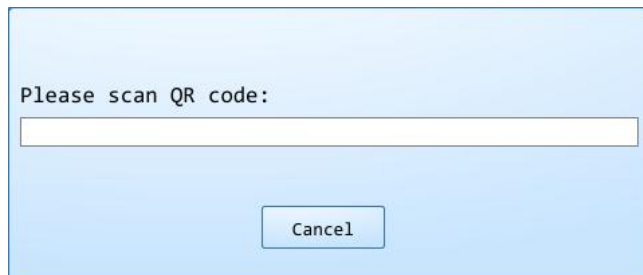


Figure 6.2 Scan the QR code

## 6.2.2 Reagent and Sample Preparation

Please follow the operation instructions of the reagent kit to prepare the nucleic acid extraction reagent and add the sample.

## 6.3 Loading of Deep Well Plate

- 1) Insert the stirring sleeve in the deep well plate;



**Reminding:** Please confirm that the stirring sleeve has been pushed into place, otherwise it may cause abnormal operation of the instrument, damage to the stirring sleeve and contamination of the magnetic bar and affect the experimental results.

- 2) Properly place the deep well plate into the experiment cabin.



**Reminding:** Please confirm that the notch of the deep well plate is outward and in place, as shown in Figure 6.3.

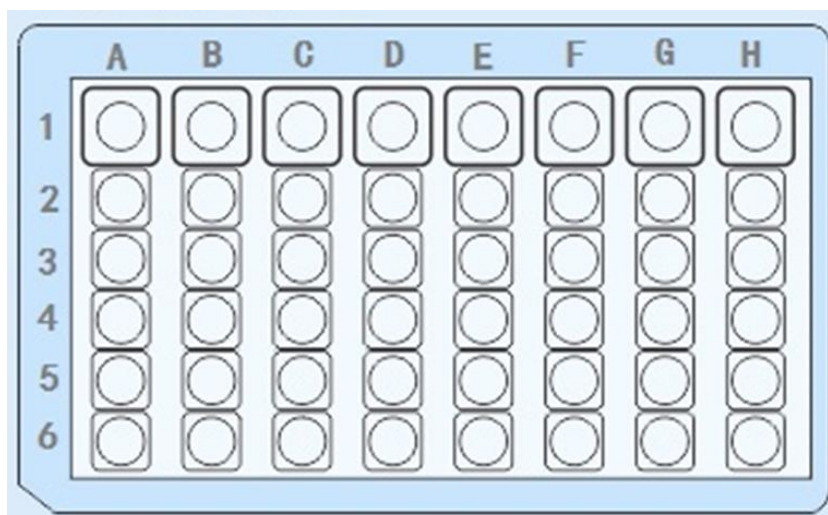


Figure 6.3 Deep Well Plate

## 6.4 Edit and Run Experiment Program

### 6.4.1 Edit Experiment Program

- 1) Please connect the power supply and turn on the power switch.
- 2) Please click **Experiment File** tab on the main interface to enter the experiment file interface and create a new experiment file on the experiment file interface.
- 3) Select the new experiment file on the experiment file interface, click **< Edit >** to enter the experiment file edit interface, edit the experiment program steps and parameters according to the reagent kit specification, and then click **< Save >** to save the corresponding settings. Refer to *"3.2.2.2 Edit Experiment File"* for details.
- 4) Elect the new experiment file on the experiment file interface, and click **< Run experiment >** in the main control bar to run the experiment file. For detailed methods, please refer to *"3.2.3 Run Monitoring Tab"* in the manual.
- 5) After the experiment is finished, the instrument will give the user a prompt that the experiment is finished. Please suck the extracted products from the wells in Row 6 and place them in the test tube for later use.



**Reminding:** If the user does not analyze the extracted product temporarily, please put it in the refrigerator at -20℃ for sealed storage.

## 6.5 Shutdown

The power switch is located on the back of the instrument. The user can switch the power switch to the end marked with “O” to turn off the GeneRotex Extractor

 **Reminding:**

- a. Do not cut off the power supply of the instrument if there is no accident or failure during the experiment, so as not to affect the experiment.
- b. Do not turn on/off the instrument frequently during operation.
- c. Please turn off the instrument when the experiment is finished.
- d. If something unexpected happens to the instrument during use, for example, the experiment liquid is spilled into the experiment cabin or the experiment consumables are forgotten to be loaded, please stop the experiment immediately and turn off the instrument.
- e. If the instrument is not used for a long time, please unplug the power plug.

 **Caution:**

- a. Before moving the GeneRotex Extractor, please turn off the instrument and unplug the power plug.
- b. In case of current leakage, please immediately cut off the power supply and stop using.

## 6.6 Matters for Attention

- 1. The type and model of selected reagent vary with the classification of the samples to be extracted, and therefore the reagent components as well as the composition and concentration of each component will also be different. Please select the appropriate nucleic acid extraction reagent according to the classification of samples.
- 2. If the user selects other magnetic bead nucleic acid extraction reagents, please follow the instructions of the reagent strictly.

3. When using the GeneRotex Extractor for the first time, do not power on the instrument directly. Please remove the transport locks according to the instructions before starting the operation. For detailed methods, please refer to ***“2.3.1 Removal of Instrument Transport Lock”*** in the manual.
4. Under normal circumstances, do not open the safety door of the experiment cabin during the operation of the instrument. In case of abnormal condition, please stop the experiment and then open the safety door of the experiment cabin.



**Caution:**

- a. The used deep well plate and stirring sleeve shall be treated as biological contaminants and recycled in accordance with the relevant provisions.
- b. The use of expired reagents or reagents unsuitable for the instrument will not guarantee the desired results.

## 7. Contact Information

Xi'an Tianlong Science and Technology Co., Ltd.



No. 389, Zhuhong Road, Xi'an, Shaanxi Province, P. R. China.

**Postcode:** 710018

**Company Tel:** +86-29-82218051/83204255

**Company Fax:** + 86-29-82216680

**After-sale Service:** + 86-29-82683675

**Email Address:** XATL@medtl.com

**Website Address:** www.medtl.com

SUNGO Europe B.V.



Olympisch Stadion 24, 1076DE Amsterdam, Netherlands.

**Tel:** +31 (0) 2021 11106

**Email Address:** ec.rep@sungogroup.com



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Xi'an Tianlong Science and Technology Co.,Ltd.

Add:No.389, Zhuhong Road, Xi'an, Shaanxi Province, P.R.China

Tel:+86-29-8268 3675 400-606-1686 Fax:+86-29-8221 6680

<http://www.medtl.com>

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