

Mini Gradient PCR Machine

Cat. No. BT2201

IMPORTANT SAFETY INFORMATION

- The user needs to have a complete understanding of how the instrument will work before operating the instrument safely. Before operating the instrument, please read this manual carefully.
- The operator should not attempt to open or repair the instrument, which would void your warranty and may result in an electric shock. In case of repair, contact BT Lab Systems.
- This product is an indoor instrument.
- Before connecting the power supply, make sure the voltage of the power supply matches the voltage required by the instrument and make sure that the rated load of the power outlet is not less than the requirements of the instrument.
- Hold the plug with hands when plugging and unplugging the power cord. When inserting the plug, make sure that the plug is fully inserted into the socket. Do not pull the power cord when pulling out the plug.
- If the power cord is damaged, it must be replaced with a power cord of the same type and specification.
- This instrument should be placed in a place with low humidity, little dust and far away from water sources and avoid direct sunlight and strong light source. The room should be well ventilated and free from corrosive gas or strong magnetic field interference. Keep away from heating, stove, and other heat sources. Do not place the instrument in damp or dusty places.
- Power off when not in use. If the instrument will not be used for a long period, unplug, and cover with a piece of cloth to protect it from dust.
- Unplug the instrument from the electrical outlet immediately under the following conditions and contact the supplier or have it attended by trained service personnel:
 - There is liquid spilling inside the instrument.
 - The instrument is exposed to rain or water
 - The instrument is not working properly, especially if there are any abnormal sounds or smells.

MAINTENANCE

Use a neutral soap solution to clean the holes in the base. Do not use strong bases, concentrated alcohols, and organic solvent solutions.

There should be no other articles under the machine or its left and right cooling windows.

After the machine is used for some time, dust will adhere to the heat dissipation window. It is essential that it is cleaned up in time.

The module should be cleaned frequently. Once some reactant residues are accumulated in the module cavity, it will affect the temperature response. It is recommended to wipe it regularly with cotton cloth.

INTRODUCTION

The Mini Gradient PCR Machine is an ultra-lightweight, ultra-thin thermal cycle gene amplification instrument.

It has a 5" TFT High-Definition, True Color, Full Touch LCD screen. The whole program displays in real time with curved graphs and the parameter modification is intuitive and convenient. It uses the latest generation of semiconductor technology, has excellent temperature accuracy, and its uniformity ensures high quality experimental results.

KEY FEATURES

- Unique appearance, compact size with interface operation simple and convenient.
- Built with the latest generation of semiconductor technology, excellent augmentation performance, effectively eliminate the edge effect of module heat conduction, the module temperature uniformity is excellent.
- Built-in four-way refrigeration film, four sensors that are evenly distributed, and program temperature control for more precision.
- Excellent temperature rising and cooling rate, up to 7°C/s.
- The bottom shell with one aluminum carved processing is not only exquisite and solid, but it also greatly enhances the heat dissipation performance.
- Has a 5" TFT HD full-touch color screen for a convenient and fast setting.
 - Can quickly edit the required files.
 - Visual accurate display of temperature curve and instrument running process status in real time.
- The system has a built-in gradient calculator, which can easily obtain accurate annealing temperature for different experimental samples to optimize PCR reaction conditions.
- The system has User login, password protection, data security, large data storage (the machine can store more than 100 files). Administrators can remove users and files that are not required.
- The ingenious elastic hot cover structure design adapts to the different heights of test tubes, guaranteeing the best conditions for the test
- Real-time display of gradient temperature distribution, real-time temperature display, more conducive to controlling the sample temperature.
- The hot lid temperature and working mode can be set. The hot lid can be switched on and off.
- The test tube and module temperature control modes can be chosen to meet different experimental requirements.

TECHNICAL SPECIFICATIONS

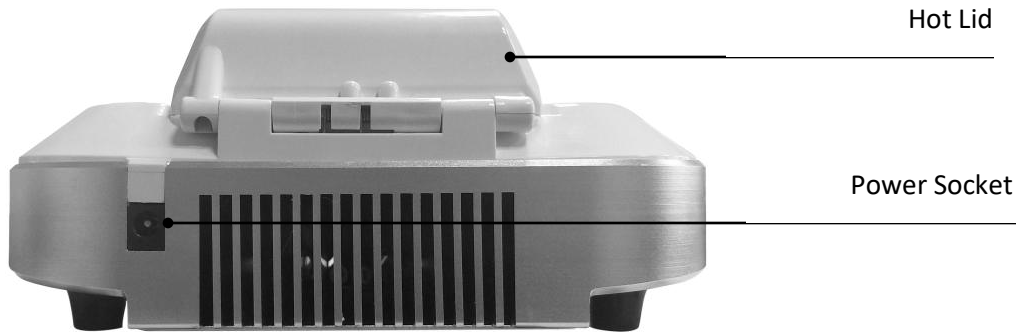
Normal Working Conditions

- Ambient Temperature: 5°C ~ 30°C
- Relative Humidity ≤70%
- Power Supply: 24V 8A

Basic Parameters and Performance

Single-Step Time Range	1-59m59s (0 is forever)
Temperature Range	4 – 99.9°C
Sample Capacity	32 x 0.2ml
Max. Heating Rate	8°C/s
Max. Cooling Rate	7°C/s
Temp. Uniformity	±0.20°C
Temp. Accuracy	±0.10°C
Temp. Display Resolution	0.1°C
Temp. Control Method	Block/Tube
Gradient Temp. Uniformity	±0.2°C
Gradient Temp. Accuracy	±0.2°C
Gradient Temp. Range	30 – 99.9°C
Gradient Temp. Difference Range	0.1 – 30°C
Hot Lid Temp. Range	30 – 105°C
Max. Steps of the program	30
Program Max. # of Cycles	99
Time increment/decrement	-599/+599s
Temp. increase/decrease	-9.9 ~ +9.9°C
Program Pause Function	Yes
16°C Insulation	Forever
LCD	5-inch, 800 x 480 Pixel
Program Storage Quantity	>100
Communication Interface	USB 2.0
Input Power	24V, 8A
Dimensions (W x D x H)	200 x 230 x 85mm
Net Weight	3.2kg

STRUCTURE



OPERATION GUIDE

Start Up

After the instrument is powered on, the LCD screen will light up. The welcome screen will appear, then the main menu interface.

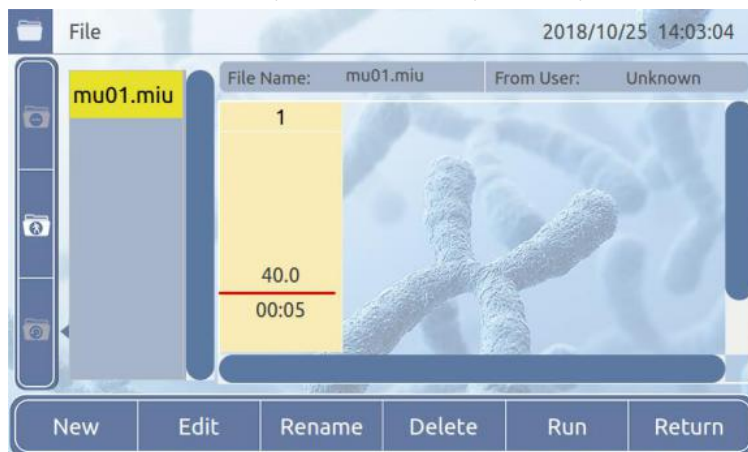


Run File Operation

The run file is the PCR amplification program. The running file consists of the temperature and the cycle steps. Each file can contain up to 30 steps.

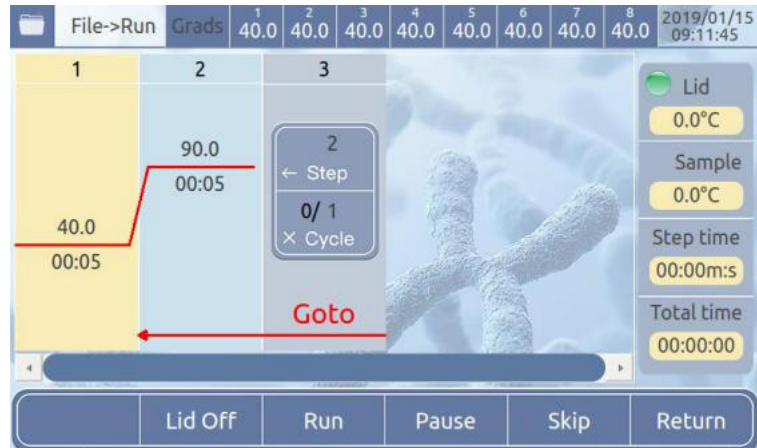
1. Access File Library

- a. Press on the "File" icon on the main menu to get to the file library interface. The left column shows the list of files. The right side shows the specific file information and file preview of the selected file. The bottom row consists of the function buttons. When a file is selected, it can be edited, deleted, and renamed.



2. Create a New File

- Press “New” to enter the new editing interface. Above the temperature curve is the temperature and below is the time.
- Press on the temperature or time to set its parameters by the number keys
- Press the “+Step” button and the “+Cycle” button to add temperature and cycle steps.
(Maximum number of steps is 30)

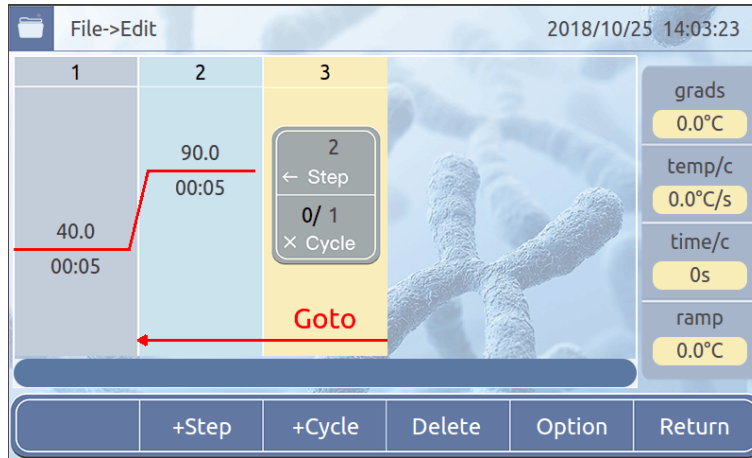


- After setting the parameters have been completed, press the “Save” button.
- Enter the file name, then press “OK” to return to the file library interface.



3. Edit File

- a. Select the file to be edited in the file library, then press on the “Edit” button. Press on the temperature or time to edit.
- b. Press the “+Step” button and the “+Cycle” button to add additional temperature and cycle steps. (Maximum number of steps is 30)



- c. Select a temperature step, then press the “Option” button to set detailed parameters for that step, including “Temp”, “Time”, “+Temp/c”, “+Time/c”, and “Grads”.



- d. Press “OK” once finished with setting detailed parameters to return to the editing interface.
- e. Press “Return” to return to the file library interface.

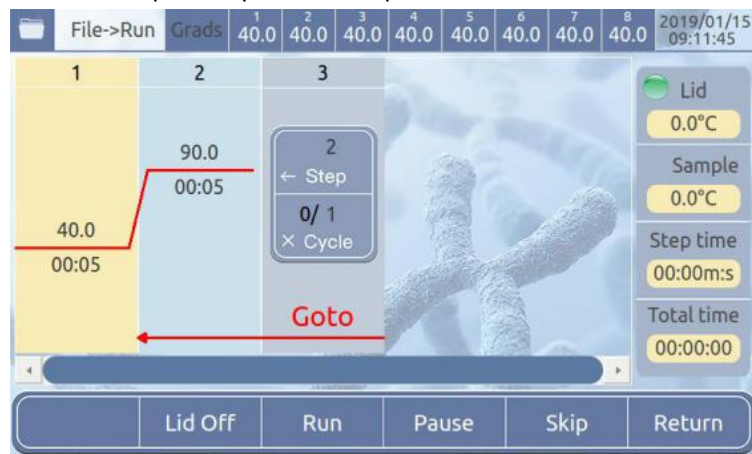
4. Running File

- Select the file to be run in the file library. Press “Run” to enter the running interface.
- Press “Lid Off” or “Lid On” to switch the hot cover.
- The column to the right of the graph shows the hot lid and module temperature, the current step time, and the total time.
- Press “Run”, and the file will start running.

When the file is running at a certain step, the temperature curve will flash to indicate that it is running.

During the operation, the following functions can be used.

- “Stop” – Stop the operation
- “Run” – Continue the operation
- “Pause” – Pause the operation
- “Skip” – Skip the next operation



After the running file time is over, the device enters a cryostat state, and the Total Time displays complete. Press “Stop” to stop running.

5. Gradient Calculation

- Press the “Calculator” icon on the main menu to enter the gradient calculation interface.

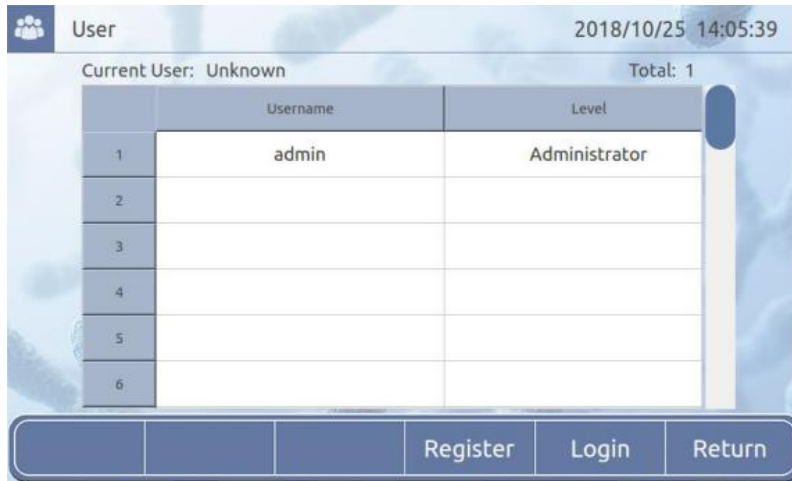


- Press on the corresponding area and enter the module temperature and gradient range. After the input is complete, press “OK” to automatically calculate the temperature of each sample. Press “Return” to get to the main menu.

User Management

User Management allows new users to be created. Only administrator level users can delete other users.

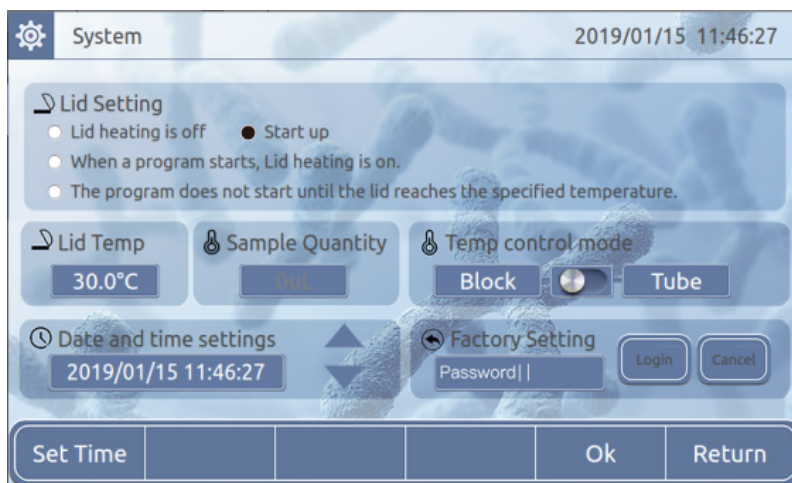
1. Press the “User” icon in the main interface to enter the user management interface



2. Press “Register” to enter the registration interface.
3. Enter the username, password, and other information, then press “OK” to complete
4. Press “Login” to enter the login interface. Input the corresponding information to complete the login.

System Settings

1. Press on the “System” icon in the main interface to enter the system settings interface.
2. After setting is complete, press “OK” to save the settings, then press “Return” to return to the main menu.



Help

1. The “Help” icon on the main menu will open the help interface screen. Press “Return” to go back to the main menu.



TROUBLESHOOTING

Fault analysis and processing method

Issue	Possible Cause	Solution
Display Error Open:x Short:x	Sensor open or short circuit	Contact BT Lab Systems
The display is not lit, abnormal	Hardware failure	Contact BT Lab Systems
Touch screen failure	Hardware failure	Contact BT Lab Systems
Power adapter indicator is not lit	Bad adapter or host is faulty	Contact BT Lab Systems
Block is not heated	Hardware failure	Contact BT Lab Systems
Block temperature is too high/ too low	Hardware failure	Contact BT Lab Systems
Hot cover is not heated	Hardware failure	Contact BT Lab Systems
Hot cover temperature is too high	Hardware failure	Contact BT Lab Systems
Fan cannot rotate	Hardware failure	Contact BT Lab Systems

WARRANTY

Our company guarantees that this unit is warranted against defective material and workmanship for a period of one year from the date of shipment. We will repair or replace the defective equipment returned during the warranty period free if the equipment has been used under normal laboratory conditions and in accordance with the instruction in this manual.

The following defects are specifically excluded:

- Damage caused by accident, misuse, or abuse
- Damage caused by disaster
- Repair or modification by anyone else without our authorization
- Corrosion due to the use of improper solvent or sample
- Defects caused by improper operation
- Use of fittings or other spare parts supplied by different manufacturers

This warranty does not apply to platinum wire and all the accessories.

A return authorization must be obtained from us before returning any product for repair on a freight prepaid basis.

For any inquiry or request for repair service, please contact BT Lab Systems via the email below.

E-Mail: info@BTLabSystems.com

TECHNICAL SUPPORT

BT Lab Systems offers technical support for all its products. If you have any questions about the product's use or operation, please contact BT Lab Systems at the following info.

E-Mail: info@BTLabSystems.com