

Gradient Thermal Cycler GP-9604E

Manual



General Information

This Manual for users contains function and operation of the Instrument. In order to use the instrument properly, please read this manual carefully before operation.

Please check the instrument and accessories with the packing list at the first time you open the instrument packing case.

Content

1. IMPORTANT INSTRUCTION	2
1.1 SAFETY INSTRUCTION	2
1.2 SAFETY	2
2. BRIEF INTRODUCTION	4
3. PRODUCT FEATURES	5
3.1 WORKING CONDITIONS	5
3.2 BASIC PARAMETERS	5
4. OPERATION GUIDE	5
4.1 STRUCTURE	6
4.2 WELCOME INTERFACE	7
4.3 FILE MANAGEMENT	8
4.4 CREATE PROGRAM	9
4.5 RUN PROGRAM	13
4.6 SYSTEM INTERFACE	14
4.7 USER	16
4.8 CALCULATOR	17
5. TROUBLES AND SHOOTINGS	18
6. THE MAINTENANCE OF INSTRUMENT	19
7. APPENDIX: GP-9604E WIRING GRAPH	20
8. PERFORMANCE TEST	22
9. PACKING LIST	24

1. Important Instruction

1.1 Safety Instruction



Read this Manual carefully before using it. Read the guidelines and directions below to prevent injury and carry out countermeasure accordingly when necessary.

1.2 Safety

The operation, maintenance and repair of the instrument should comply with the basic guidelines and the remarked warning below.

If users don't comply with them, it will have an effect on the instrument.

This is a general device produced under standard GB9706.1, only use it in door where ventilated well.



Only trained person can operate this instrument. Users or person who are not permitted are not allowed to open device, which will lead electricity shock or other danger. Please contact factory for maintenance.



For safety use, ensure the power supply with earth/ grounding socket. Make sure the voltage supplied is complied with indication on label. Exchange the power cable once it is damaged.



Don't place any stuff on the power cable, hold the plug head properly when pulling the cable off from the socket. The metal heated block can reach a high temperature during heating, probably leads to sample/liquid boiled out of tubes, which may cause injury, so it is prohibited to touch metal block by any part of your body during heating procedure.



The instrument should be placed in a room with low humidity, less dust, and away from water sources, direct sunlight and strong light sources.

The room should be well ventilated, and away from heating, fire and other heat sources, and interference of corrosive gas or strong magnetic field. Keep at least 30cm of space between other devices.



Power off when you finish your work. Pull off the connector plug when there's long time no use of the Instrument and cover it with a cloth or plastic paper to prevent from dust.

Pull the connector plug from the jack at once in the following



- There is some liquid flowing into the Instrument
 - Drenched or fire burned
 - Abnormal operation: such as abnormal sound or smell
 - Instrument dropping or outer shell damaged
 - The function has obviously changed

2. Brief Introduction

Gradient PCR machine is derived from general PCR machine, which is commonly used in molecular, medicine, food industry and gene detection etc.

Products highlights:

- 1) Small footprint, compact design, good space-saver.
- 2) Featured excellent cooling function benefits from qualified cooling semiconductor
- 3) High temperature accuracy and good uniformity, quick heating up
- 4) Extremely quiet, low noise
- 5) 42°C gradient range
- 6) 5-inch touch screen, easy and friendly to use
- 7) Linux operation system
- 8) Data can be exported and saved into USB disk

3. Product Features

3.1 Working Conditions

Ambient temperature: 5° C ~ 30° C The relative humidity: ≤70%

Voltage: AC100 -240V, 50/60Hz

3.2 Basic Parameters

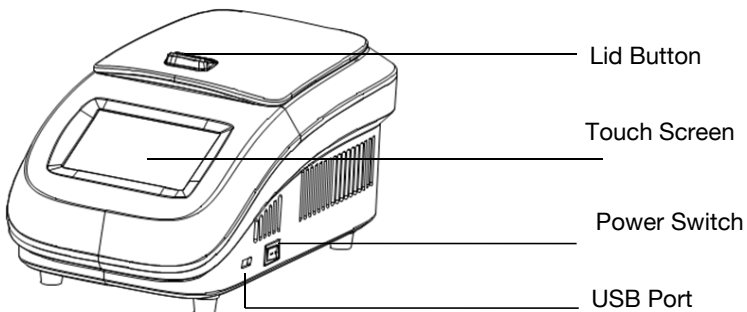
Model	GP-9604E	Mode	Block or Tube
Capacity	96x0.2ml(Semi with/without skirt)、12x8 strips、8x12strips、tubes(height 20~23mm)	Automatically Heating Lid	Shut off automatically when sample lower than 30°C or program over
Block Temperature Range	0~105°C	Timer Increasing / Decreasing	-599~599S for Long PCR
Block Temperature Display precision	0.1°C	Temperature Increasing / Decreasing	-9.9~9.9°C for Touchdown PCR
Block Temperature Uniformity	±0.25°C	Programs	10000+
Block Temperature Accuracy	±0.2°C	Max. Cycles	99
Timer of Single step	1s~59min59sec/0(Infinite)	Max. Steps	30
Heating Lid Temperature range	30~110°C	Pause	Yes
Max. Heating Rate	5°C/s	16°C Holding	Duration: Infinite

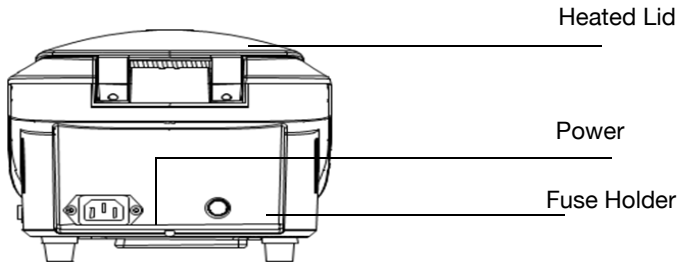
Max. Cooling Rate	4.5°C/s	Real-time operation status	Image-text displayed
Gradient Temperature Range	30~105°C	USB Port	USB 2.0
Gradient Set Span	0.1~42°C	Dimension (LxWxH) mm	200x300x170
Gradient Temperature Accuracy	±0.3°C	Weight	4.5kg
Gradient Temperature Uniformity	±0.3°C		

4. Operation Guide

This chapter introduces the instrument mechanical structure, the navigation and each button's functions and some preparations before power-on. Please read it before first operation.

4.1 Structure





4.2 Welcome Interface

Welcome interface appears once instrument turned on, seconds later will enter into main interface. This Gradient PCR requires universal power supply AC100~240V,50/60Hz.



Fig 1 Welcome Interface

There are four optional buttons on the main interface, File, System, User, Calculator, as Fig 2. When no user is logged in, the title bar shows "Guest" .

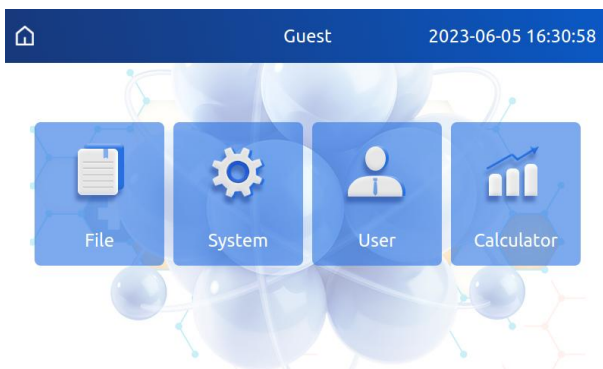


Fig 2 Main Interface

4.3 File Management

Click “File” on the Main Interface to start managing files, at the top of the window showing the title, middle part is browse area, at the bottom of the window are buttons.

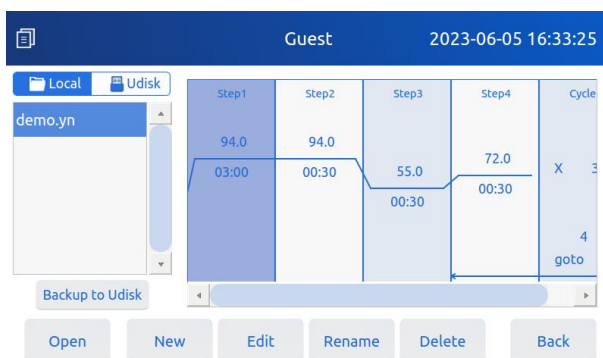


Fig 3 File Management window

(1) Browse files

“File” function can open PCR files with suffix “.yn” in your local storage and U disk, click “Local” to search a local file, the program graph showing at right side, user can check more by moving the slide bar. If there is a U disk

connected to the instrument, there is a button “save to U disk” for program storage.

U disk files can also be saved in local disk. Choose a file from U disk, click “Save to Local” to proceed.

(2) Program graph area

There are 30 rows for 30 steps of each one program. User can check details by moving slide bar.

(3) Buttons

There are six buttons, Open, New, Edit, Rename, Delete, Back. Click “Back” can return to Main Interface, others are for browsing program.

4.4 Create Program

Click button “New” to create a new program, as Fig 4, the middle big window showing details of program, like steps, cycles which can be added or deleted.

(1) Add steps

Firstly decide the position of step where need addition, (the default position is step 1, avoid clicking the area near the temperature curve which will lead to parameters setting), click “Temp” and “Cycle”, user can add a new step after the step you choose.

(2) Delete steps

Choose one step in the browse window, click button “Delete”.

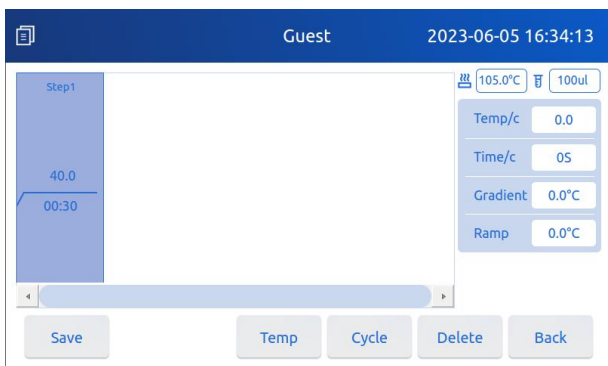


Fig 4 Edit Program

(3) Program parameters setting

Click the temperature or time figures around the temperature curve to set new parameters.

Temperature range is 0~105 , as Fig 5. Button “Clear” can clear away the input value, click button “Enter” to confirm new setting, button “Back” can close the keyboard.

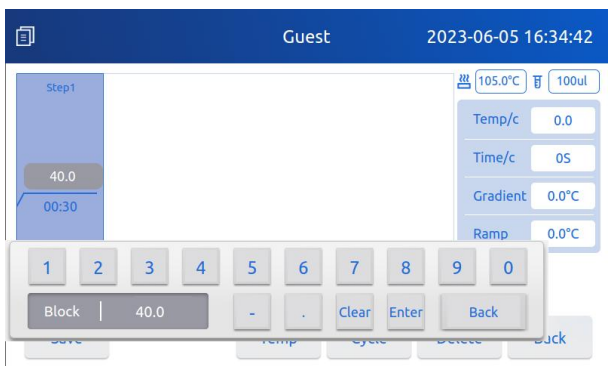


Fig 5 keyboard for Temperature setting

Timer range 00: 00~59: 59, timer format “xx: xx”, for example: 30S, just input 0030, the icon : can be display automatically, as Fig 6

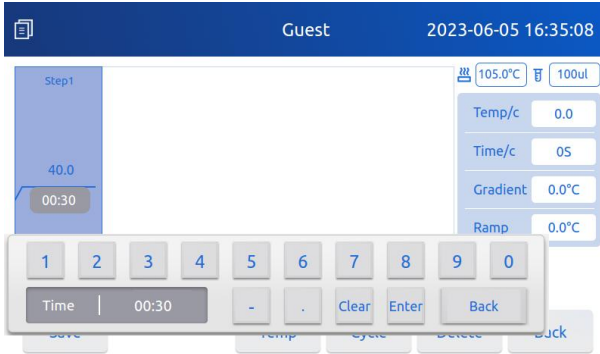


Fig 6 keyboard for Timer setting

The number at right side of icon “x” means cycle times, set it as Fig 7, “Skip to”

means next step skips to which step, as Fig 8.

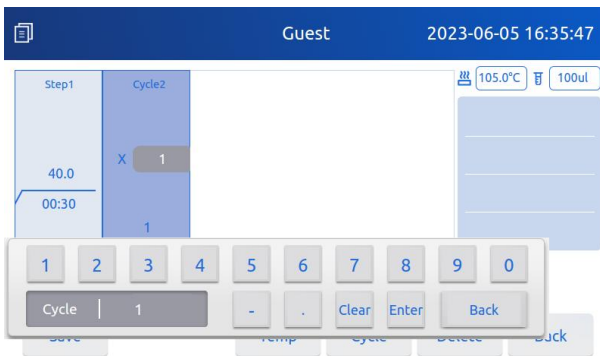


Fig 7 Set Cycles number

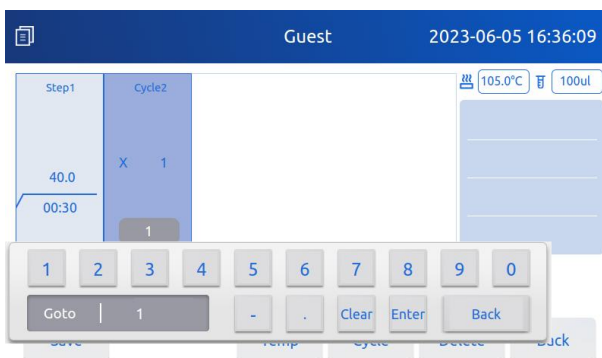


Fig 8 Cycle “skip to” setting

(4) Other program settings

User can also set “Temperature increasing”, “Timing Increasing”, “Rate” and “Gradient”. Click the parameters windows, keyboard will appear for setting. All the parameters default is 0, Rate is maximum when it is 0.

(5) Save programs

Rename and save the program after parameters setting, as Fig 9. The default name for new program is “test” which can be renamed according to needs, with max. 10 characters. Clear away by click “del”, button “Caps” is for capital and small letters shift. Button “BS” can delete one character, click “Enter” to confirm program name.

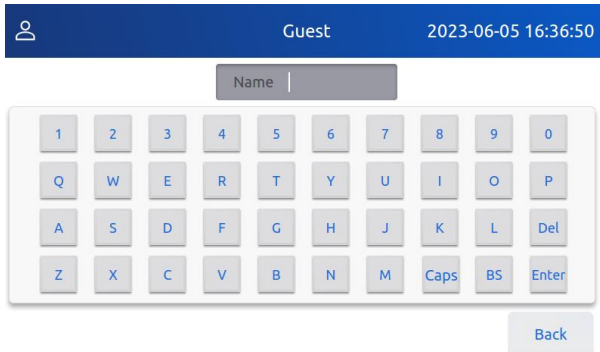


Fig 9 Rename program

4.5 Run program

Choose one program, and click “Open”, as Fig 10, Click “Edit” button to set program.

User can set value for Lid temperature or Tube volume for each program



heated lid can be set between 30~110°C, sample volume can be set between 0~100ul.

Once parameters and mode are confirmed, click “Run” to make program working.

The temperature curve segment will flicker during working to reminder user the program’s status.

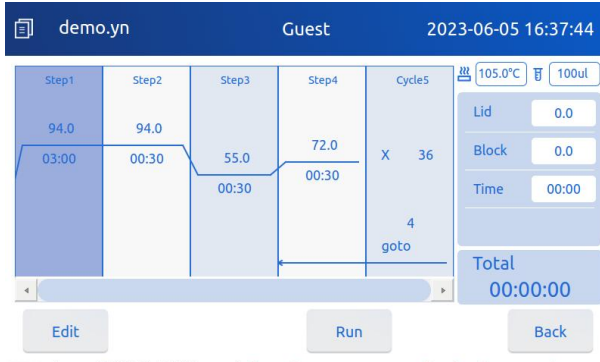


Fig 10 Program interface

During program working, users can click “Pause”, “Stop” “ Skip” to operate, as Fig 11.



Fig 11 Program running

4.6 System Interface

Click “System” button on the Main Interface, users can set lid mode, lid temperature, date and time, beep, software update, and screen calibration.

As Fig 12.

(1) Lid Mode Setting:

A、OFF: Heated lid not working when program running

B、ON: Heated lid working once program start working

C、Program run start: No matter whether heating lid reaches target temperature, program starts to run.

D、Lid runs first: Program runs once heating lid reaches target temperature. During lid heating, block temperature keeps at 10°C to reserve samples.

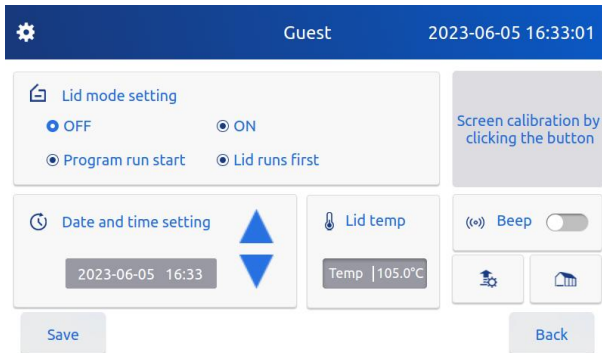


Fig 12 Lid setting

(2) Date and Time setting

Click “UP” or “Down” button besides “Date and Time Setting”, the cursor starts to flicker, tab the value which needs set, adjust value via buttons “UP” and “DOWN”.

(3) Lid Temp

Click the temp value on screen, a keyboard appears for value set, and click “Enter” on keyboard to confirm.

(4) Beep

The “Beep” is on when the button is blue, otherwise Beep is OFF.

(5) Software Upgrade

Reserve upgrade software in U disk and connect to instrument, click “Upgrade” to proceed. Restart instrument after upgrade completed.

4.7 User

Under “User” mode, different users can create their own programs as personal PCR files with password avoid others to edit nor delete.

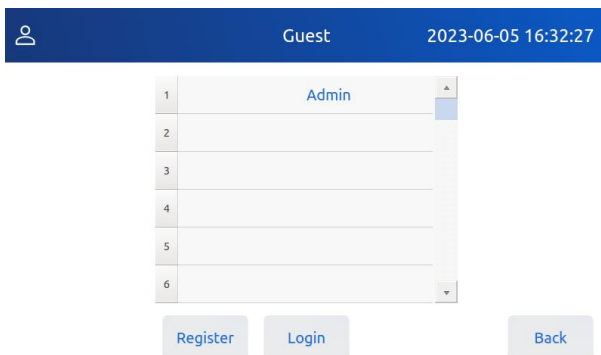


Fig 13 User Interface

Click “User” on the Main Interface, there is an administrator account “admin” with priority who can revise others’ password and delete other users accounts.

Click “Register” to create a new user account, user can set up personal account name with password, confirm setting by click “Enter”.

This new user account is default logged in, there is not any program under this new account, user needs to create new programs or run programs in U disk. User needs to relog in in case of instrument restart, also can click “Back” to return back to Main Interface.

The registered user can choose the name and log in by password.

4.8 Calculator

Click "Calculator" on Main Interface, As Fig 14, set "block" temperature within 30~105°C, "Grad" can be set 0.1~42°C

Click "Calculate" to check 12 rows temperature.



Fig 14 Calculator

5. Troubles and Shootings

No.	Troubles	Causes	Shootings
1	No signals on the display when turned on	No power Supply	Check the connection of power
		Broken power	Exchange the power
		Broken switch	Exchange the switch
		Others	Contact vender
2	The actual and displayed temperatures are quite different	Broken sensor	Contact vender
3	Block not heating	Sensor circuit or peltier circuit broken	Contact vender
4	Touch defective screen	Touch screen disable	Contact vender
5	Lid not heating	Heating film or heating circuit broken	Contact vender
6	Lid over-heat	Heating circuit or temperature detection problem	Contact vender
7	Fan not working	Fan broken or circuit problem	Contact vender
8	“ERR1.xx : Sensor open circuit”	Temperature Sensor circuit cutoff	Contact vender
9	“ERR2.xx : Sensor short circuit”	Temperature Sensor short circuit	Contact vender

6. The maintenance of Instrument

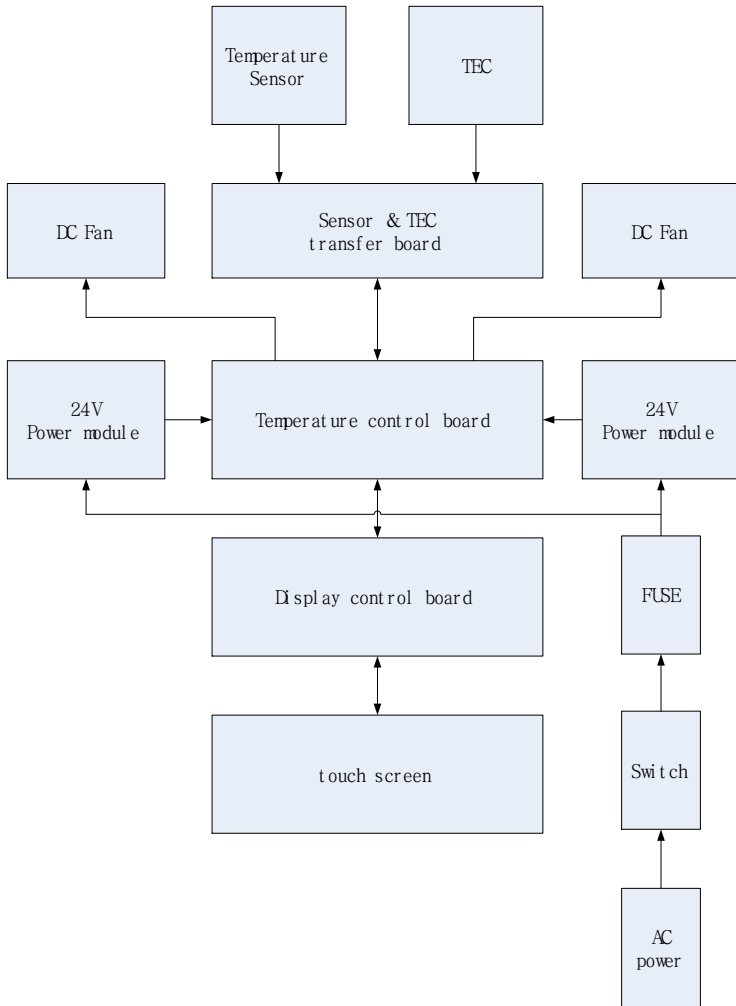
The block and wells should be cleaned by the cloth stained with alcohol to assure good heat translation between the block and the test tube and no pollution.



Power off when cleaning the instrument when cleaning the well, don't drop the cleaning liquid in the well; Corrosive cleaning liquid is strongly prohibited.

7. Appendix: GP-9604E Wiring graph

(Only for reference)



8. Performance Test

Item	Gradient Thermal Cycler		Model	GP-9604E
Date			Serial No.	YNCK-
No.	Content	Methods	Standards	Results
1	Standard PCR program	Calculagraph	≤1.9 Hours	<input type="checkbox"/> Qualified
2	Block Temperature Accuracy	High precision thermometer	≤±0.25°C	<input type="checkbox"/> Qualified
3	Block Temperature Uniformity	High precision thermometer	≤±0.2°C	<input type="checkbox"/> Qualified
4	Lid Temperature Accuracy	High precision thermometer	≤±0.3°C	<input type="checkbox"/> Qualified
5	Lid Temperature Uniformity	High precision thermometer	≤±0.3°C	<input type="checkbox"/> Qualified
6	Lid Temperature Precision	High precision thermometer	≤±1°C	<input type="checkbox"/> Qualified
7	Basic Function	Visual check	Valid	<input type="checkbox"/> Qualified
8	Appearance	Visual check	Pass	<input type="checkbox"/> Qualified
9	Label	Visual check	Pass	<input type="checkbox"/> Qualified
10	Continuous Running Test	Visual check	72H without problem	<input type="checkbox"/> Qualified
Result				
Remarks:				

QC:

Confirmed by:

9. Packing List

No.	Item	Model/Type	Quantity	Remarks
1	Gradient Thermal Cycler	GP-9604E	1	
2	Manual		1	
3	QC PASS Card		1	
4	Power Cable		1	
5	Touch Pen		1	
6	Silicon pad		1	
7	Support frame		1	
8	U Disk		1	
9	Fuse	5A	1	
Confirmed by: _____ Date: _____				