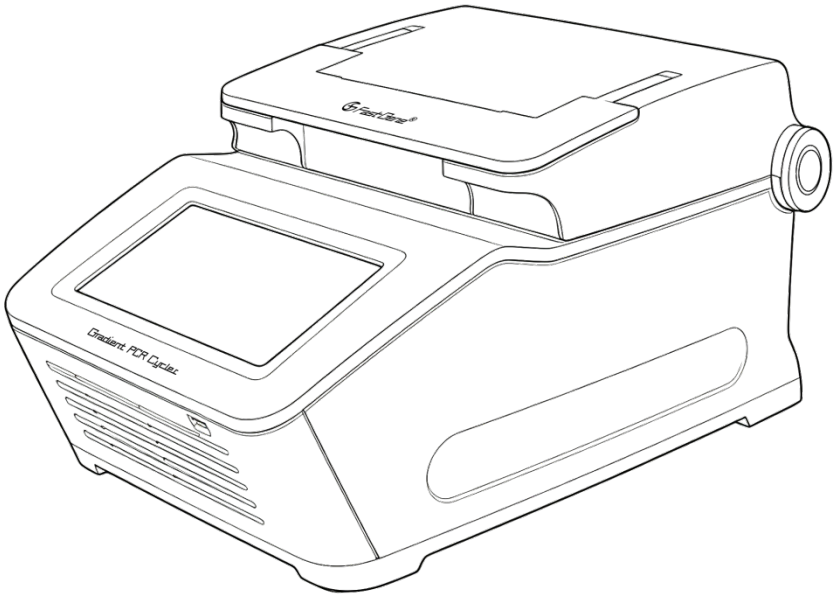
Manual

FastGene®

Gradient PCR Cycler

Cat #: FG-TC03



Activate our exclusive service now

... and enjoy your benefits:

- Priority access to latest software updates
- Fast line to our expert service team
- Sneak peek at new features and accessories

Scan QR code to register

nippongenetics.eu/en/instrument-registration/

It only takes a minute! Register your instrument with NIPPON Genetics EUROPE today to ensure full access to all services and software updates.



Read this manual carefully before installing or using the instrument for the first time. Pay particular attention to warnings, operating limits, and actions that could affect safety or performance.

Read and follow the safety information in this manual before installing, operating, maintaining, repairing, or transporting the instrument.

This manual uses three signal words to show the level and type of safety information.



Warning

Failure to follow the instructions may result in serious injury, death, or partial or complete damage to the instrument.



Danger

Failure to follow the instructions may result in serious injury, death, fire, or partial or complete damage to the instrument.



Note

Provides important information. Ignoring this information may cause injury, instrument damage, experimental failure, or data loss.

Content

1) Safety 1
Instrument safety 1
Electromagnetic Compatibility (EMC) Information 2
CE Certification 3
2) Overview 5
Identification 5
Introduction 8
Design and operating principle 9
Application 10
Normal working conditions 13
Transport and storage conditions 14
Naming 14
Technical specifications 15
Data and USB security 16
Instrument description 18
3) Installation 19
Introduction 19
Unpacking and inspection 19
Power requirements 19
Environmental requirements 20
Installation procedure 20
Installation check 20
4) Operation 21
Power-on self-test 21

User management 23
Program 28
Operation 39
Functions 42
Settings 50
5) Maintenance and cleaning 53
Replacing the fuse 53
Cleaning and disinfection 53
Safety inspection and routine maintenance 54
Performance testing and calibration 55
Product service life 56
Environmental protection 57
6) Troubleshooting 58
7) Contact 62

1) Safety

Instrument safety



Warning

Moving parts can cause impact or cutting injuries. Keep hands clear during operation.



Warning

The hot lid and block can become hot. Take care to avoid burns.

According to YY/T 1173-2010 for polymerase chain reaction analyzers, this product is classified as a standard PCR instrument.

The instrument is manufactured with reference to the following standards:

EN IEC 61010-1:2010+A1:2019 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use-Part 1: General Requirements;

EN IEC 61010-2-101:2022/A11:2023 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use-Part 2-101: Particular Requirements for In Vitro Diagnostic (IVD) Medical Equipment;

EN IEC 61326-1:2021 Electrical equipment for measurement, control and laboratory use-Electromagnetic compatibility-Part 1: General requirements;

EN IEC 61326-2-6:2025 "Electrical equipment for measurement, control and laboratory use-Electromagnetic compatibility-Part 26: Special requirements-In vitro diagnostic (IVD) medical equipment".

EN IEC 61010-2-14:2021 "safety requirements for electrical equipment for measurement, control and laboratory use-part 14: special requirements for automatic and semi-automatic equipment for analysis and other purposes in laboratories".

EN IEC 61010-2-010:2020 "safety requirements for electrical equipment for measurement, control and laboratory use-part 6: special requirements for laboratory material heating equipment".

Connect the instrument only with the supplied three-core grounded power cord and a 100-240 V AC, 50/60 Hz power supply. Do not use an ungrounded power cord. If a fuse must be replaced, use only the specified F6.3A L250V (5 x 20 mm) fuse.

The instrument has an IP20 protection rating and is intended for portable indoor use.

The block and hot lid can reach up to 110 °C. Keep the hot lid closed during operation. Before opening the lid and removing samples, allow the block to return to room temperature. Open the hot lid fully when loading or removing samples.

The instrument contains no user-serviceable parts. Do not disassemble it. Use only supplied accessories and approved spare parts. Repairs and replacement parts must be provided by NIPPON Genetics or an approved service partner.

For reliable operation, place the instrument level on a clean, flat surface in a well-ventilated room. Keep the hot lid closed during operation and leave at least 20 cm clearance around the instrument. Do not block the air inlet or outlet.

Do not operate the instrument outside the specified working conditions, including high temperature, high humidity, condensation, or excessive altitude. Operation outside these limits may cause malfunction, component damage, electrical hazards, alarms, fire, or injury.

For service and after-sales questions, contact NIPPON Genetics:

+49 (0)2421 55496 0 immediately.

Electromagnetic Compatibility (EMC) Information

The instrument is designed and tested as CISPR 11 Class A equipment. In some environments it may cause radio interference, and protective measures may be required. Evaluate the electromagnetic environment before use and keep strong electromagnetic sources, such as unshielded RF sources, away from the instrument.

Evaluate the electromagnetic environment before using the instrument.



Note

The user is responsible for providing an electromagnetic environment in which the instrument can operate correctly.

Evaluate the electromagnetic environment before use.

CE Certification

CE compliance

The FastGene® Gradient PCR Cycler (Cat. No. FG-TC03) complies with the applicable requirements of the relevant European Union legislation.

The product has been tested against the applicable criteria for electromagnetic compatibility and electrical safety.

The CE mark on the product indicates conformity with the applicable European legislation.

Manufacturer:

NIPPON Genetics EUROPE GmbH
Mariaweilerstraße 28a
52349 Düren
Germany

Product:
FastGene® Gradient PCR Cycler

Catalog number:
FG-TC03

Year of CE marking:
2026

Relevant directives and standards include 2014/30/EU (EMC), (EU) 2017/746 (IVDR), 2014/35/EU (Low Voltage Directive), EN IEC 61010-2-010:2020, EN IEC 61010-2-081:2020, EN IEC 61326-1:2021, EN IEC 61010-2-101:2022 + A11:2022, EN 61010-1:2010 + A1:2019, and EN IEC 61326-2-6:2021. A copy of the EU Declaration of Conformity is available upon request from NIPPON Genetics EUROPE GmbH.

Precautions

Before installation, read this manual and all labels. Confirm that the transport, storage, and operating conditions have been met.

Maintenance by unauthorized or untrained personnel may damage the instrument or cause injury. Service work must be carried out by authorized personnel.

Dispose of waste liquids and equipment according to laboratory procedures and local environmental regulations.

Operate the instrument only as described in this manual. Do not modify the instrument. Unauthorized modification may cause:

Loss of warranty coverage

Loss of safety and EMC conformity

Potential safety hazards

Unacceptable operating risk



Warning

NIPPON Genetics is not liable for injury or damage caused by use outside the intended purpose or by unauthorized modification.

Note



The instrument can resume operation after a power interruption. To reduce the risk of accidental power loss, use a suitable uninterruptible power supply (UPS) where needed.

Warning



The operator is responsible for data integrity and USB media security. Before using USB storage, check it with current antivirus software and confirm that it does not contain malicious files. Back up important programs and settings.

2) Overview

Identification

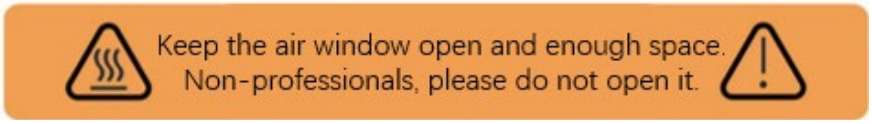
Safety labels


Biohazard warning: The instrument may contact biohazardous substances during use. This label is located below the handle and includes service contact and biosafety information.


High-temperature warning: The area near this label may be hot.


Use the instrument only as described in this manual.


This mark identifies the protective earth terminal inside the instrument.



This label is located on the rear panel. It warns of nearby hot surfaces and reminds the user to keep the air inlet and outlet clear.



This label is located on the front handle and warns the user not to open the hot lid during operation.



This instrument is electrical equipment. Do not dispose of it as municipal or household waste. Dispose of and recycle it separately according to applicable local and national regulations.

Molded markings

CFG

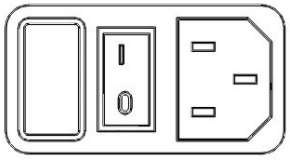
Warning

This interface is for manufacturer testing only and is sealed with a rubber plug. It is not intended for operator use. Do not remove the plug or use the interface without authorization.

COM

Warning

This interface is for manufacturer testing only and is sealed with a rubber plug. It is not intended for operator use. Do not remove the plug or use the interface without authorization.



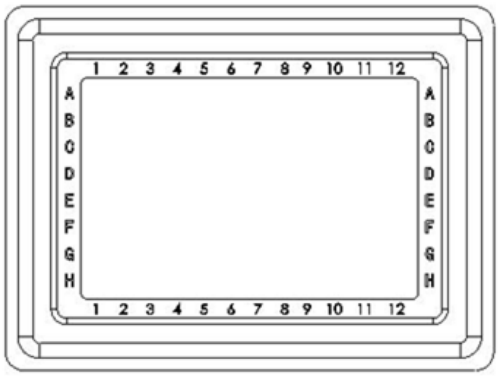
POWER

The rear power module contains the power socket, two-position power switch, fuse holder, and filter components. Power and fuse specifications are shown on the product label.

The fuse holder is located on the left side of the assembly.

The power switch is in the middle of the assembly. The marked symbols indicate the on and off positions. I O

The power cord socket is located on the right side of the assembly.



The FG-TC03 block has printed well coordinates on the outer frame. Columns are numbered 1 to 12 from left to right, and rows are marked A to H. The 96 well positions can be identified by these coordinates.

Printed markings



The words "WORKING CONDITION" are printed above the LED light bar on the hot lid housing. During normal operation, the light changes brightness in a breathing pattern.

FastGene®

The brand logo is printed on the hot lid handle.

Gradient PCR Cycler

The logo is printed below the front display.



The USB 2.0 port is located on the front of the instrument.

Introduction

Polymerase chain reaction (PCR) is a key method in molecular biology. It enables rapid amplification of specific DNA sequences for downstream analysis.

The FastGene® Gradient PCR Cycler supports PCR and other thermal cycling methods. Its semiconductor-based heating and cooling system provides fast thermal cycling. Temperature performance is listed in the technical specifications.

The instrument includes a heated lid to reduce sample evaporation, so mineral oil is usually not required. Keep the hot lid closed during operation. The self-adjusting lid is suitable for common PCR tubes and PCR plates, except full-skirted plates.

The instrument provides two temperature control modes:

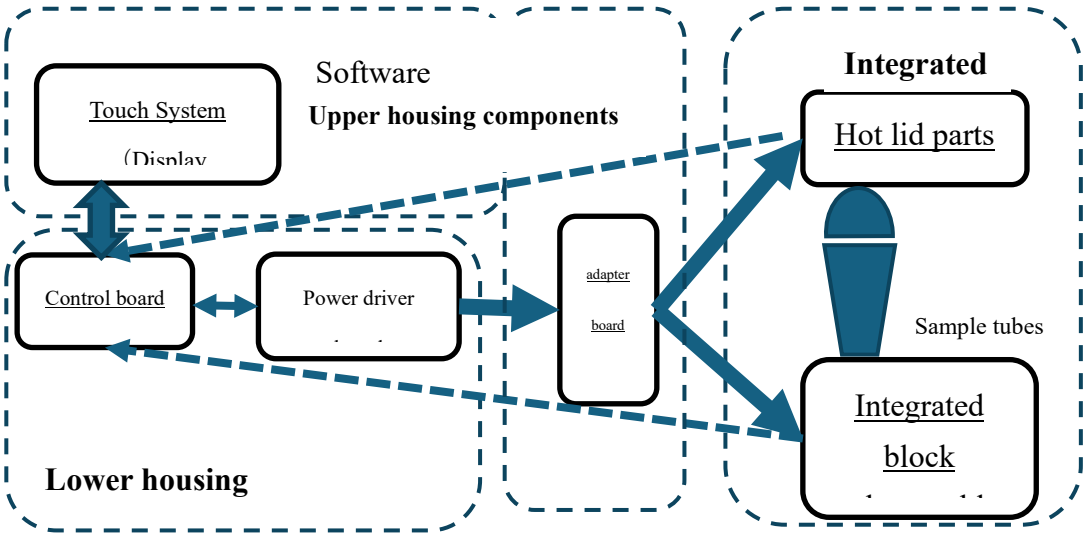
Tube mode: controls the estimated sample temperature based on the entered reaction volume.

Block mode: controls the metal block temperature directly.

The touchscreen interface provides graphical program editing, run control, run logs, and system self-test functions.

Design and operating principle

The main components of the instrument are shown below.



The instrument consists of the lower housing, upper housing, integrated block assembly, hot lid, control boards, power drive board, touchscreen system, adapter board, and software version V1.

Purpose: The instrument uses controlled temperature cycling to support PCR amplification of target nucleic acid sequences in prepared reaction mixtures.

Operating principle: The control system reads temperature signals from the block and hot lid, then regulates heating and cooling according to the programmed denaturation, annealing, and extension steps required for PCR.

Application

PCR technology

PCR is an in vitro nucleic acid amplification method. It uses template DNA, primers, and a thermostable DNA polymerase to amplify specific DNA fragments through repeated temperature cycles. PCR is widely used in life science, clinical research, forensic, veterinary, plant, and other molecular biology applications.

Scope of application

The product is suitable for PCR applications in fields such as immunology, human genetics, forensic analysis, oncology, tissue and population biology, paleontology, zoology, and botany.

Contraindications

No known contraindications are listed in the source documentation.

Test reagents and experiments

Use only suitable reagents and consumables within their expiry dates. Before use, confirm that the reagents, consumables, and operating parameters are appropriate for the planned experiment and follow the reagent instructions.

The instrument does not extract samples automatically. The operator prepares the reaction mixture, loads the tubes or plate into the block, and closes the hot lid. Do not open the hot lid during a run.

The instrument does not require or collect patient or sample information.

The instrument does not provide diagnostic results. Amplified samples must be analyzed with suitable downstream methods, such as electrophoresis, UV imaging, or quantitative fluorescence PCR systems.



Warning

Chemical hazards: Before handling chemicals, read the relevant safety data sheet (SDS/MSDS) and follow all precautions.

Use the instrument in an appropriately equipped molecular biology laboratory. Samples, reagents, and chemicals may be hazardous or infectious. Before handling reagents or instrument components, identify the materials used and wear suitable eye protection, protective clothing, and gloves.

Consumables are single-use only. Place experimental waste in designated closed containers. After use, disinfect the work area as required and prevent amplification products from contaminating the laboratory. Dispose of waste according to applicable laws, regulations, and laboratory procedures.

Operator requirements

Operators must be trained in relevant molecular biology laboratory techniques.

Operators must understand the samples, reagents, and chemicals used and must know how to prevent biological and chemical hazards.

Operators must be able to assess experimental risks and follow applicable laboratory regulations and procedures.



Warning

The instrument may be operated only by trained laboratory personnel who have read this manual.

Risk



Danger

Improper operation may damage the instrument, cause data loss or experiment failure, contaminate the laboratory, or result in injury, infection, or death.



Warning

Assess risks related to the instrument, reagents, consumables, samples, laboratory facilities, operating environment, and electromagnetic environment before use.

When used under the stated operating conditions and according to this manual, the instrument is designed to operate within an acceptable risk range.

Do not use or modify the instrument outside the specified environmental conditions, use conditions, or rated range. Contact NIPPON Genetics if you have safety questions.

Use the instrument only in a suitable molecular biology laboratory and follow all applicable rules for personnel preparation, sample handling, reagent preparation, operation, cleaning, disinfection, waste handling, and hazardous materials.

The main application risk is biological hazard, and safe operation depends strongly on the operator. Only trained personnel who understand this manual should operate the instrument.

Biological samples, including tissues, body fluids, and blood, may transmit infectious disease. Treat nucleic acid samples as potentially biohazardous. Wear suitable eye protection, protective clothing, and gloves.

During experiments, operators may contact hazardous reagents or biological samples. Spills, residues, incorrect PPE, or incorrect operation can affect results, contaminate the laboratory, damage the instrument, or expose personnel to hazardous materials.

Before reuse, return, recycling, or disposal, decontaminate the instrument as required. Dispose of the instrument according to applicable local and national regulations.



Warning

For return transport, decommissioning, or disposal, use secure closed packaging. Before packaging, clean and disinfect the instrument to prevent exposure to residual biological or chemical materials.

Normal working conditions

Environmental conditions:

- Use: indoor use only
- Altitude: below 2000 m
- Ambient temperature: 10-30 °C
- Relative humidity: 20-85%
- Transient overvoltage category: II
- Pollution degree: 2
- Environment: not suitable for high-temperature or high-humidity areas
- Atmospheric pressure: 85.0-106.0 kPa
- Device type: portable device
- Operating mode: continuous operation

Power:

- Rated supply voltage: 100-240 V AC
- Rated frequency: 50/60 Hz
- Input power: 1000 VA
- Protection rating: IP20



Warning

Before switching on the instrument, confirm that the operating conditions are met.

Confirm that the power cord is properly grounded.

Do not operate the instrument outside the specified working conditions.

Transport and storage conditions

Ambient temperature: -20 °C to +55 °C

Relative humidity: up to 85%

Transport and storage markings are shown on the outer packaging. Follow all markings, including moisture protection, stacking limit, fragile, and handle-with-care symbols.





Note

Before return transport, decommissioning, or disposal, clean the instrument surface and disinfect it, including UV disinfection where applicable, before packaging.

See the cleaning and disinfection section for the recommended procedure.



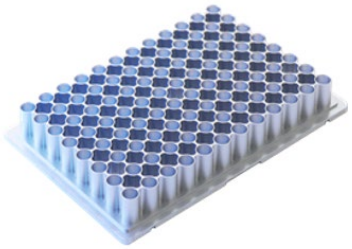
Return transport: Keep the original box and inserts for future transport.

Wrap the instrument in a plastic bag or film, place it in the original packaging, seal the box, and use a suitable carrier to protect the instrument from damage and moisture.

Naming

Model designation:

The model designation for this instrument is FG-TC03.



Technical specifications

Parameter	Specification
Sample Capacity	96-well block
Application	Endpoint PCR
Instrument Design	Compact benchtop system
Instrument Dimensions	427 mm × 288 mm × 227 mm, L × W × H
Sample Volume Range	5-100 µL
Instrument Weight	9.7 kg
Consumable Compatibility	Standard 0.2 ml PCR tubes, PCR strips, and PCR plates; compatible with non-skirted and semi-skirted plates
Maximum Ramp Rate	5°C/s
Average Ramp Rate	≥2°C/s
Temperature Accuracy	±0.1°C
Temperature Precision	±0.1°C
Temperature Uniformity	±0.3°C at 55°C
Temperature Settings Range	0–105°C
Gradient Function	Yes
Gradient Temperature Setting Range	30–99°C
Gradient Range	42°C across the block
Touchdown Function	Yes

Thermal Control System	3 independent Peltier elements for heating uniformity
Independent Programmable Gradient Zones	No independent gradient zones
Lid Temperature	30–105°C
Display	7-inch touchscreen
User Interface	Graphical touchscreen interface
Program Storage Capacity	Up to 5000 programs
Internal Storage	5 GB
RAM / Working Memory	1 GB
User Management	Up to 50 users
Data Export / Import	USB supported
Software Updates	Via USB

This manual lists the main parameters and functions. For additional application guidance, use the instrument help interface or contact NIPPON Genetics.

Data and USB security

Operating environment

Hardware configuration:

- CPU:1.3GHz Quad-core A7 ARM
- Architecture: ARM Cortex-A7
- Frequency: 1.3GHz
- Memory: 1GB LvDDR3
- ROM:5GB eMMC
- Peripheral device: USB storage, used only for software updates and file import/export

Software environment:

- Operating System: Android 5.1.1

- Network connection: not applicable
- Network type: not applicable

Data interface and user access

Data interface: USB 2.0

User Access Control

The administrator account is admin. The initial password is 888888. Passwords can be changed in the user interface and may contain 6-8 digits or characters.

Administrator rights include creating, modifying, and deleting users; setting passwords and permissions; editing, viewing, and running programs; and performing software updates.

General users are created by the administrator. User names may contain 2-8 digits or characters, and passwords may contain 6-8 digits or characters.

General users and guests can access their own files, edit, view, run, delete, import, and export programs, and view or delete their own logs.

Administrators also have access to software update, factory reset, and user management functions.

In user management, administrators can set permissions for guests and users, including editing shared programs, editing private programs, running programs, and viewing other users' run records.

Software update

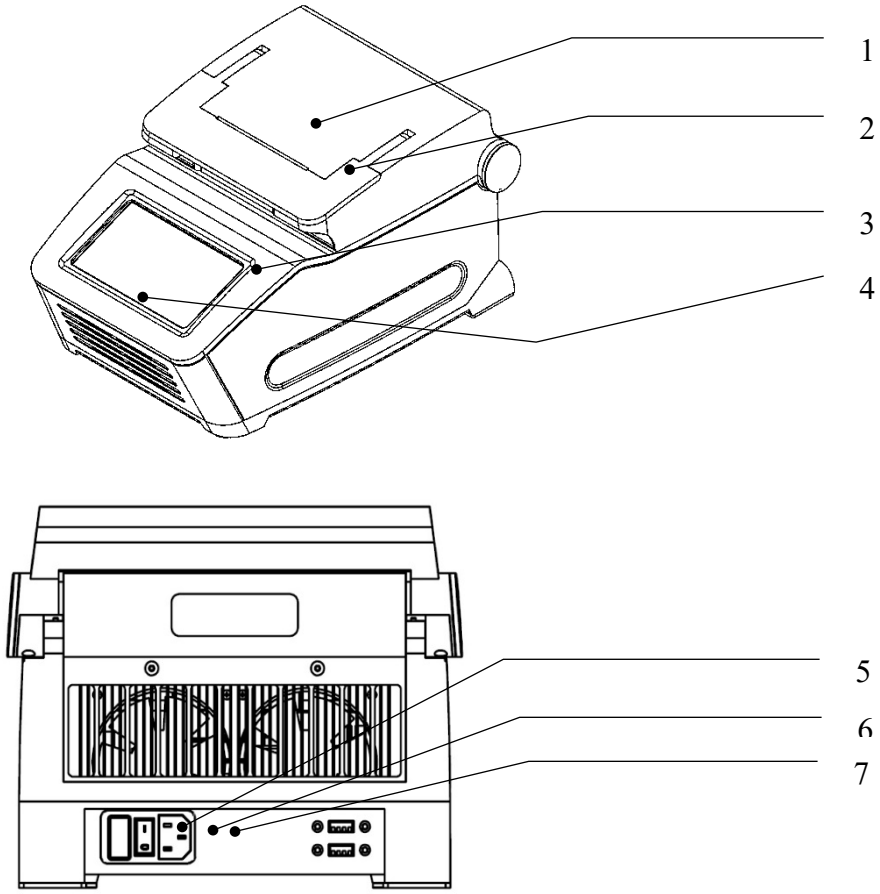
Software updates are installed from USB storage. Select the latest update file to install.

Software update files use the.apk format.

The current software version is displayed on the main interface.

Instrument description

The following figure shows the main instrument parts:



1. Status indicator	2. Hot lid handle	3. Touch screen	4. USB interface	5. Fuse
6. Power switch	7. Power outlet			

3) Installation

Introduction

This chapter describes how to unpack, place, and connect the instrument.

Before installation, check the packaging, operating environment, and power supply.

Unpacking and inspection

The instrument is shipped in a rigid carton. Follow the transport and storage markings on the box.

Unpacking steps:

- Before unpacking, check the carton for damage. Record and report any damage immediately.
- Place the carton upright, remove the top cover, and lift the insert handle upward to open the packaging.
- Remove the instrument and place it on a level surface away from dust, vibration, and direct light.
- Inspect the instrument for cracks, deformation, loose parts, or other damage. If damage is found, document it, report it immediately, and contact the carrier if required.
- Compare the serial and lot numbers on the packing list with the certificate. Report any mismatch immediately.
- Check all accessories against the packing list.
- Keep all packaging materials for future transport.

Power requirements

- Power supply: 100-240 V AC, 50/60 Hz, 1000 VA.
- Connect the instrument only to a properly grounded power supply.

Environmental requirements

- Place the instrument on a flat, level surface in a well-ventilated room. Keep it away from dust, solvents, and acid vapors.
- Avoid vibration and direct light.

Installation procedure

Install the instrument as follows.



Danger!

If condensate water is found in the package and shell of the instrument, the instrument should be placed under natural ventilation for at least 3 hours before installing the instrument and turning on the power supply, and make sure that the water vapor has been fully removed.



Warning

Moving parts can cause impact, cutting, or pinching injuries. Keep hands clear when closing or locking the hot lid.

After the installation conditions are met, continue as follows:

- Place the instrument in a ventilated position with at least 20 cm clearance on all sides.
- Make sure the rear power switch is off.
- Connect the power cord to the rear power socket.
- Switch on the instrument and follow the on-screen prompts.

Installation check

The instrument is calibrated before shipment. The test results are included with the instrument.

At first use, confirm normal operation. If the instrument powers on, completes self-test without an error, responds to touch input, and opens the main interface, installation is complete.

4) Operation

This chapter explains how to create, edit, and run PCR programs and how to adjust system settings.



Warning

If the instrument makes abnormal sounds, shows abnormal display behavior, or reports a fault such as Error XX during self-test or operation, switch it off immediately. Record the message and operating state, then contact NIPPON Genetics (+49 (0)2421 55496 0).



Warning

Take care around the hot lid and sample wells to avoid burns.



Warning

Avoid contact with moving parts during operation.

Note

If only a few samples are used, distribute tubes evenly across the block so the hot lid applies even pressure, and temperature distribution remains uniform.



Use consumables of suitable height. Use the same consumable type within one run to avoid uneven lid pressure or poor thermal contact.

At high altitude or low pressure, check whether high temperature settings may bring reagents to boiling. Boiling may cause reagent loss and experiment failure.

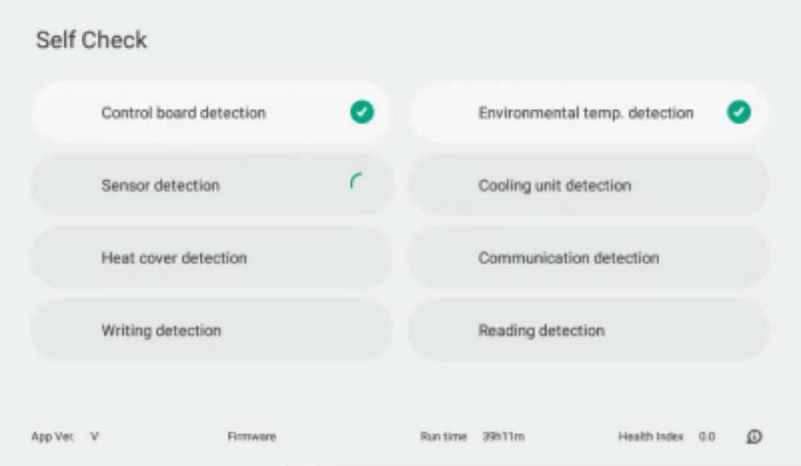
Check the default settings before each run and adjust them as needed.

Power-on self-test

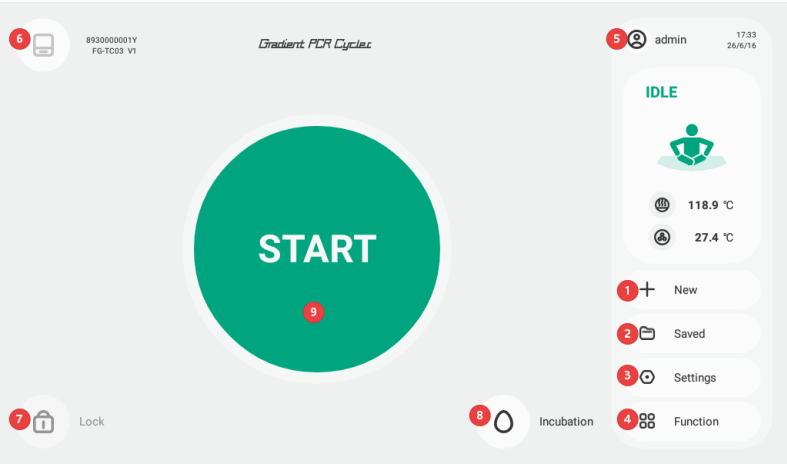
Lift the hot lid handle and confirm that no foreign material is between the block and the lid. Close the hot lid without pressing the handle down; keep the lid unlocked.

After the rear power switch is turned on, the boot screen appears and the blue indicator on the hot lid lights up. If enabled in system settings, the instrument enters self-test mode. The software version, firmware version, and maintenance index are shown at the bottom of the screen.

Self-test takes about 1 minute. If self-test fails, an error message appears. Record the message and instrument state, then contact NIPPON Genetics. After a successful self-test, the main interface opens automatically.



The maintenance index is calculated from accumulated run time. As use increases, temperature performance may drift and Peltier service life may decrease. Press and hold the maintenance index in the lower-right corner to view maintenance recommendations.



① Select a template and create a new program.

② Open saved programs.

③ Open settings.

④ Open functions.

⑤ Open user management.

⑥ Display instrument information. Tap to set the label name.

⑦ Lock the screen.

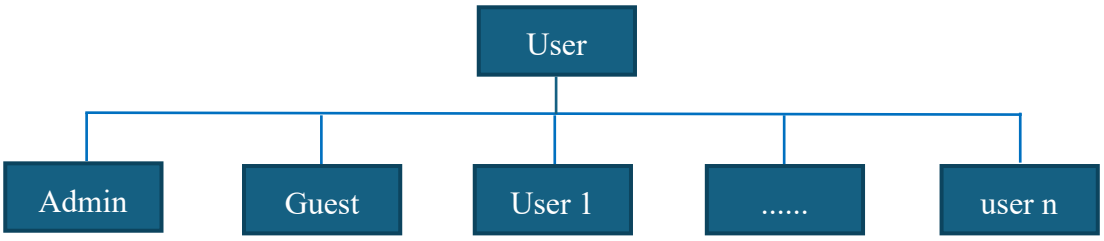
⑧ Open the one-touch incubation window to run or edit the incubation program.

⑨ Open a recent program in the editing interface.

The upper-left corner of the main interface shows the instrument series and software version.

User management

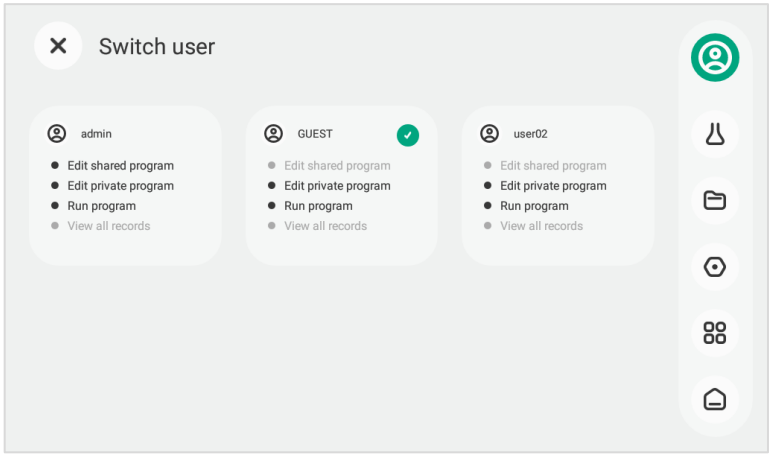
The user management structure is shown below.



The instrument supports multiple users. "Admin" is the administrator account and "Guest" is the default account at start-up.

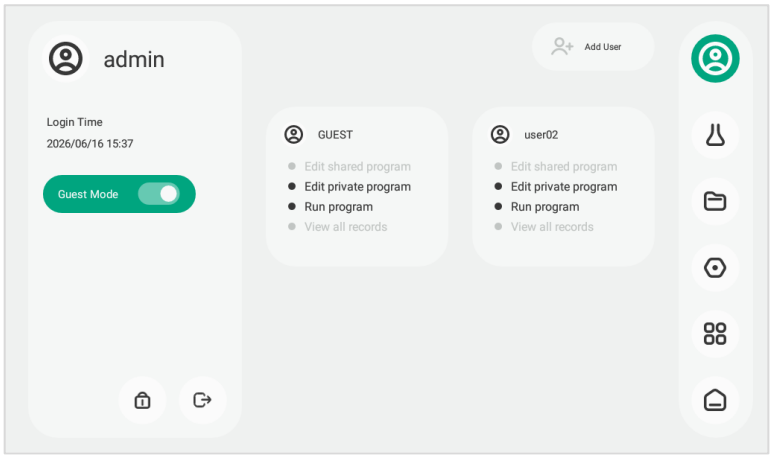
Use the user interface to change passwords or switch accounts.

To change the current password, tap "Change Password", enter the new password, and tap "OK". To switch accounts, tap the switch account icon, select "admin", enter the password (default: 888888), and tap "OK".

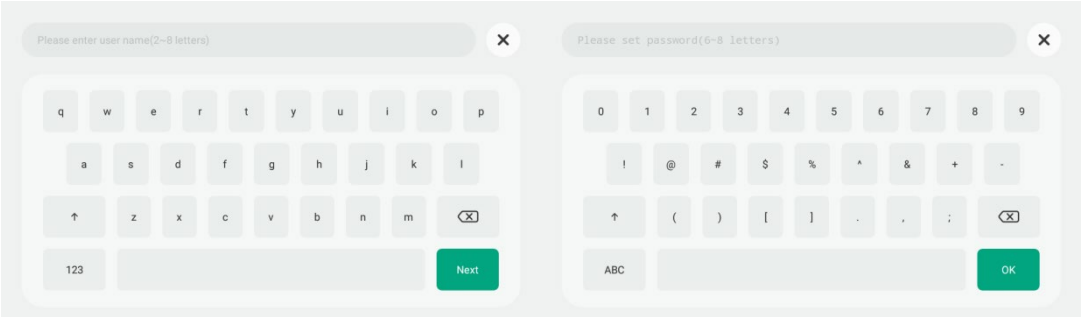




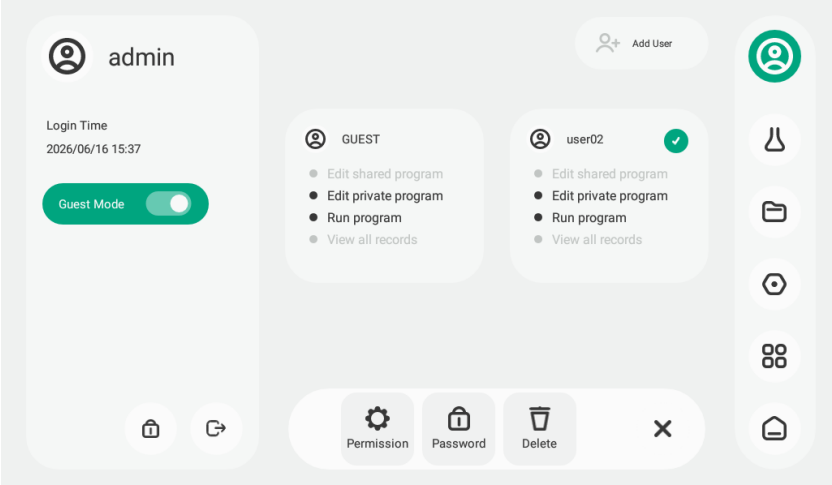
The administrator can manage users and enable or disable guest mode. If guest mode is disabled, users must log in before using the instrument.



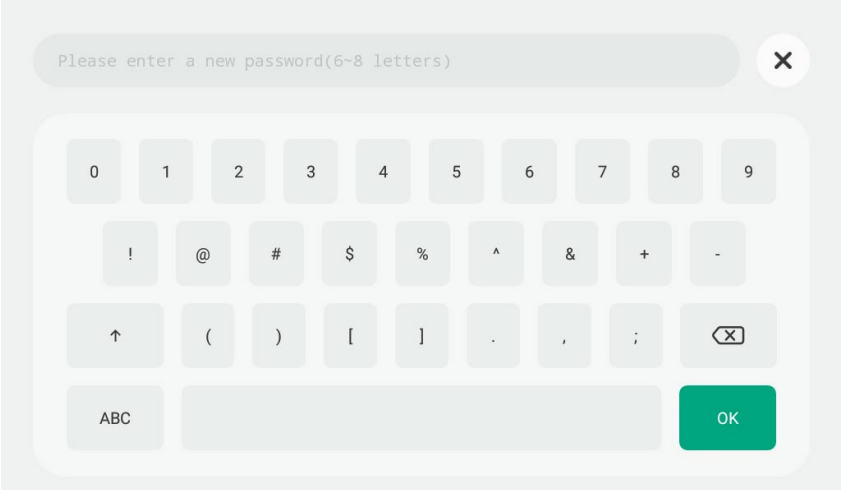
Tap [Add User], enter the user name and initial password, then tap "OK".



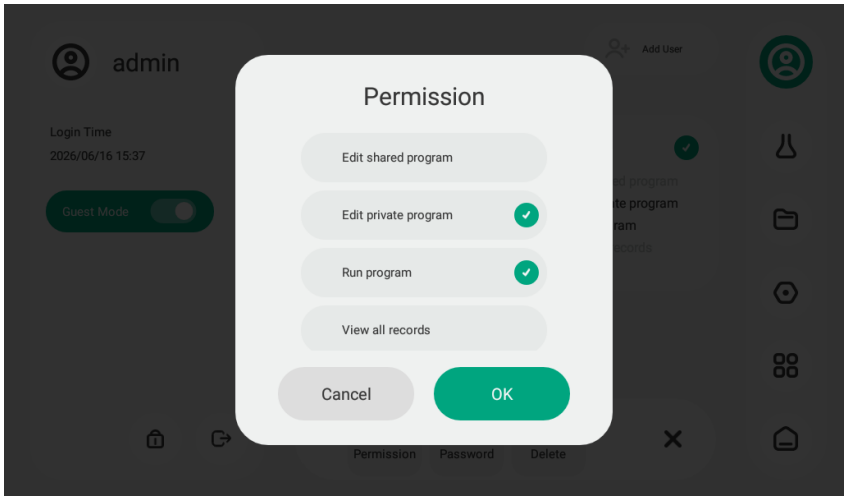
Select a user to modify the password, change permissions, or delete the user.



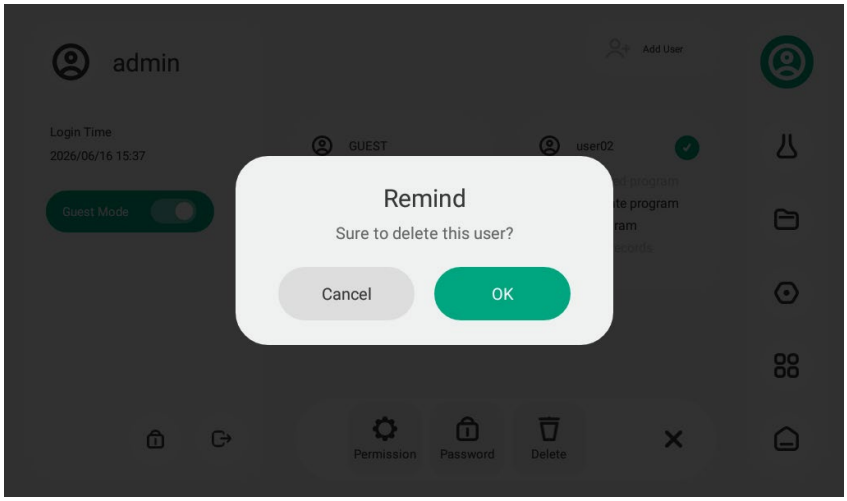
1. Tap "Password", enter the new password in the pop-up window, and tap "OK".



2. Tap "Permission", select the required permissions, and tap "OK".



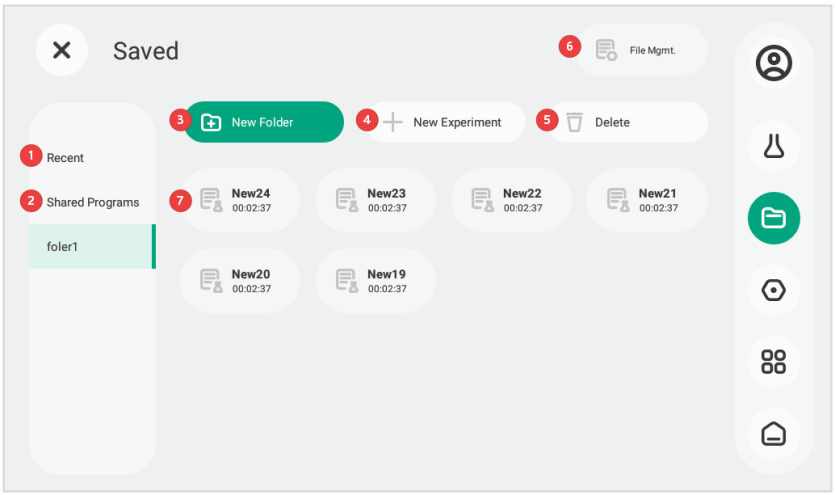
3. Tap "Delete" and confirm with "OK" to delete the user.



Program

Saved programs

On the main interface, tap button 2 to open saved programs.



① Recently edited or run programs.

② Shared programs.

③ New folder

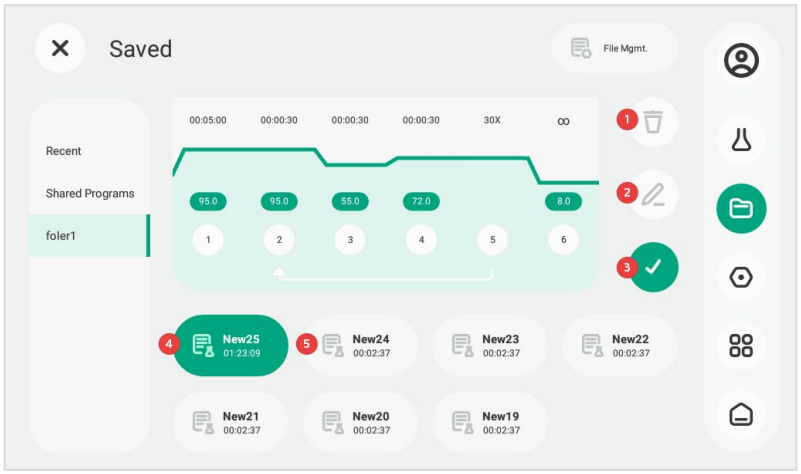
④ Create a new program in the selected folder.

⑤ Delete the selected folder.

⑥ Open file management.

⑦ Select a program file.

After a program is selected, the following options are available:



① Delete the selected file.

② Open details for the selected program.

③ Run the selected program.

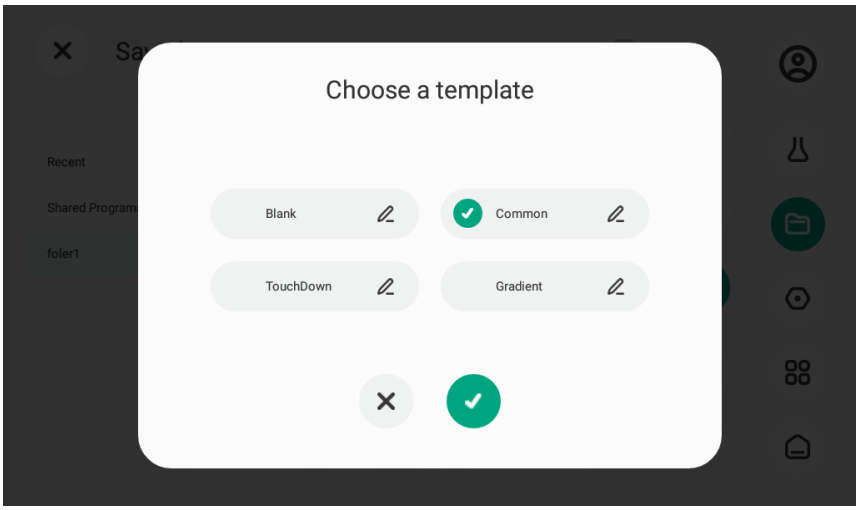
④ Open details for the selected program.

⑤ Switch between selected program files.

Tip: Long-press a program file to drag it, pin it for quick access, delete it, or run it quickly.

Creating a new program

Tap button 1 on the main interface, select a template, edit it, and save it as a new program. To modify a template, tap the edit button next to the template name.



1) Program editing



① Edit the run time of the current step (1 s to 8 h 59 min 59 s).

② For a temperature step, set the block temperature (0-105 °C). For a loop step, set the number of cycles (1-150).

③ Select a step to display its details on the right.

④ Add a step before the selected step.

⑤ Add a step after the selected step.

⑥ Add a loop step that returns from the new step to the selected step.

⑦ Delete the selected step.

⑧ Switch soak/hold for the step on or off.

⑨ Edit the hot lid temperature.

⑩ Edit the reaction volume.

⑪ Pin or unpin the program.

⑫ Edit the experiment name.

⑬ Run the current program.

⑭ Close the program interface.

⑮ Edit temperature touchdown parameters. This is available only for steps inside a loop.

Temperature change per cycle. Default: 0 °C. Range: +/-0.1 to 10 °C per cycle.

⑯ Edit time touchdown parameters. This is available only for steps inside a loop.

Time change per cycle. Default: 0 s. Range: +/-1 to 599 s per cycle.

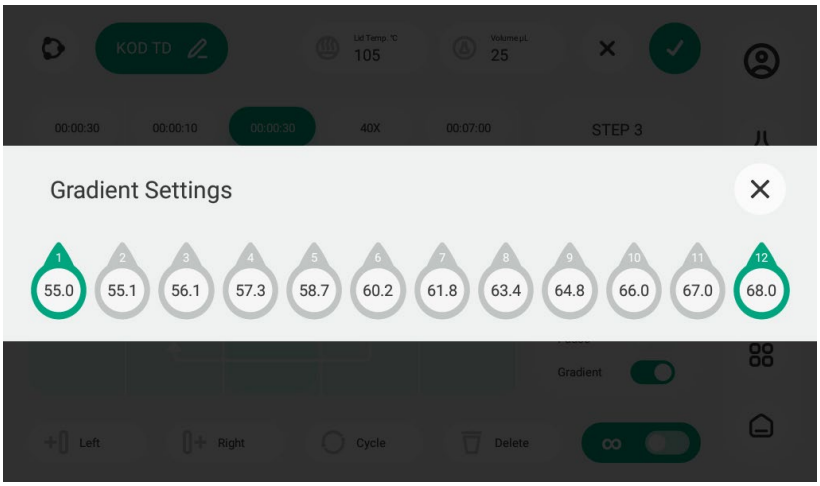
⑰ Edit the ramp rate. Range: 0.1-5.0 °C/s. "Max" uses the maximum rate allowed by the system.

⑱ Pause the program automatically at this step.

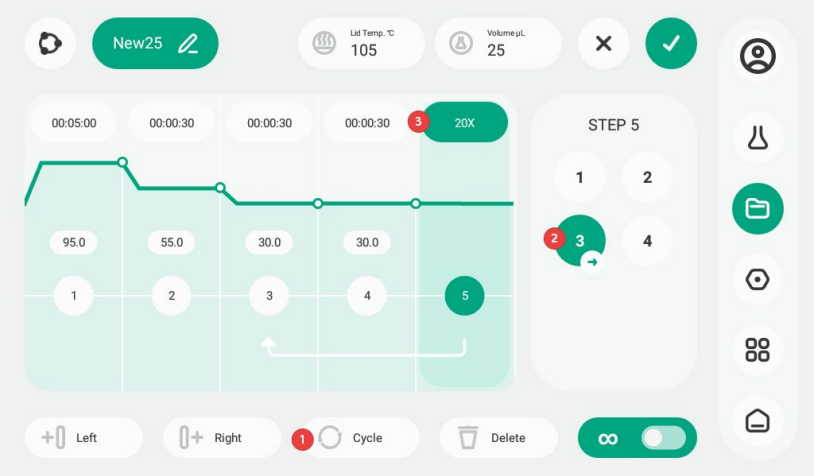
⑲ Set this step as a gradient step. The 12 columns increase in temperature from left to right.

When gradient is selected, the temperature editor shows left and right column settings. Enter the temperature for the leftmost and rightmost columns. The instrument calculates the estimated temperatures for columns 1-12 automatically.

For gradient steps, the left and right column settings must be 30-100 °C. The right column must be higher than the left column. The allowed gradient difference is 1-42 °C.



Set loop steps as follows:



1. Tap the add loop button.

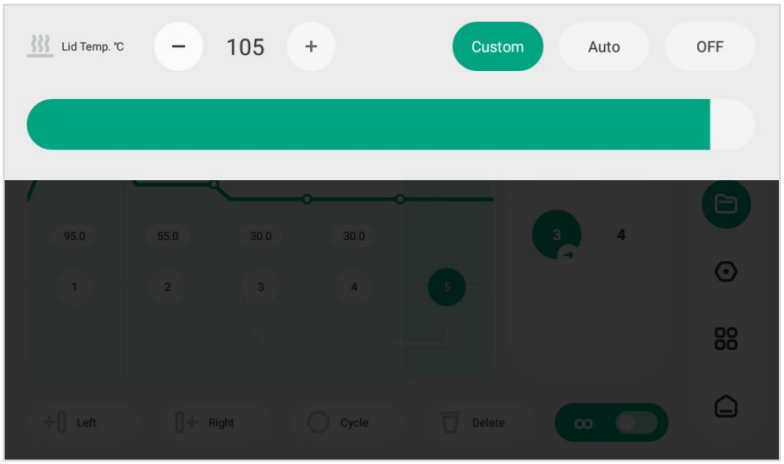
2. Select the first step of the loop.

3. Enter the number of cycles in the program chart.

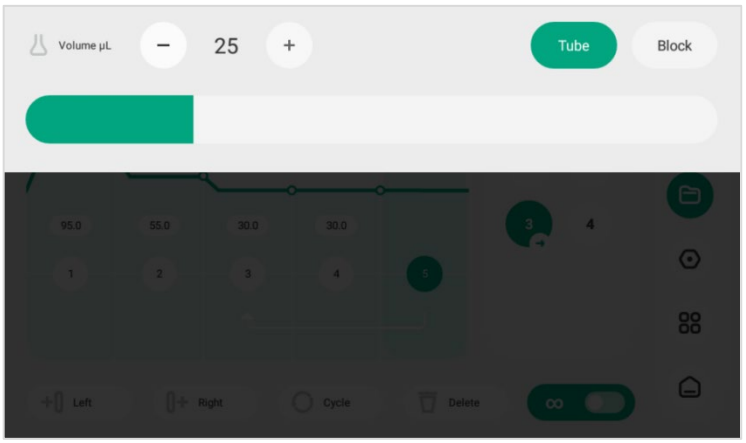
Note: Loops can be nested up to three levels. Loops may be nested inside larger loops, but they must not cross over each other.

2) Hot lid and reaction volume

After setting the program steps, set the hot lid temperature and reaction volume from the top of the interface.



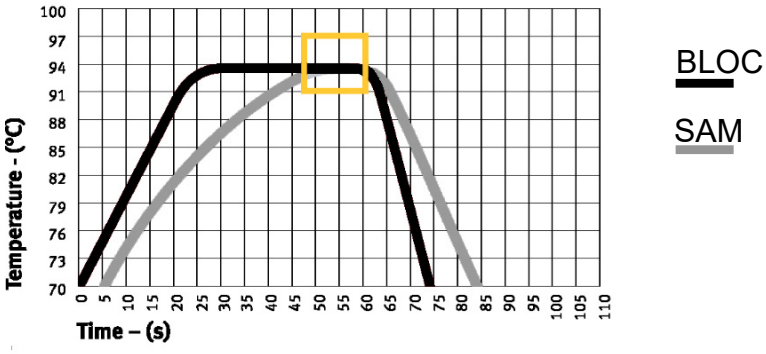
Hot lid temperature	Default: 105 °C. Setting range: 30-110 °C. Set the hot lid at least 1 °C above the highest block temperature to reduce evaporation. If set to "Auto", the system sets the hot lid 10 °C above the maximum program temperature where possible.



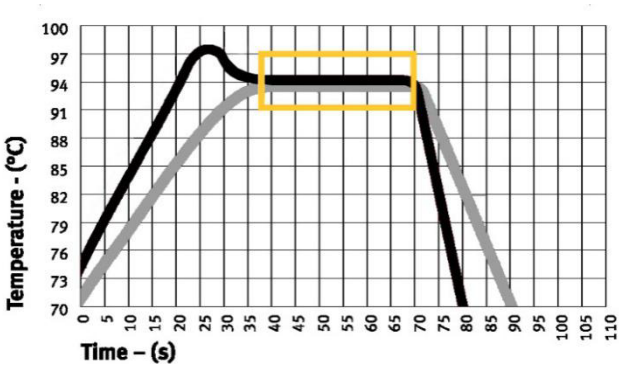
Reaction volume	Default: 25 µL. When a reaction volume is set, Tube mode is used by default. Tube mode estimates the reagent temperature in the tube, while Block mode controls the metal block temperature directly. Tube mode is recommended. Enter the actual reaction volume; common volumes are 1-100 µL.

Tube mode and Block mode

Block mode controls the heating and cooling of the metal block. Because the reagent temperature lags behind the block temperature, the reagent may reach the set temperature later than the programmed step time suggests.



Tube mode accounts for the lag between the block temperature and the reagent temperature. The instrument adjusts the control behavior so the reagent reaches the target temperature more quickly and consistently.



Tube mode considers tube characteristics, reaction volume, current temperature, temperature span, ramp rate, hot lid influence, and evaporation risk. It is intended to improve reagent temperature control in the 16-99 °C range.

5) Reagent preparation and loading

Place prepared PCR tubes or plates into the block and confirm good contact with the wells. Distribute tubes as evenly and symmetrically as possible and avoid edge positions when possible. Press the hot lid handle down to lock it before starting the run.

Single tube	For one 0.2 mL PCR tube, place the tube near the center of the block and place empty tubes at the corners to help distribute hot lid pressure evenly.
Gradient reactions	Because the gradient distribution is not perfectly linear, the instrument calculates and displays the estimated temperature for each well position. For gradient optimization, rows D or E are recommended for higher accuracy.

Sealing plates	When using film or silicone covers with plate consumables, use appropriate sealing tools and confirm that the seal is tight. If a silicone cover is applied manually, press each well firmly to prevent evaporation or leakage.



Consumable quality affects heat transfer and experimental results. Confirm that tube wall thickness, taper, bottom shape, surface finish, and cap sealing performance are suitable.

Use high-quality, widely accepted PCR consumables.

6) Run the program

After loading the reactions and locking the hot lid, tap the run button. The instrument starts the run and switches to the run interface.

7) Example PCR program

The following example shows how to enter a typical PCR program:

Step 1: 30°C for 2 minutes and 30 seconds

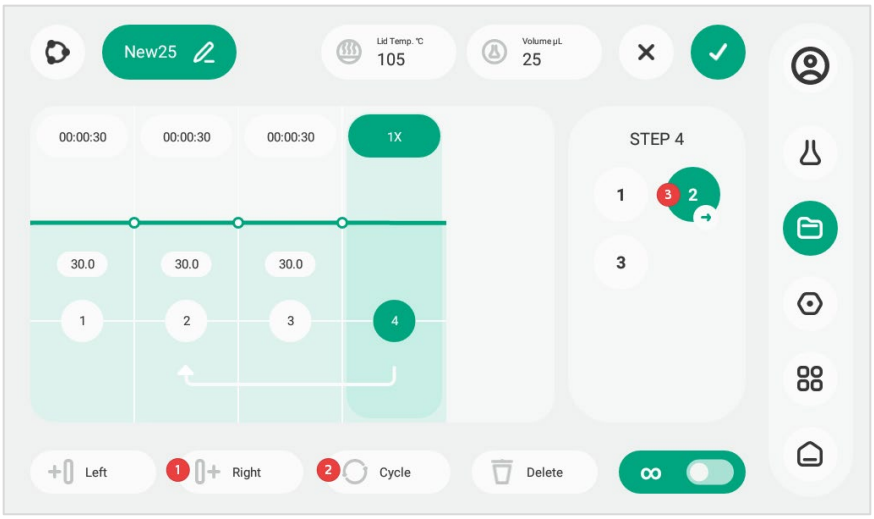
Step 2: 95°C for 30 seconds

Step 3: 60°C for 30 seconds. This cycle is repeated 40 times between Step 2 and Step 3.

Step 4: Store at 8°C for a long time.

Enter the program as follows:

Step 1: Tap the add button on the right twice. Then tap the add loop button and select the first step of the loop.

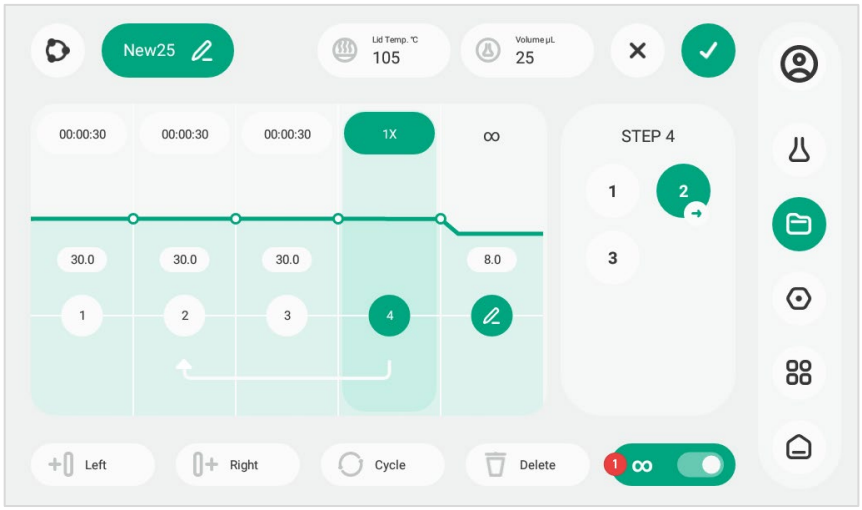


The cal program in the shared folder is used for standardized block temperature testing. It may be edited but must not be deleted or renamed.

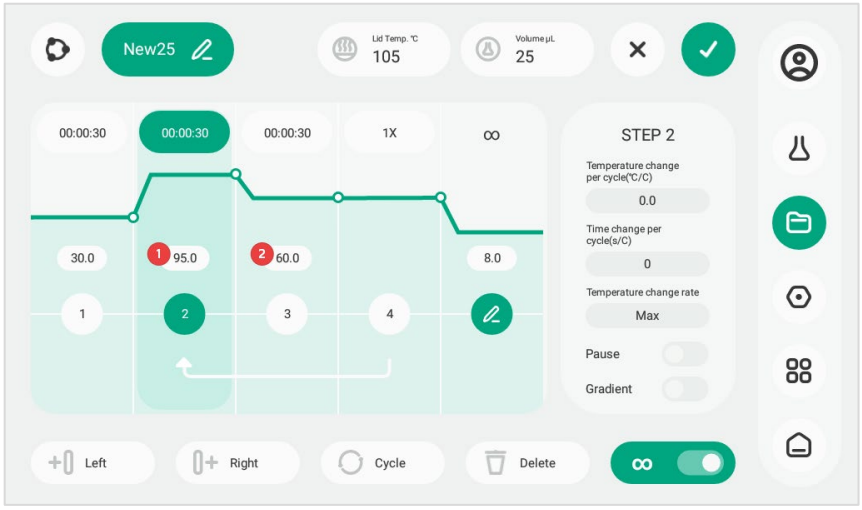
Block temperature calibration requires professional measurement standards, specialized equipment, and data processing software. Calibration must be performed only by qualified service personnel.

Users should not edit or change the cal program unless instructed by NIPPON Genetics.

Step 2: Tap the soak/hold button to enable the cooling or hold process.

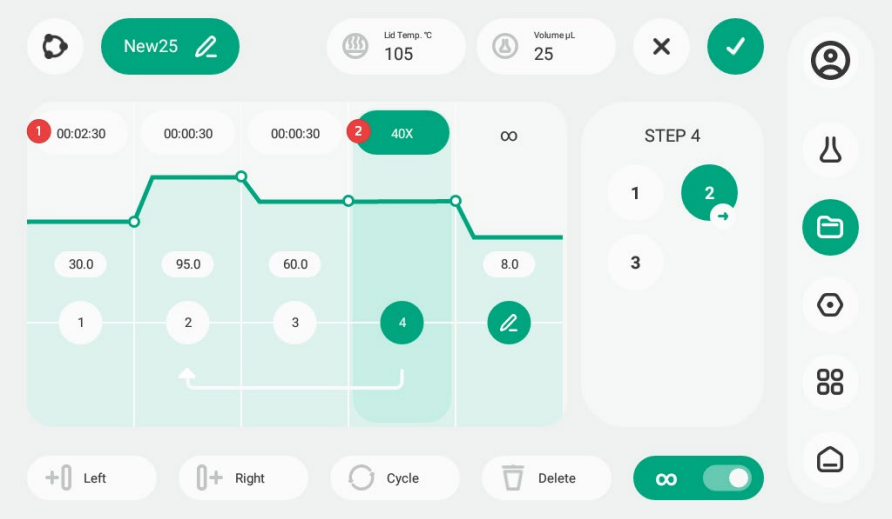


Step 3: Tap the temperature field and enter the temperature for each step.



Step 4:

Tap the time field and enter the time for each step. Then tap the loop step and enter the number of cycles.

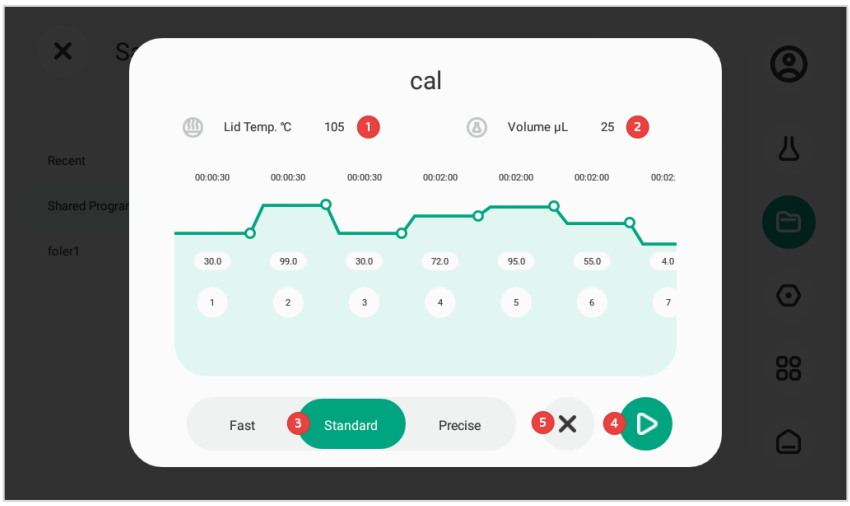


After entering the steps, set the hot lid temperature and reaction volume. Leave the hot lid at the default 105 °C or set it to Auto. Set the volume according to the reagent volume used; common reaction volumes are 1-100 µL.

After all settings are complete, tap Save to save the program.

Operation

Preparing a run



① Change the hot lid temperature.

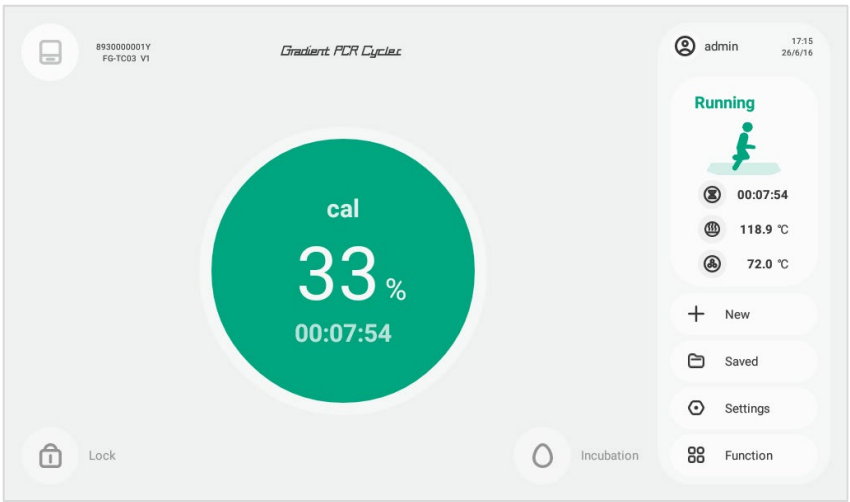
② Change the reaction volume.

③ Select the operating mode.

④ Start the run.

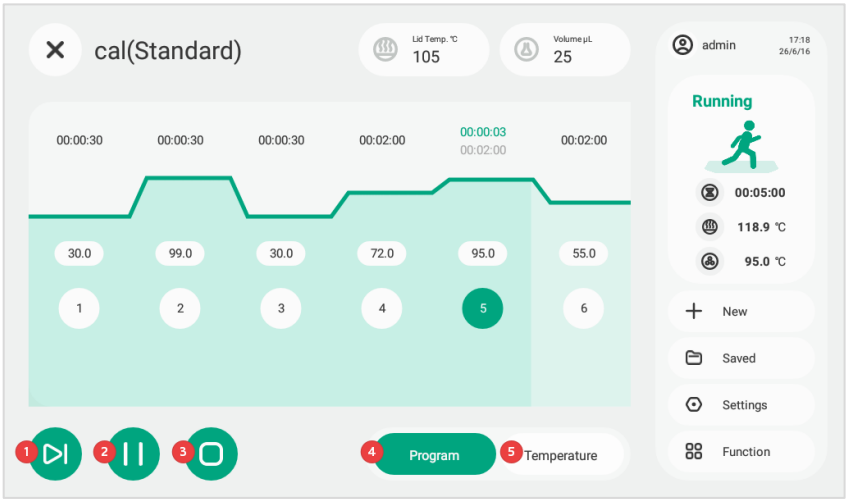
⑤ Cancel the run.

Main run interface



During a run, the center progress circle shows the experiment name, progress, and estimated remaining time. Tap the circle to open the program steps interface.

Program steps interface



Completed steps are shown with a dark background. The active step darkens gradually as it runs.

The temperature area flashes while the temperature is rising or falling.

① Skip the current step. A confirmation window appears.

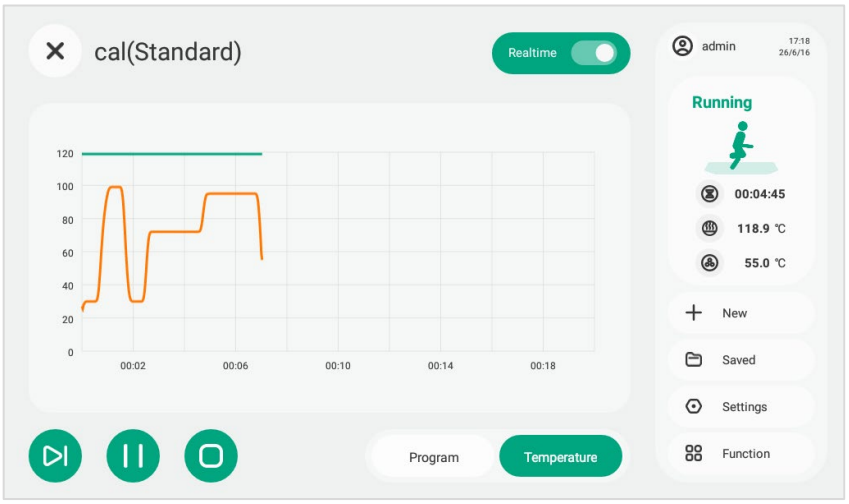
② Pause or resume the run.

③ Stop the run. A confirmation window appears.

④ Show program progress.

⑤ Show the temperature curve.

Temperature curve



In the temperature curve interface, green shows the hot lid temperature and orange shows the sample/block temperature. Time is displayed as h:min. The real-time display can be switched on or off in the upper-right corner. When real-time display is off, slide to view all data.

Tip: New programs can be created and edited while another program is running.

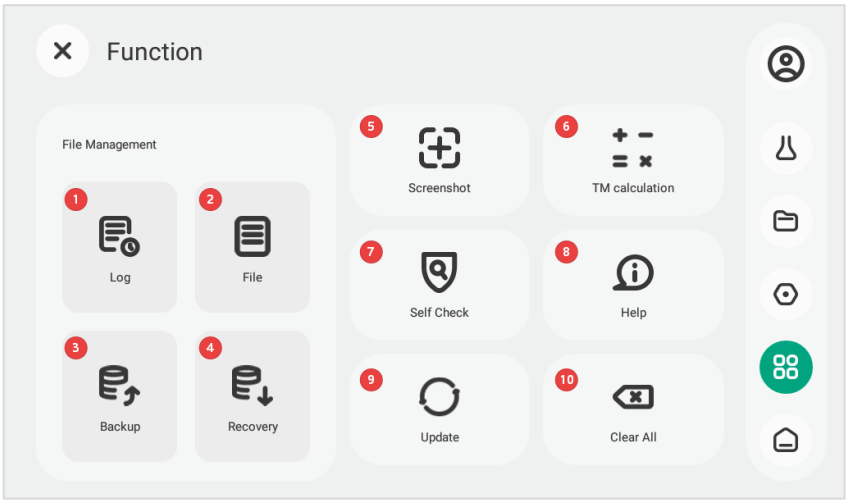
Tip: While the hot lid heats to its target temperature, the block cools to 10 °C to help preserve reagent activity and reduce non-specific amplification. When the hot lid reaches the target, the program begins. During low-temperature steps, the system may switch off the hot lid and insert a natural cooling process at 10 °C.

The interface also uses color and icons to show instrument status.

Program running	During a run, the main progress bar shows the completion percentage, the upper-right area is orange, and a running icon is displayed.
Program paused	When paused, the progress bar shows "Paused" and the pause time. A standing icon is displayed.
Program stopped	When stopped, the progress bar shows "Standby", the top area turns green, and a standby icon is displayed.

Functions

Tap button 3 on the main interface to open the functions interface.



① Open logs.

② Open file management.

③ Back up the current user's program files to USB storage.

④ Search USB storage for backup files and restore selected files to the current user.

⑤ Open the screenshot window and save screenshots to USB storage.

⑥ Open the Tm calculator.

⑦ Run a power-on self-test to check instrument systems.

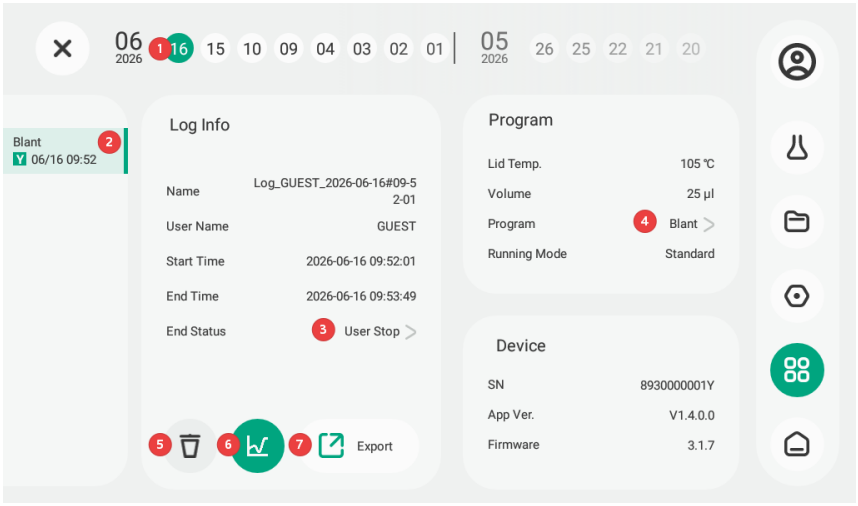
⑧ Enter the help interface.

⑨ Search USB storage for software update files and install the selected update. This function is visible only to Admin.

⑩ Delete all user data and settings. This function is visible only to Admin.

Logs

Use this interface to view, export, or delete run logs.



① Select the log date.

② Select the log entry.

③ View end-of-run details.

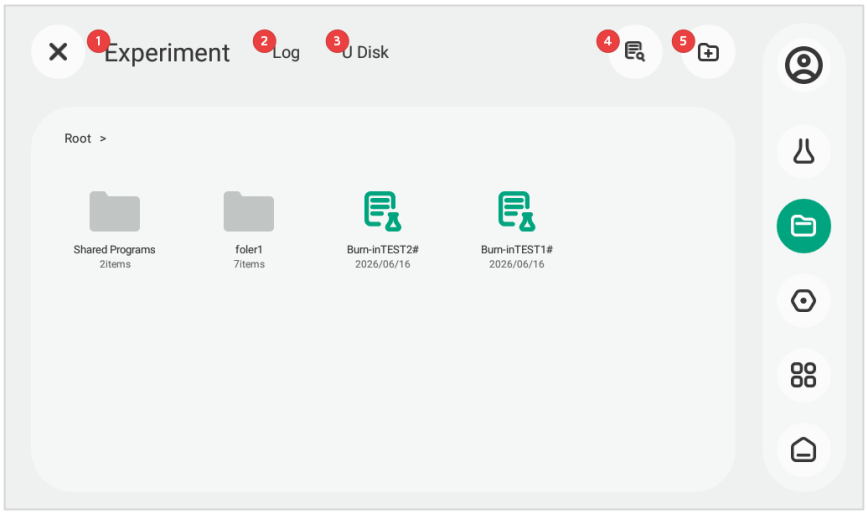
④ View program step information.

⑤ Delete the log after confirmation.

⑥ View the temperature curve.

⑦ Open the export interface and export the log file to USB storage.

File management



① Manage program files.

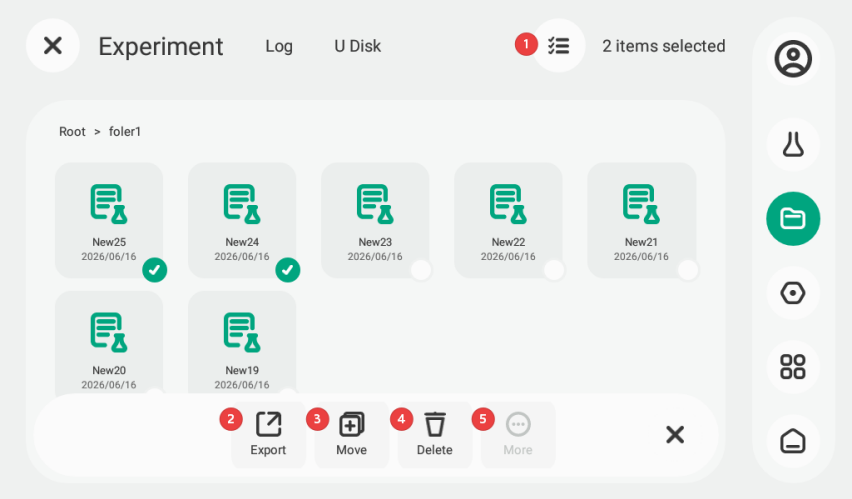
② Manage log files.

③ Manage USB files.

④ Open search and enter keywords to filter files.

⑤ Enter a name to add a new folder.

Tap a program file to open or view it. Tap a log file to view it. Long-press to enter multi-select mode. The bottom menu allows batch export, move, or delete. Tap the upper-right icon to select all files.



① Select all files and folders.

② Open the USB file interface, select a folder, and tap Paste to export files to USB storage.

③ Open the move file interface, select a folder, and tap Paste to move files.

④ Confirm in the pop-up window to delete the selected files and folders.

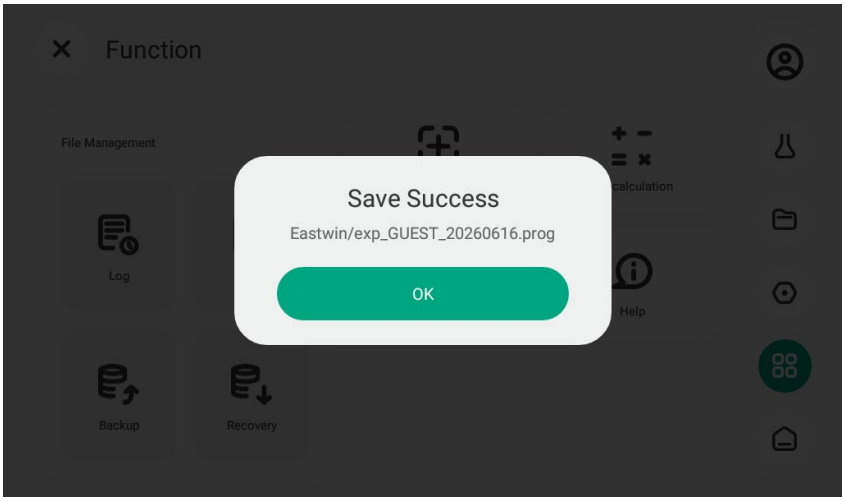
⑤ When one item is selected, tap More to rename, copy, or share it.

Select one program file and tap More to rename it or pin/unpin it.

Select one folder and tap More to rename it. A folder that contains files must be emptied before it can be deleted.

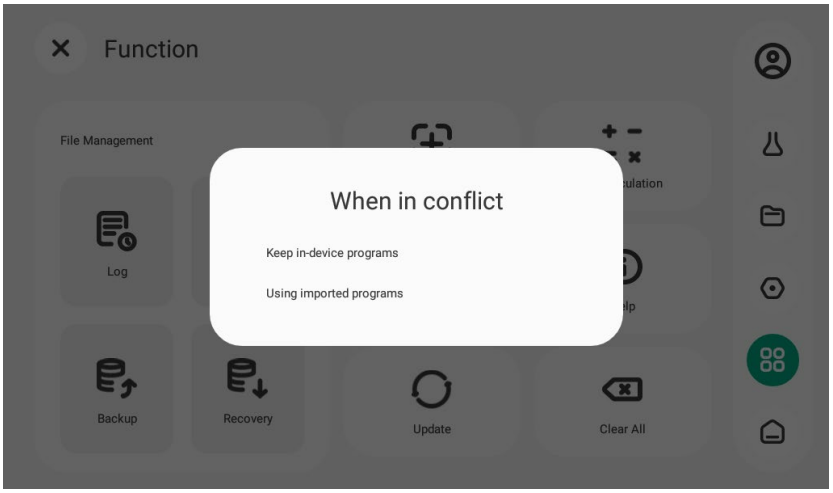
Backup and restore

Insert USB storage into the instrument and tap "Backup". The instrument exports the current user's folders and programs. If logged in as Admin, you can also export other users' folders and programs.



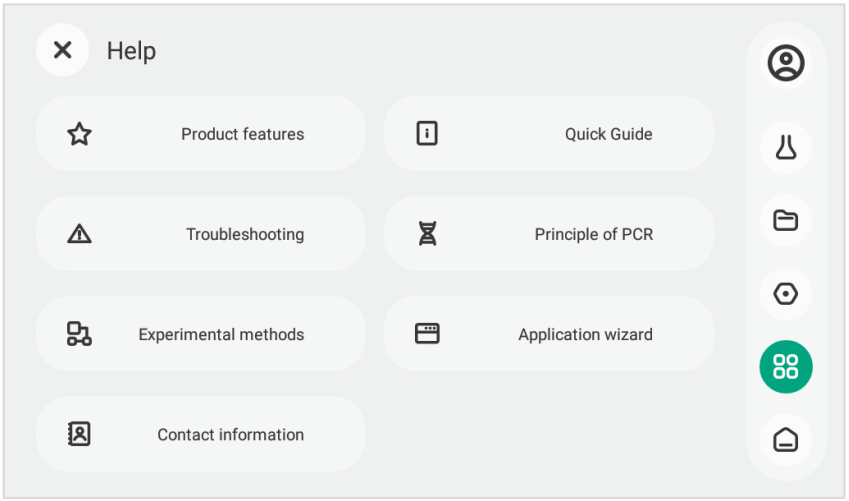
Tap "Restore", select the backup files, and import folders and programs from USB storage to the current user. Folders with the same name are merged. For programs with the same name, choose whether to keep the instrument version or the USB version.



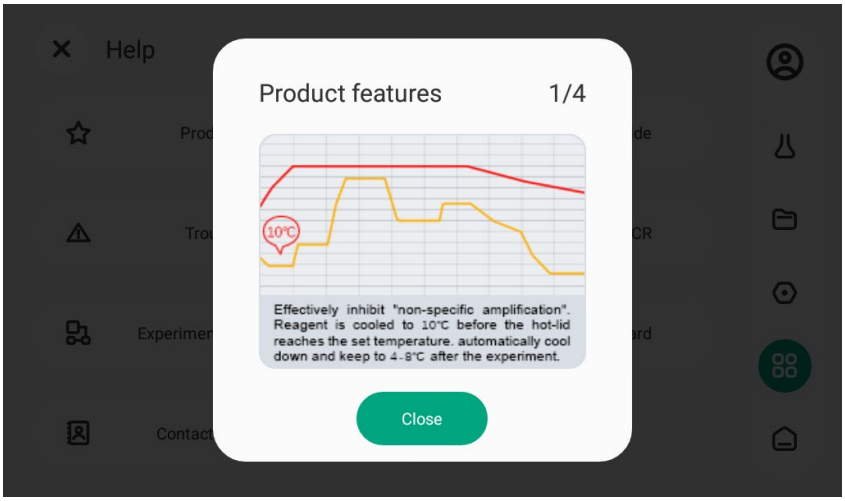


If a conflict occurs, keep the program stored on the instrument.	If the same program name exists on the instrument and USB storage, the instrument version is retained.
If a conflict occurs, keep the imported program.	If the same program name exists on the instrument and USB storage, the USB version overwrites the instrument version.

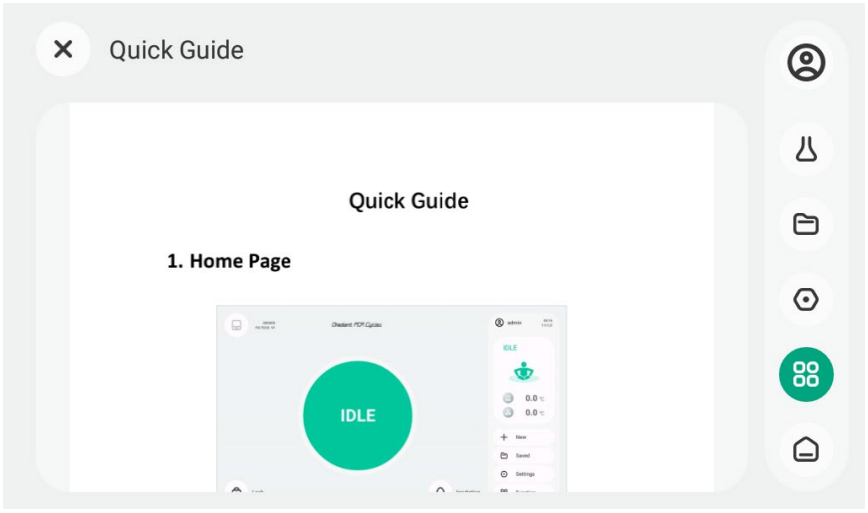
Help



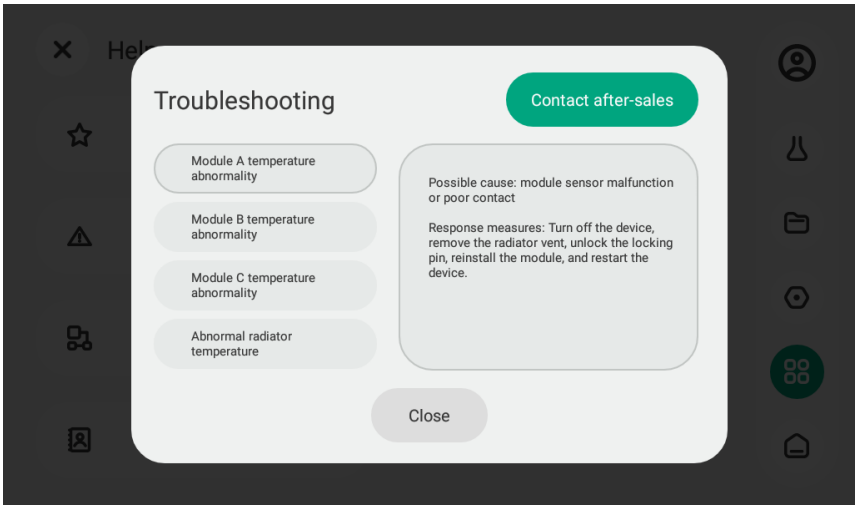
Tap "Product Features" to view product feature screens. Swipe left or right to view more images.



Tap "Quick Guide" to view software instructions. Swipe up or down to scroll and use two fingers to zoom.



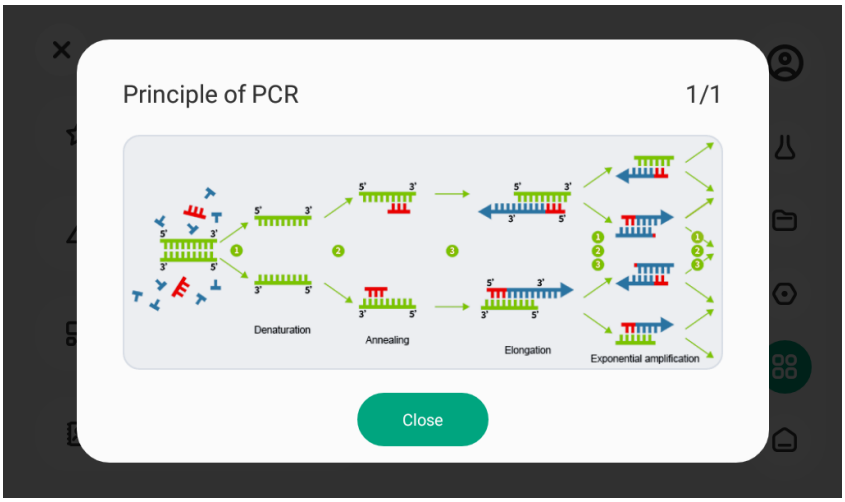
Tap "Troubleshooting" to view troubleshooting information.

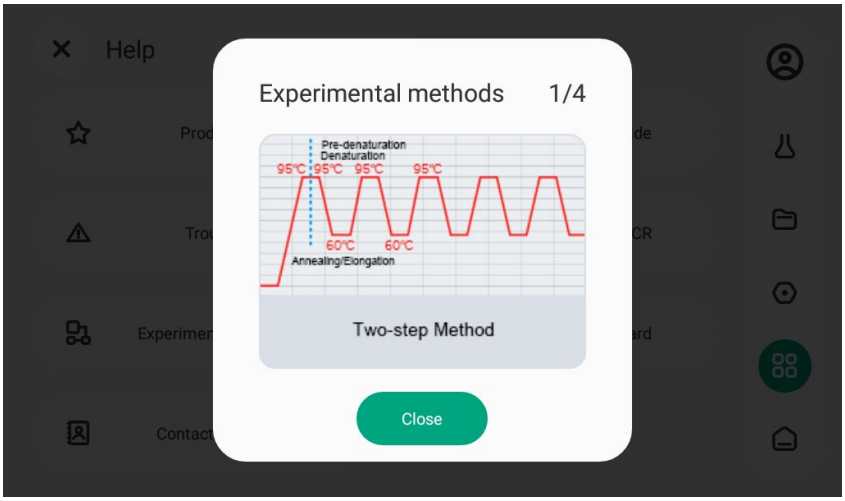


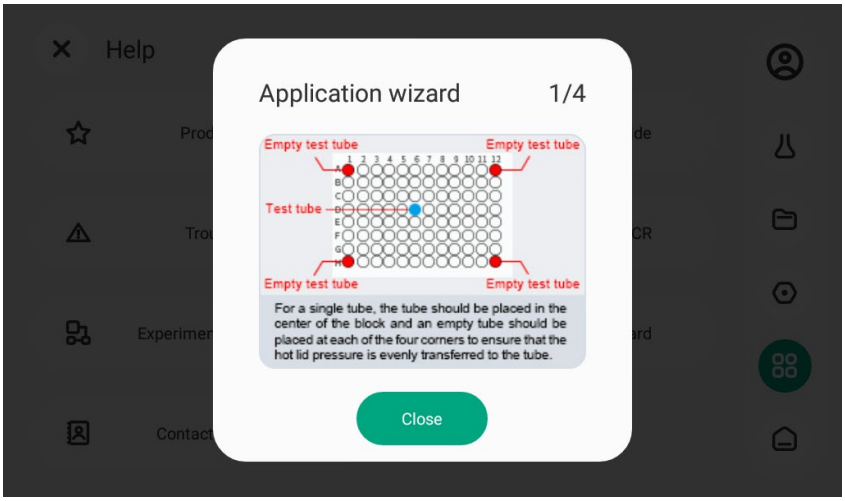
Tap "Contact information" to view service and support contact details.



The help area also includes PCR principles, experimental methods, and application guide diagrams.









Do not switch off the instrument during a software update. After a successful update, the instrument restarts and opens the Guest account. Check the software version in product information to confirm the update. Existing folders, programs, run records, and system settings are not changed by the update.

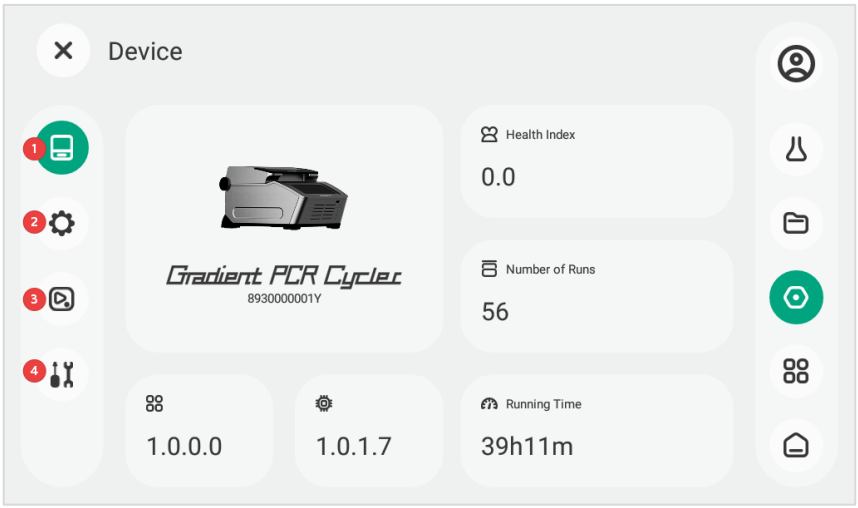


Restoring factory settings deletes all newly created users, folders, programs, and run records. Use this function only when needed.

This function is available only to the Admin account.

Settings

Tap button 4 on the main interface to open Settings.



① Device information: model, software version, firmware version, and maintenance information.

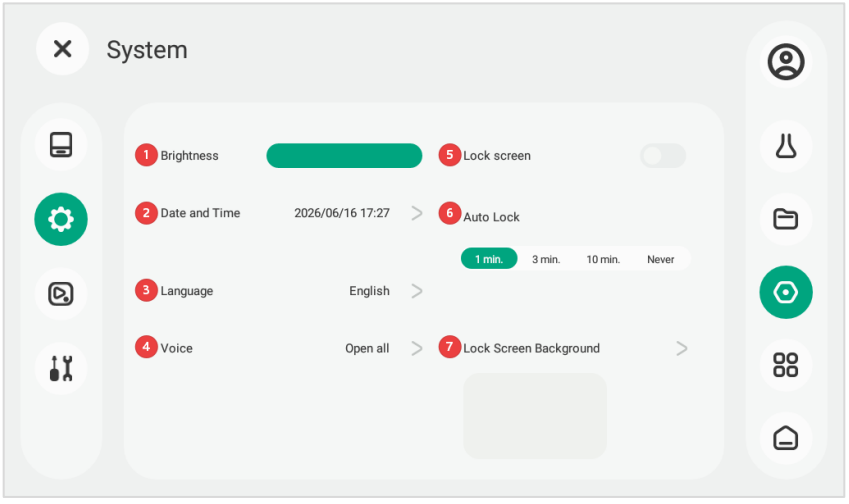
② System functions: screenshot, backup, and related operations.

③ System settings: time, language, lock screen, program templates, and related settings.

④ Run and standby settings.

⑤ Factory mode: for service use only.

System settings include:



① Adjust screen brightness.

② Set system time.

③ Set system language.

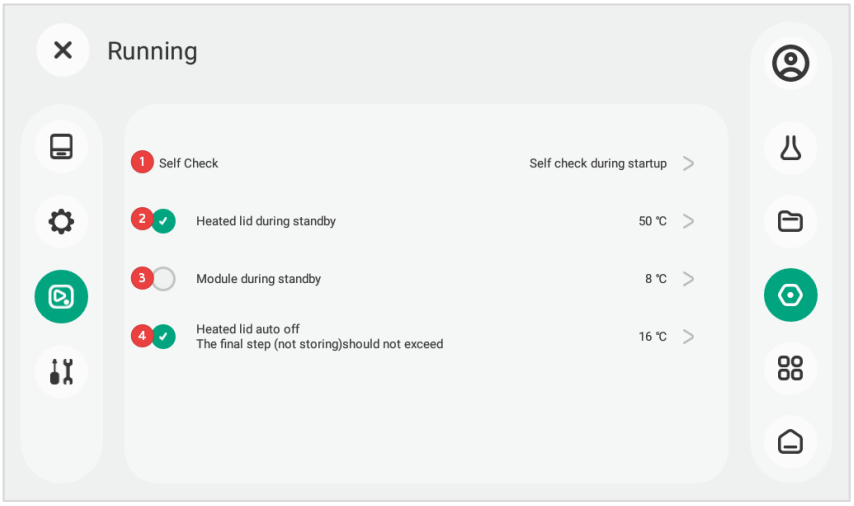
④ Switch button sounds and prompt sounds on or off.

⑤ Switch the lock screen function on or off.

⑥ Set the automatic lock time. This applies only when lock screen is enabled.

⑦ Set the lock screen background.

Run settings are shown below. Tap an input field to enter a temperature value and enable the setting where required.



① Self-test mode.

② Hot lid standby temperature.

③ Block standby temperature.

④ Hot lid automatic shut-off temperature. The hot lid switches off below the set temperature.

5) Maintenance and cleaning

Replacing the fuse

The fuse is located in the rear power module. Replace it as follows:



Warning

To prevent fire, replace the fuse only with the same type and rating.

- Switch off the instrument and unplug the power cord.
- Insert a screwdriver into the fuse cover slot, open the cover, and remove the fuse holder.
- The fuse holder is beside the power switch.
- Remove the blown fuse and replace it with a fuse of the same type and rating.
- Fuse type: F6.3A L250V (5 x 20 mm).
- Reinsert the fuse holder and close the cover.
- Reconnect the power cord and switch on the instrument.



Warning

If the fuse blows again, switch off the instrument immediately and stop using it. Contact NIPPON Genetics EUROPE service as soon as possible.

+49 (0)2421 55496 0

Cleaning and disinfection

No internal parts require daily cleaning or disinfection. Keep the outer surface and block clean. Wipe up liquid or chemical splashes immediately so liquid does not enter the instrument. Before cleaning, disconnect the instrument from power and follow laboratory safety procedures.

Clean the instrument surface and block as follows:

For UV disinfection, follow the laboratory standard for exposure time, distance, and intensity. Open the hot lid so the block is exposed to UV light.

After disinfection, clean the block wells with a cotton swab lightly moistened with 95% ethanol.

Wipe the instrument surface gently with a soft, low-lint cloth lightly moistened with water. Do not scrub printed areas and do not allow liquid to drip into the instrument.

If reagents, products, or chemicals contact the operator, rinse immediately with plenty of water and follow the applicable safety procedure.



Warning

The responsible person must ensure that:

A. If hazardous substances leak onto the instrument or block, or enter the instrument, appropriate disinfection is performed.

B. Cleaning agents or disinfectants that may react dangerously with instrument materials are not used.

C. If compatibility of a cleaning agent or disinfectant is unclear, NIPPON Genetics or an authorized representative is consulted.

Safety inspection and routine maintenance

The instrument can perform a self-test at start-up. Users can also start a self-test from the system interface.

When the maintenance index is 0.8 or higher, users may choose to run self-test before each program to confirm instrument status before using valuable samples.

A passed self-test indicates that the instrument is currently ready for use.

Self-test checks include temperature sensors, block temperature control and Peltier performance, hot lid over-temperature protection, data communication, ventilation and heat dissipation, internal overheating, and ambient temperature.

During a run, the instrument monitors constant-temperature steps and temperature changes. If an abnormality is detected, fault information is displayed. See "Fault Codes" in the Help menu.

If a safety-related fault is detected, the instrument shuts down power outputs, stops the current operation, and displays fault information. Do not use the instrument again until the fault has been repaired and self-test passes.

Routine maintenance: After PCR work, disinfect the workplace according to laboratory procedures, including UV treatment where required, to reduce contamination from amplification products.

If dust is found in the wells, clean them with a cotton swab lightly moistened with mild detergent. Follow maintenance index recommendations and self-test guidance to maintain reliable operation.



Warning

Do not use acetone. It can damage the instrument surface.

Do not scrub printed markings.

Keep the block wells clean. Dirty wells can affect heat transfer and PCR results.

Performance testing and calibration

Periodic calibration helps reduce the effect of performance drift. NIPPON Genetics EUROPE can provide inspection services according to factory inspection specifications and issue inspection reports. This service requires return of the instrument and may incur a fee.

For calibration and maintenance services, contact NIPPON Genetics EUROPE.

Product service life

The production date is shown on the rear product label. The stated service life is 5 years.

The service life is based on life testing of the Peltier cooling components. Maintain and service the instrument according to this manual. After maintenance or repair, the instrument may be used if basic safety and performance are confirmed.

Actual service life depends on use frequency, operating conditions, operating habits, and maintenance quality. Proper maintenance can extend useful life.

The instrument provides power-on self-test, a maintenance index, and maintenance recommendations. In the system interface, users can select no self-test (default), self-test at each start, or self-test when the maintenance index is above 0.8.

Report error messages to NIPPON Genetics EUROPE service promptly.

If repaired instrument performance or safety does not meet the stated requirements, stop using the instrument.

For early end-of-life guidance, contact NIPPON Genetics EUROPE service.

Dispose of the product according to applicable national and local regulations.



The Peltier element is a core component of the PCR cycler. Its life is affected by installation, heat dissipation, and the number, duration, and frequency of rapid heating and cooling cycles.

The maintenance index counts effective program run time for programs longer than 5 minutes. The instrument provides prompts during power-on self-test when accumulated use approaches or exceeds the built-in threshold.The threshold does not mean that the instrument has failed or is about to fail, and it does not guarantee operation until the threshold is reached. Peltier life is not the same as total instrument design life.

Use the maintenance assessment as a guide for timely maintenance or service.

Environmental protection



WEEE warning

Waste electrical and electronic equipment (WEEE) should be reused, recycled, or recovered where possible to reduce disposal. Follow applicable WEEE requirements when disposing of the instrument.

6) Troubleshooting

This chapter lists possible faults, likely causes, and recommended actions.

In an emergency, such as fire, smoke, rupture, or leakage, disconnect the instrument from power immediately.

When an error message appears, the instrument may shut down automatically. If a fault prevents safe shutdown, risk may remain. Record the error message, switch off the instrument, and contact service.

Faults during self-test or operation:

<table>
<tr><th>№</th><th>Fault Description</th><th>Cause Analysis</th><th>Processing Method</th></tr>
<tr><td>1</td><td>Block is open.</td><td>Block connection is loose</td><td rowspan="5">Shut down, remove the heat dissipation air outlet, unlock the locking pin, reinstall the block and lock it, and restart the machine.
If the problem remains, contact NIPPON Genetics.</td></tr>
<tr><td rowspan="3">2</td><td>Abnormal temperature in block A area</td><td rowspan="3">Block sensor damaged or poorly connected</td></tr>
<tr><td>Abnormal temperature in block B area</td></tr>
<tr><td>Abnormal temperature in block C area</td></tr>
<tr><td>3</td><td>Abnormal radiator temperature</td><td>Heat sink sensor damaged or poorly connected</td></tr>
<tr><td>4</td><td>Abnormal temperature of hot lid</td><td>Hot lid sensor damaged or poorly connected</td></tr>
<tr><td>5</td><td>Block A zone temperature control is abnormal</td><td>Peltier element damaged, or</td><td>Wait for the block temperature to decrease, then restart the system.</td></tr>
</table>

	Block B zone temperature control is abnormal	block temperature is too high or Instrument started in a cold environment	Run Self-test from the System interface. If the problem remains, contact NIPPON Genetics.
	Block C Zone Temperature Control Abnormal		
6	Abnormal heating of hot lid	Poor connection	Restart the system to confirm. Contact NIPPON Genetics.
		Hot lid fault	
7	Other anomalies	Unknown internal fault	Contact NIPPON Genetics.

Other possible faults:

№	Fault phenomenon	Cause analysis	Processing method
1	After turning on the power switch, the display does not light up, and the breathing light does not light up.	The power is not connected	Check and connect the power cord and socket.
		Fuse blowing	Replace the fuse. Type: F6.3A L250V (5 x 20 mm). If the problem remains, contact NIPPON Genetics.
		Power switch fault	
		Other cause	
2	Occasional hot lid or abnormal fluctuation of block temperature data sometimes triggers the block to be refrigerated at 10 °C.	Strong interference in power supply system	Check the quality of power supply and high-power or frequency conversion equipment, and adopt UPS and other measures.
		Temperature sensing amplifier supply undervoltage	Check the MCU voltage regulator circuit.

3	The block heating or cooling rate changes noticeably, temperature control is unstable, or the constant-temperature countdown does not start for a long time. The instrument displays: "Abnormal temperature control. End the experiment and run self-test." The message is recorded in the run log.	The ambient temperature exceeds the limit, and the radiator temperature is too low or too high.	Provide an environment that meets normal (temperature, humidity and air pressure) and ventilated working conditions. Try running again.
		No tube or plate on the block	Place test tubes as specified.
		Block surface condensation	Remove condensation from the block.
		A Peltier channel is damaged.	Run Self-test from the System interface. If the problem remains, contact NIPPON Genetics.
		Fan fault	
		Drive circuit fault	
		A temperature sensor channel fault	
		Hot lid fault	
4	When the program starts, the message "Sensor is abnormal. Run self-test after the experiment has stopped" appears and the program stops automatically.	A temperature sensor channel is open	Run Self-test from the System interface. If an error is found, contact NIPPON Genetics.
		A temperature sensor channel is short-circuited	

5	Display clock is incorrect	Local time is not set	Start the "system settings" in the "settings" on the main interface, reset the time, and press the confirmation key to save after the setting is completed.
		Display battery voltage is low	Contact NIPPON Genetics to replace the battery.
6	Interface is frozen or cannot be operated.	Software error	Switch the instrument off and restart it. If the problem remains, contact NIPPON Genetics.





Note

During the warranty period, do not open the instrument housing for self-test. If inspection requires opening the housing, contact NIPPON Genetics EUROPE (support@nippongenetics.de; +49 (0)2421 55496 0).

Different cyclers may have different temperature control characteristics, including ramp rate, stability, fluctuation, and system offset. A PCR program that works on one instrument may need adjustment on another instrument.

7) Contact

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