

Real-time Gene Amplificator

User Manual

Model: isoQuarkF2

Doc No.: ITLM-01-001-EN
Rev No. : 2022.12.10 (rev.3)

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RevoSketch Inc.
10.Dec.2022



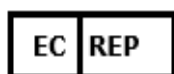
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This instrument meets European requirements for emission and immunity with standard (IEC 61326-1:2012,2020)

This equipment complies with Part 15 of the FCC Rules, pursuant to the limits for a Class C digital device. These standards are designed to provide adequate protection against adverse interference when installed in residential areas. Since this product uses electricity, it may radiate radio frequency energy. If not installed in accordance with these precautions, it may cause electromagnetic interference to wireless communications. However, there is no guarantee that crosstalk will not occur in a particular installation. If this device interferes with the performance and functions of radio or television reception, turn the device off and on again, check the environment around the user, and correct the interference by the following method.

1. Rotate or move the receiving antenna in a different direction.
2. Increase the installation gap between the device and receiver.
3. Connect the equipment to the setter to which the receiver is connected and to another set that is separate.
4. Seek help from an experienced radio/TV technician.

Warning & Symbols

For the safety of users and others, anything about the changing and, editing software and hardware in RevoSketch Inc. must be done only with the approval of RevoSketch Inc.

Before using the equipment, please check the respective manuals of the connected devices as well as the software provided.

The symbols and meanings shown in this manual are used.



Warning

The accidents by nonfulfillment of this instruction is not our responsibility. User should pay attention to safe use and keeping.

In case of unauthorized changes to the supplied product, the warranty of RevoSketch Inc. will be void, and we will not be liable for any abnormal operation of the product.

This product shall be used only under the rated power specified. Power outside the rated power range shall not be applied.

For disposal and recycling of equipment parts, please comply with local government standards and recycling plans



Warning

This product has part could into contact the skin during use, please be sure to understand how to use and handling it for burn safety.

Safety Information

Please follow the following Safety Precautions to use the product rightly and safely.

This equipment is designed to meet the stringent safety requirements of gene amplification devices and satisfies the test standards. It also meets safety requirements. To ensure the safety of users and others, use this equipment in accordance with the order of use, warnings and cautions at all stages of use and operation of this equipment.

If this equipment is used differently from its intended use, the product characteristics cannot be guaranteed. This equipment must be used within its intended use.

Installation, servicing, and scope of use of this equipment should only be carried out by qualified and trained personnel. Users should fully understand the precautions and safety rules specified in the manual.

There are no user-serviceable parts inside this device. The device should only be opened and serviced by qualified service personnel. Failure to heed this warning may result in injury to service personnel or damage to equipment and void all warranties. If there is a service problem, please contact RevoSketch Inc. or an authorized dealer.

1. General precautions

- 1) This equipment must be used for in vitro diagnostics “must be used by experts (including medical personnel)
- 2) This equipment is an electrical or mechanical device and may cause electric shock or physical injury. You should fully understand the instruction manual and use it according to the instruction manual.
- 3) Make sure that all cords are securely connected without being damaged
- 4) Check the rated power source and not touch the switch or power cord with wet hands.
- 5) While the device is in operation, the heating block's temperature rises to 70°C, so care must be taken when handling it to avoid skin burns.
- 6) This equipment should be used intended purpose specified in the user manual only.

2. Application notes.

- 1) Gloves suspected of contamination should be replaced with clean gloves, and the

interior of the laboratory should be kept clean.

- 2) A sample handling space and a separate area for product amplification and analysis, fixtures, and consumables are provided.
- 3) Handle the sample carefully to avoid splashing or splashing
- 4) When the device is running, do not move the device, disconnect the connected cable, or turn off the controller.

3. Safety precautions

- 1) When handling reagents and residues, wear protective equipment (latex gloves, clothes, glasses, masks, etc.).
- 2) During the equipment's operation, the heating part increases the temperature to 70°C, so be careful about the physical hazards.
- 3) The device should be supplied with an appropriate adapter and power cable and check if the cable is damaged. The damaged cable may cause electrical shock or fire.
- 4) Do not disassemble or modify the product without permission
- 5) In the event of a device malfunction, contact the manufacturer or service center and have only a designated technician repair the product

4. Cautions on driving environments

- 1) Do not place heavy objects on the device.
- 2) Do not install the device in a place with high humidity and avoid liquid around the device.
It could cause electric shock, fire or malfunction of the system
- 3) Avoid direct sunlight, and do not place near or inside heat source
- 4) Make sure the device is installed on a flat surface to prevent it from moving.
- 5) Avoid installation in a place with magnetic objects or electromagnetic interference. Keep the device at a distance of 15cm from the walls.
- 6) Care should be taken not to shake or drop the device. Since it contains precision optical components, they may be impaired due to damage, etc.

5. Other matters regarding safety of use

If the same condition occurs below, turn off the machine, unplug the connected power Cord from an electrical outlet, and contact RevoSketch Inc. or an authorized service representative.

- 1) When the power cord of adapter is damaged.
- 2) When a heavy object falls into the equipment.
- 3) When liquid or water enters the device.

- 4) When the equipment has been dropped or damaged.
- 5) When the operation instructions were followed, but the equipment does not work properly.

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1. Product description

RevoSketch's real-time gene amplicator is a test and analysis equipment specially designed for research institutes, tests, laboratories, on-site testing, measurement, and analysis.

Working principle

- This product is a device that can check the amplification and accumulation of genes at isothermal temperatures in real-time. The body consists of a thermal block, an optical module, and a stage for moving the optical module. The heat block amplifies the gene while maintaining the sample at a specific temperature, and the optical module excites and detects the fluorescent material associated with the gene.
- This product consists of a main body, software that controls the main body to show changes in the amount of fluorescence in real-time, a USB cable, and an adapter.

Compact size and fast analysis function

Real-time gene amplicator equipment is recommended for small product size and use of space. It can be used for testing, analysis laboratory. You can also quickly see how DNA or RNA is displayed and analyzed in real-time.

Efficiency can be improved by conducting test and analysis processes used in the field.

Simple design and easy to use

Real-time gene amplicator is for use in research institutes, tests, laboratories, and on-site, small in size, and can be operated with a nice appearance.

Provided software: It is developed to implement and analyze the fluorescence change process in the socket of the target gene in real-time through a simplified GUI, which will give a management effect.

1.1. *Intended for use*

This product is a real-time isothermal gene amplification device that automatically maintains isothermal temperature according to the designed isothermal samples and monitors fluorescence changes while the target gene is amplified.

. Reagents used for testing are not covered by this permission.

2. Product unpacking

2.1. Check the appearance

Real-time gene amplicator transports the product in packaging designed to protect the product from external shocks. Before removing the product, check the exterior of the product box for any damage. If there is any damage to the product's outer box, please contact the shipping company immediately.

2.2. Check the contents

Please check the contents, below.

Part No.	Item
IT-FP-01-001	Real-time gene amplicator (isoQuarkF2)
ITPA-A000-005	Power Adapter
ITPA-A000-001	USB Interface Cable
ITPA-A000-00X	Power code
ITLM-B100-004	Quick guidance

2.3. Appearance



Figure 1. Appearance of isoQuarkF2

Accessory and contents

	
Power Adapter	Power cord
	
USB Interface cable	Quick Guidance

Notice

AC/DC Adapter

Manufacturer : BridgePower Corp.

Model : BM090S24Fxx

- Input: 100-240 V AC., 50/60 Hz, 1.3-0.5 A
- Output: 24 V DC., 3.75 A max.

These adapter meets the safety standards of IEC60601-1

**Warning**

When sending the product to the manufacturer or seller for A/S or return, please be sure to pack the product and accessories together in the product box.

**Warning**

Using power cord; Type SJT or SVT, min. 18AWG, 3-Conductor, VW-1 125V, min 10A (or 250V, 10A). Max 3.0m long; NEMA 5-15P for 125V or NEMA 6-15P for 250V.

Connect the power cord to the adapter.

Connect the connector jack of the adapter to the adapter connector on the back of the product, and connect the power cord to the wall or the corresponding outlet.

"Warning: Use a power cord with a ground.

When connecting in a country-specific region, check whether the power cord is the correct type for the use region.

**Notice**

Improper disposal of this product leads to environmental pollution. When disposing of the product, please contact the relevant authorities. RevoSketch Inc. is not responsible for any responsibility arising from disposing of this product without consulting with the staff of RevoSketch Inc.

3. Installation

**Warning**

Check for improper installation locations.

- In humid and dusty places
- Hot places
- Places with a lot of vibration or shaking
- Places with a lot of electromagnetic noise or electromagnetic interference
- Places with high radiant heat

3.1. Installation environments

The real-time gene amplicator must be installed on a sturdy and flat desk, and at least 25 cm of space is required on the right side of the product. 15 cm on the back. The required space is as follows

To open and close the heating block door, it is required at more 25cm space on the right side.



Figure 2. Required space of isoQuarkF2

**Warning**

Never put the Product on the bottom floor.
Install on a flat and stable place. If installed in an inappropriate location, it may cause equipment failure, deterioration in function and performance, or an accident.

**Warning**

If the product is dropped or impacted, the product may be damaged, or the optical position for fluorescence measurement may be shifted.
External vibrations or shocks during gene amplification can affect amplification and analysis functions.

**Warning**

Never place heavy objects or other objects on the product.

**Warning**

This device may be interfered with or interfered with by other electronic devices. Keep a distance of at least 1.0m from other devices.

3.2. Component

Please check the isoQuarkF2 component name, accessory, and installation method.

Software name: isoQuark (ver. 1.0.1.x)

3.2.1. *Component name*

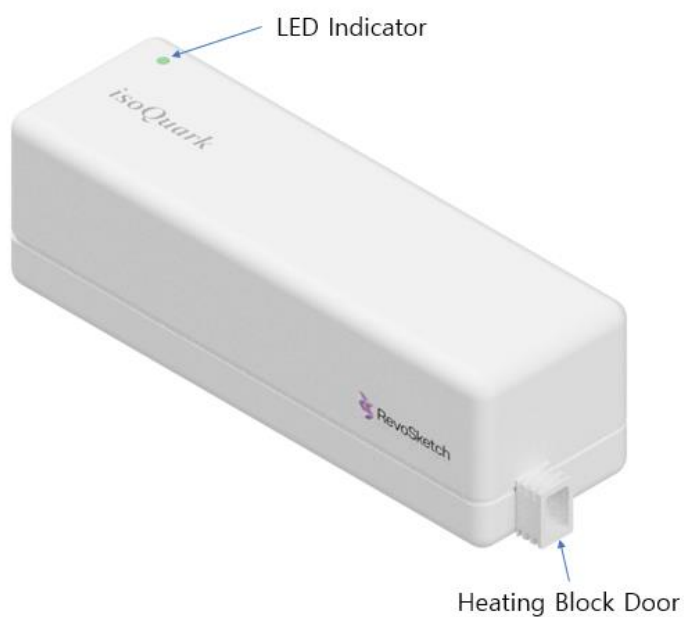


Figure 3. Front component

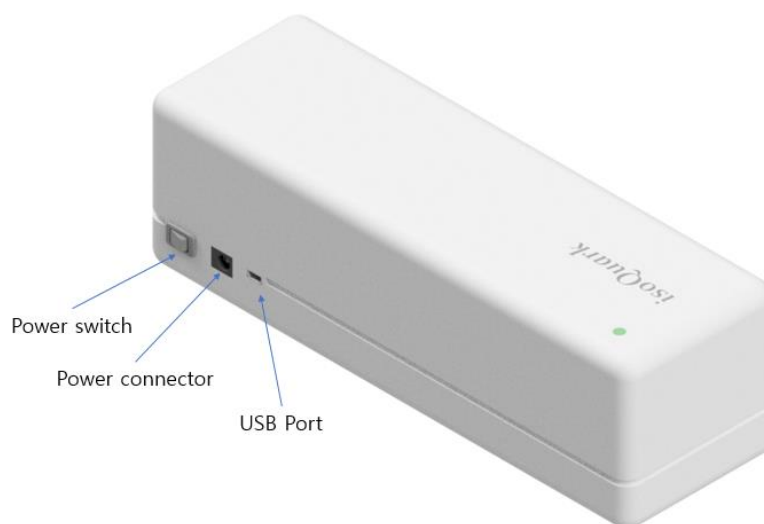


Figure 4. Back component

Component name and description

No.	Name	Description
1	LED indicator	indicator of operating state.
2	Heating block door	Holder of heating block door
3	Power Switch	Power ON/OFF Switch
4	Power connector	For adaptor, power connector
5	USB Port	For connect PC, USB connect port

3.2.2. *LED indicator description*

LED lamp color			operating state
Blue	Green	Red	
On			Power On & Standby
	On		During reaction
		On	Error

3.3. *Installation SW Environment*3.3.1. *(Android) Recommended requirements***– Recommended specifications**

Operation System	Android 10
CPU	Octa-core or higher
RAM(memory)	RAM 4GB or more
Storage	64GB Free Space
USB	2.0 High speed or more
Display	2560x1600

–Minimum specification

Operation System	Android 9.0 pie
CPU	Quad-core
RAM(memory)	RAM 2GB or more
Storage	32GB Free Space
USB	2.0 High Speed
Display	1280x800

3.4. *Installation of provided software*

Refer to the Quick Guide (ITLM-B100-004) provided with isoQuarkF2, access the homepage, and download and install the installation file.

Home page: www.revosketch.com

Installation file: isoQuark app_version number.apk

3.5. *Connection of cables and power cords*

The real-time gene amplification device supports wired and wireless communication between the device and the tablet with SW for operation and Bluetooth or USB cable connection method.

3.5.1. *USB interface cable connection*

1. Use the USB cable provided in the product box.
2. Connect the cable to the USB port on the back of the product.
3. Connect the other end of the USB cable to a USB port on your tablet.



Figure 5. USB cable connation



Warning

This unit's communication connection is only available for indoor use.

**Warning**

Do not remove the USB cable during use.

3.5.2. *Power cable connection*

1. Connect the adapter to the backside product.
2. Connect the adapter's power cord to a wall outlet



Figure 6. Power cable connection

**Warning**

This product must be connected to a grounded outlet. You must use a three-prong power cord with a ground terminal. If the plug does not fit into the outlet, consult a qualified technician to replace the outlet. Be sure to use a grounding plug.

**Warning**

Do not use a power supply that does not match the rating indicated on the power adapter. Use with other electrical adapters may result in fire or electric shock.

**Warning**

Please use the provided electrical adapter and power cord with the product only.
If adapt another accessory use, fire, electric shock, or electric shock may result.

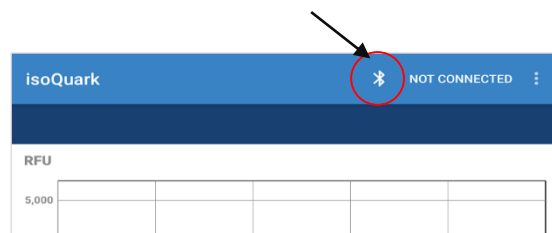
**Warning**

The Outlet can be used easily installed in peripheral devices.
Please do not place the product in a place where it is difficult to install with the socket outlet.
While the gene socket is in progress, unplug the power cord or not turn off the power switch.

3.5.3. Bluetooth connection

Bluetooth wireless connection is only possible with the tablet application.

1) With the product turned on, click the Bluetooth icon on the application screen



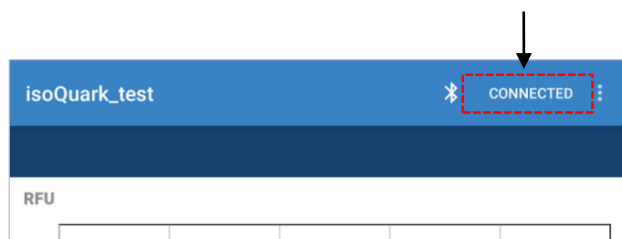
Finger 7. Bluetooth connection

2) Click the BLUETOOTH SCAN button on the screen to search isoQuark products.



Finger 8. isoQuark product search

- 3) If you click the name of the isoQuark searched for, it moves to the main screen and the connection is completed. Please check the CONNECTED message above the screen



Finger 9. Connection completion screen

- 4) If the device is not found, turn the device off and on, and click the Bluetooth icon to search. If the problem persists, please contact Revo Sketch Co., Ltd. or your sales representative.

3.6. Specifications

Performance category	Specifications
Sample Number	16 wells
Channel	Two channels [FAM(474nm)/HEX(529nm)]
Sample Volume	10 – 50 ul
Heater Block Temperature control	40 – 70 °C
Temperature accuracy	± 0.3 °C
Temperature uniformity	± 0.5 °C
Heating Speed(time)	0.3 °C/s(Within 2 minutes (60°C setting at 24°C))
Computer Connection	Bluetooth , USB Interface
Power adapter	100-240V AC (50/60Hz) DC 24V, 3.75A (90W)
Dimensions (W x D x H in mm)	263 x 80 x 80
Weight	0.7 kg

* Specification may slightly vary depending on the measurement condition

3.7. Operating Condition

Indoor use only	
Operating Temperature	20°C ~ 40°C (68°F ~ 104°F)
Relative Humidity	15% ~ 95% (non-condensing)
Storage Temperature	- 10°C ~ 65°C (14°F ~ 149°F)
Storage Humidity	15% ~ 95% (non-condensing)
Storage Atmospheric Pressure	500 ~ 1,060 hPa
Transportation Temperature	- 10°C ~ 65°C (14°F ~ 149°F)
Transportation Humidity	15% ~ 95% (non-condensing)
Transportation Atmospheric Pressure	500 ~ 1,060 hPa
Altitude(use environment)	Up to 2,000m
Equipment Maintenance	Do not repair or disassemble the product by the user.

**Warning**

Do not repair or disassemble the product by the user.
The product must be dismantled and serviced only by qualified service personnel.
If damage to the product or damage caused by failure to observe the above, all warranties will be void. If there is a problem, please contact the distributor and RevoSketch Inc.

3.8. How to Use

3.8.1. Power on

In the backside, there is the power button.



Figure 10. power button.

3.8.2. power on

Turn on your tablet. Please install the provided software before operating the product, following the SW user guide.

3.8.3. Opening and closing heated doors

To start the real-time gene amplification, place the tube containing the PCR mix on the block in the arrow's direction on the heater block door. Slide the heater block door in the direction of the arrow to close it.

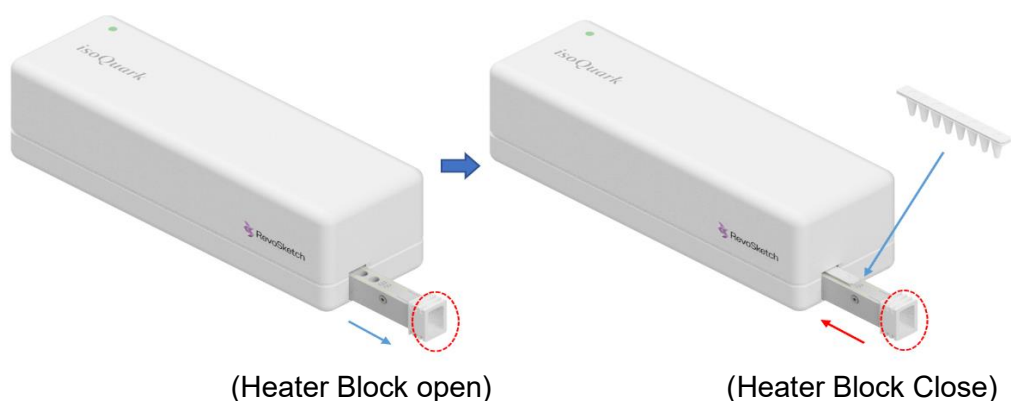


Figure 11. Heating Block

**Warning**

- . Close the heater block door by pushing it completely.
- . If the heater block door is not completely closed, the door open is detected and the red LED is turned on.

3.8.4. Operating & Ending PCR

Following the SW user manual, please operate the device.

If finished PCR reaction, discard tubes from the heating block.

3.8.5. Block Diagram

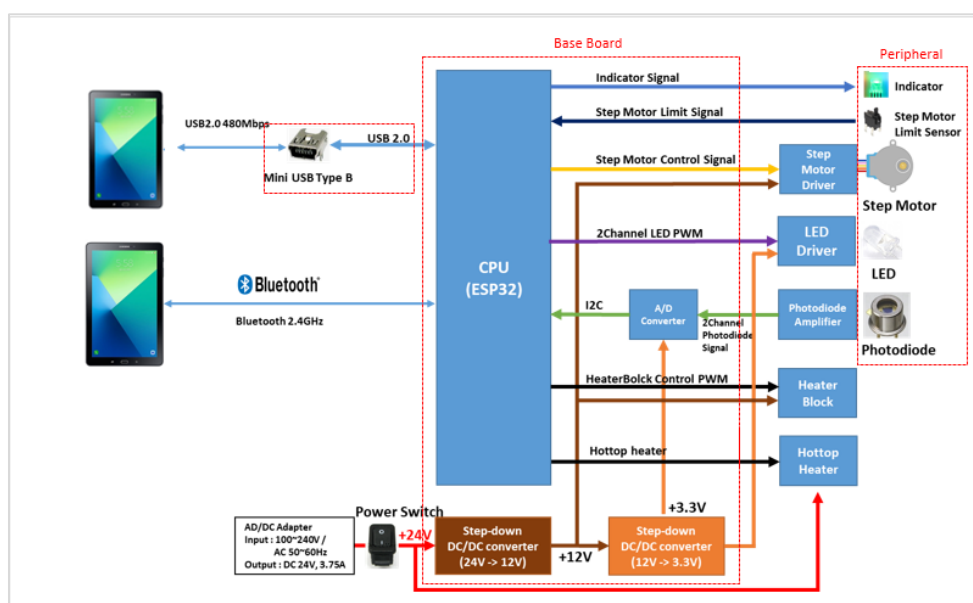


Figure 12. Circuit Diagram

- ✓ AC/DC Adapter
 - Provides power to all modules in the system required for product operation.
- ✓ Base Board
 - Controls peripheral devices related to gene amplification, and controls and transmits the amplified data via Bluetooth or USB.
- ✓ Step Motor Driver Board
 - Position control of optical modules for PCR tube scanning

- ✓ LED Driver Board
 - LED control function of the optical module.
- ✓ Photo Diode Amplifier Board
 - Fluorescence signal processing function
- ✓ Heater
 - A function that generates heat to keep the PCR block isothermal
- ✓ Peripheral

Peripheral devices serve as individual functions involved in gene amplification.

 - Indicator: Product operation status display function.
 - Step Motor limited sensor: Step motor movement detection function
 - Step Motor: Move function of the optical module for scanning of fluorescence
 - LED: The function of stimulating a specific fluorescence to express the light of its own wavelength.
 - Photo diode: Detection of fluorescent signals following gene amplification.

4. *Warning and Maintenance*

4.1. Caution after use

- 1) If the sample is not removed in a timely manner, the inside of the equipment may be contaminated. After all uses, open the heater block door and remove the sample from the well
- 2) If the product heater block door is left open for a long time, dust, etc. may enter and interfere with the analysis. After use, be sure to push the heater block door into the product and store it.

4.2. Caution for cleaning

- 1) Before cleaning the product, be sure to clean it with a soft cloth with the power turned off.
- 2) Never pour or drop any liquid on the product.
- 3) If the product is contaminated due to careless handling of the sample, stop the experiment and immediately apply ethyl alcohol or DNA degradation solution to a cotton swab and gently rub and wash to prevent the spread of contamination

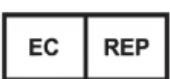
4.3. How to store after use

- 1) The heater block and tray inside the equipment should be cleaned by wiping gently with ethyl alcohol using a cotton swab.
- 2) Equipment that has been used must be stored with the power turned off
- 3) Avoid direct sunlight and do not store or use near heat sources.
- 4) It should be stored and used in a well-ventilated environment.
- 5) Do not store in a place where there is a risk of falling.
- 6) When storing, it should be stored in a place free from vibration or mechanical shock, and should be stored away from places where chemicals are stored or where gas is generated.

4.4. Equipment storage (storage and transport)

- 1) Temperature: -10 ~ 65°C.
- 2) Humidity: 15 ~95%

5. Symbols

Symbol	Description
	Manufacturer
	Date of Manufacture
	Serial number
	Lot Number/ Batch Code
	In Vitro Diagnostic Medical Device
	Authorized representative in the European Community / European Union
	Unique Device Identifier Indicates a carrier that contains Unique Device Identifier information
	Equipment Power ON
	Equipment Power OFF
	Warning, Consult Accompany Documents General mandatory action manual General prohibition indication Caution
	User Manual Reference

	Do not dispose of this product as unsorted municipal waste. Follow local municipal waste ordinances for proper disposal provisions to reduce the environmental impact of waste electrical and electronic equipment (WEEE).
	Universal serial bus (USB) port
	Bluetooth Connection
	Temperature limit
	Humidity limitation
	Atmospheric pressure limitation
	Keep Dry
	Fragile
	This side up
	Non-ionizing electromagnetic radiation
	For Professional Use Only
	CE Mark

5.1. *Manufacturer's Declaration – Electromagnetic emission*

The real-time gene amplifier is designed for use in the electronic environment specified below. Customers or users of the real-time gene amplifier system should check whether the usage environment is appropriate.

EMC test	Applied category	Electromagnetic environment - guidance
RF emissions CISPR 11	Class B	The real-time gene amplifier model is suitable for all facilities and can be directly connected to a low-voltage power supply network that supplies buildings for domestic use.
Harmonics emission IEC 61000-3-2	A	
Voltage fluctuation IEC 61000-3-3	Complies	

5.2. *Manufacturer's Declaration – Electromagnetic immunity*

The real-time gene amplifier is designed for use in the electronic environment specified below. Customers or users of the real-time gene amplifier system should check whether the usage environment is appropriate.

Immunity test	IEC61326 Test level	Compliance level	Electromagnetic Environment -guidance
Electrostatic discharge (ESD) IEC 61000-4-2	8 kV Contact 15 kV Air	8 kV Contact 15 kV Air	Condition-The floor must be made of wood, concrete and ceramic tiles. If the floor is made of synthetic material, the relative humidity should be at least 30%.
Electrical fast Transient / burst IEC 61000-4-4	2kV for power supply lines 1kV for input/output lines	2kV for power supply lines 1kV for input/output lines	The main power capacity should be for commercial or hospital use only.
Surge IEC 61000-4-5	1 kV differential mode 2 kV common mode	1 kV differential mode 2 kV common mode	The main power capacity should be for commercial or hospital use only.
Power frequency (50/60Hz) Magnetic field IEC 61000-4-8		3.0 A/m	The power frequency use range must ensure the characteristics of commercial, hospital-specific conditions

Voltage dips, short Interruptions and Voltage variations on power supply input lines IEC 61000-4-11	<5% U_T (>95% dip in U_T) for 0.5cycle 40% U_T (60% dip in U_T) for 5 cycle 70% U_T (30% dip in U_T) for 25 cycle <5% U_T (<95% dip in U_T) for 5 s	<5% U_T (>95% dip in U_T) for 0.5cycle 40% U_T (60% dip in U_T) for 5 cycle 70% U_T (30% dip in U_T) for 25 cycle <5% U_T (<95% dip in U_T) for 5 s	The main power quality should be for commercial or hospital use only. If the BSVD-1000 system user needs to operate the equipment even in a power outage, it is recommended to use the real-time gene amplification system connected to an uninterruptible power supply or battery. The main power quality should be for commercial or hospital use only.
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms 150 kHz to 80 MHz	The real-time gene amplification systems and cables should not be used near portable or mobile RF communications equipment. The recommended isolation distance calculated, taking into account the transmitter frequency, must be observed. Recommended separation distance $d = \left[\frac{3,5}{V_1} \right] \sqrt{P}$

Radiated RF IEC 61000-4-3	3 V/m 80.0 MHz to 2.5 GHz	3 V/m 80.0 MHz to 2.5 GHz	Recommended separation distance $d = \left[\frac{3,5}{E_1}\right]\sqrt{P}$ 80 MHz to 800 MHz $d = \left[\frac{7}{E_1}\right]\sqrt{P}$ 800 MHz to 2,5 GHz P is the transmitter's maximum wattage in watts (W), depending on the transmitter manufacturer, and d is the recommended isolation distance in meters (m). The field strength from a fixed RF transmitter must be less than (a) the range to be observed in each frequency range (b), as determined by the electromagnetic field survey. INTERFERENCE OCCURS NEAR PRODUCTS MARKED WITH THE SYMBOL BELOW. 
Note 1) U_T is the A.C voltage before application at the test level. Note 2) At 80 MHz and 800 MHz, it applies to the higher frequency range. Note3) The above setting range does not apply in all situations. Electromagnetic field propagation is affected by structure, absorption, and reflection.			

a. The strengths from fixed transmitters, such as cordless phones and terrestrial mobile communications, amateur radio, AM and FM radio, and TV broadcasts, are difficult to say in theory. Because of the fixed RF transmitter, to gauge the electromagnetic environment, consider the electromagnetic location survey if the field strength is measured at the location where the EUT is used, the RF standard, and the EUT checks normal operation.

If your operation is daring, you will need to take a new method or other action, such as relocating the EUT.

b. Over 150 kHz to 80 MHz frequency frequencies, the field strength is built up by [V1] V/m.

When using mobile RF communications equipment and the real-time gene amplification system together, the recommended separation distance must be observed.

The real-time gene amplification system can only be used if conditions are met to prevent radiated RF crosstalk. Depending on the maximum output of the RF communication equipment, users of the real-time gene amplification system maintain a minimum distance between the RF equipment (transmitter) and the real-time gene amplification system, such as a communication device, and prevent interference of electromagnetic waves. It can be prevented.

Rated maximum output power (W) of transmitter	Separation distance (m) according to frequency of transmitter		
	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2.5 GHz
0.01	0.12	0.12	
0.1	0.37	0.37	0.74
1	1.17	1.17	2.33
10	3.70	3.70	7.37
100	11.70	11.70	23.30

Transmitters not falling within the maximum power list above are calculated by applying the recommended separation distance (d) per unit meter (m) corresponding to the equipment's frequency.

P is the maximum amount of power at the transmitter in watts (W) in the transmitter manufacturing range.

Note 1: For 80 MHz to 800 MHz, the separation distance applies to the high-frequency range.

Note 2: The above ranges do not apply in all situations. Electromagnetic field transmission is affected by absorption and reflection from structures, objects, and people.

Immunity and Compliance Level			
Immunity test	IEC61010 Test Level	Actual Immunity Level	Compliance Level
Conducted RF IEC 61000-4-6	3 Vrms, 150 kHz to 80 MHz	3 Vrms, 150 kHz to 80 MHz	3 Vrms, 150 kHz to 80 MHz
Radiated RF IEC 61000-4-3	3 V/m, 80 MHz to 2.5 GHz	3 V/m, 80 MHz to 2.5 GHz	3 V/m, 80 MHz to 2.5 GHz

5.3. Guidance and Manufacturer's Declaration

<i>The real-time gene amplifier system is being used in the electromagnetic field environment below.</i>			
Immunity test	IEC61326 Test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000- 4-6	3 Vrms 150 kHz to 80MHz	3 Vrms 150 kHz to 80 MHz	The real-time gene amplifier system should be used in a designated location with minimal RF blocking effect. Cables to be used in the shielding area must also have minimal RF shielding effect.
Radiated RF IEC 61000- 4-3	3 V/m 80.0 MHz to 2.5GHz	3 V/m 80.0 MHz to 2.5GHz	The range of electromagnetic interference from a fixed RF transmitter must be less than 3V/m.a. INTERFERENCE OCCURS NEAR PRODUCTS MARKED WITH THE  SYMBOL BELOW:
Note 1) This range does not apply in all situations. Electromagnetic field transmission is affected by structures, absorption, and absorption, reflection. Note 2) It is important that the actual blocking effect and filter weakening in the blocking area are preferred.			
a. The strength from fixed transmitters, such as radio (cell-based radio/cordless) phones and land mobile radios, amateur radio radios, AM and FM radio broadcasts, and TV broadcasts, cannot be predicted theoretically with accuracy. An electromagnetic field site survey should be considered to measure the electromagnetic field environment from a fixed RF transmitter. If the field strength is measured outside the concealed position where the EUT is used 3V/m, the EUT should be verified for normal operation. Additional measures will be required to relocate the EUT operation or take advantage of the higher RF blocking effect and the occluded location with the filter.			

6. *Warranty*

6.1. *Warranty period*

RevoSketch Inc. guarantees free service only for non-consumables among hardware products with material and technical defects during the one-year warranty period from the date the customer receives the product. Besides, if the same hardware defect occurs more than 3 times during the warranty period, you are obligated to exchange for a new product only once. And for consumables, the quality is guaranteed for 3 months. The warranty covers parts and labor costs required to repair the product. Please keep the product packaging box for use in case of product defects. Products returned to the factory for repair must be packaged in a case. In order to receive warranty service, you must follow the service application procedure to RevoSketch Inc. Failure to do so may result in a delay or additional cost to the customer.

This warranty is valid only when the product is used for its intended purpose. We do not guarantee damage caused by product modification, abuse, accident, or connection with incompatible equipment without the permission of RevoSketch Inc.

This warranty is instead of any other warranties, either express or implied.

6.2. *Repair service*

RevoSketch Inc. may suspend repair management, parts and technical support services for non-consumable hardware products that have passed 5 years after product production was stopped. Technical support for older versions of software products is provided for 12 months from the time the product is upgraded or discontinued

6.3. *Repair at Out of warranty*

In some specific regions, service is still available after the repair service warranty period has expired. Please contact your supplier regarding current terms and conditions and fares.

6.4. Shipping

The real-time gene amplification is designed to be robust for safe transport. However, to prevent product damage during the transport period, it must be properly packaged.

In general, it is best to pack the real-time gene amplifier in the original product box. If you don't have a product box, pack the real-time gene amplifier in a foam or bubble pack of at least 75 mm (3 inches) thick. The packaged equipment is then placed in a rigid cardboard box. A breakage caution is indicated on the box's outer side, and a marking as an arrow indicates the equipment's top.

To protect the real-time gene amplifier, do not use a non-rigid foam pallet. Falling during transport can cause the equipment to shake and damage.

If the user does not have a way to properly package the real-time gene amplifier to another location or return it to the factory, additional product packaging boxes can be ordered. There is a cost to the user, but it is economical compared to repairing the equipment due to damage incurred during transportation.

It is the user's responsibility to pack the system before shipping properly. If the system is damaged in transit due to improper packaging, the carrier will not be liable for compensation.

7. Technical support

7.1. Troubleshooting

If an abnormal operation occurs while using the equipment, proceed according to the corresponding countermeasures in each of the following items. Following counter measures, if the problem still occurs consistently. Please contact the manufacture and local distributor.

Problem	countermeasures
The equipment does not power on	- Check if the power cable connection and adapter connection are correct. Make sure the device's power switch is off. - If there is no problem with the cable connection, please contact the retailer or RevoSketch Inc.
During installation, not connected via device.	- Check the security policy of your tablet or network (firewall, SW block, port open, user authority) - When connecting the device to a tablet, a USB cable must be used. Check that the direct cable is the correct cable used for connection. - Turn on the power and check if the system initializes - If the length is not connected even after checking all of the above, please contact RevoSketch for inspection.
The system does not operate even press the Start button.	- Check if the system normally initializes when the power switch is turned on - Check if the door is normally closed - Make sure that the accessories to be mounted are correctly installed. - If the system does not work even after checking the above, request an inspection.
Abnormal Stop	- Make sure you have selected the Stop function of the supplied software - Turn off the power of the system and equipment and check again - If the system does not work even after checking the above, request an inspection.
Not match temperature with setting and operating.	- Turn off the power of the software and equipment used and check again. - If the system does not work even after checking above, request an inspection.
NOT CONNECTED	- Please restart SW and device, recheck the connection. - If there is no problem with the SW, please contact the retailer or RevoSketch Inc.
RED LED on	- Please check the heating block is adequately located. - If there is no problem with the heating block location, please contact the retailer or RevoSketch Inc.
The equipment smells of burning.	- Shut down the system, unplug the equipment's power cord, and disconnect the power. - Please contact the retailer or RevoSketch Inc..

7.2. *Technical support*

When you have some questions during the install or use, please contact the local distributor and us.



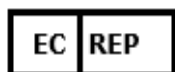
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