Nucleic Acid Automatic Extraction and Purification Instrument 48

Operation Manual

BioChain®
ISO 9001 & 13485 Registered

AnaPrep 48

Instruction Manual

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Introduction

Thank you for purchasing the AnaPrep 48 system which is a fully automated, standalone robot that can purify nucleic acids within 30-45 minutes, depending on sample types. With advanced magnetic bead separation technology, it enables you to obtain high-quality extraction results with minimal usage of plastic consumables. Moreover, the user-friendly interface allows users to be free from troublesome parameter settings and maintenance.

This guide contains important information regarding the safe use of the AnaPrep 48 system. Please read this manual carefully before you start to run the system for the first time, especially for Safety Information.
If there is any question about how to install or operate the system, please contact our technical support center (techsupport@biochain.com).

Contact Info:

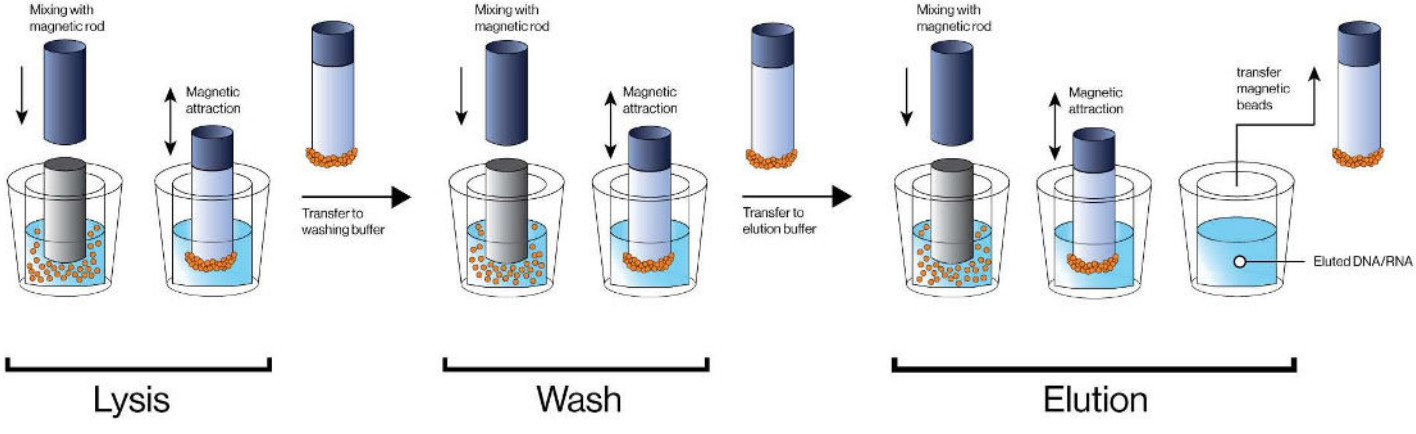
Company:	BioChain Institute Inc.
Address:	39600 Eureka Dr. Newark, CA 94560, USA
Tel:	1-510-783-8588
Fax:	1-510-783-5386
Mail:	info@biochain.com

Working Principle

The AnaPrep 48 adopts magnetic bead-based separation technology in the extraction and purification of nucleic acids from various sample sources. The unit moves magnetic beads adsorbed with nucleic acid to different columns of a 96-well deep-well plate by using the cooperative movement of the magnetic rod and the magnetic rod sleeve. The beads are quickly and repeatedly stirred with the buffer in the well using the magnetic rod sleeve for full mixing.

Using this principle, each column (up to 6) of the plate can contain reagents necessary for extraction, clean-up, and elution of pure nucleic acids. Using a full 96-well plate will then allow for purification of nucleic acids from up to 16 samples simultaneously. Likewise, running 3 plates concurrently results in the processing of up to 48 samples in one extraction experiment.

AnaPrep Magnetic Bead Purification Process



AnaPrep 48 Features

• Touch Screen operation - Large-screen full-color display with easy-to-use touch-sensitive operation

• Consistently reliable results - Avoid errors and cross-contamination caused by manual extractions and generate consistently reproducible results

• Self-cleaning - Built-in ultraviolet disinfection function

• Open system - Various magnetic bead-based nucleic acid extraction reagents can be used

• Safe - Automatic locking of the door to ensure operational safety
- Closed experimental chamber with disposable plastics minimize the contact between the operator and the reagents

Safety Information

The meaning of safety precaution marks are as follows:

WARNING:
"WARNING" indicates a dangerous condition that may lead to death or serious injury.

BIOHAZARD:
This symbol indicates that certain precautions must be taken when working with potentially infectious material.

This

CAUTION:
symbol indicates that non-compliance with instructions or procedures may lead to physical injury or even death or could cause damage to the instrument.

HOT

SURFACE:
This symbol labels potentially hot surfaces on the instrument.

Important:
"Important" points an important note for appropriate usage, as well as prohibited actions.

Note:
"Note" indicates the procedures that should be obeyed and supplementary information for use.

About the Instrument

WARNING:

- Ignoring the following notations may lead to fire or electric shock.
  - In countries other than Taiwan, US and Canada, use a power cable that meets your country's standard or contact your local distributor.
  - Do not use the AnaPrep 48 system with the voltage other than the voltage specified on the device.
  - Do not use the AnaPrep 48 system with a damaged power plug or a loose socket.
  - If there is dust on the prongs of the power plug or on the plug socket, remove it with a dry cloth.
  - When you disconnect the plug from the outlet, be sure to hold the power plug itself. Do not pull the power cable.
  - For maintenance, disconnect the power plug from the outlet.
  - Do not touch the power plug when you hear the crash of thunder.

- Do not pour any liquid on the AnaPrep 48 system.

- Do not place any objects containing liquid on the AnaPrep 48 system. Doing so may cause device failure, fire, or electric shock.

TION:

- Never attempt to remodel the AnaPrep 48 system without the manufacturer's permission. Doing so may cause fire or electric shock.

- Do not place or drop objects on the AnaPrep 48 system. Also refrain from bumping or knocking it, as doing so may cause a failure or malfunction of the AnaPrep 48 system.

- If any liquid materials are left inside the device, wipe it up with a soft paper tissue, etc. Otherwise, the AnaPrep 48 system may be damaged.

- Repairs to the AnaPrep 48 system should only be performed by such agencies as are specifically authorized by the BioChain Institute Inc.

- Only original AnaPrep 48 replacement parts should be used. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

- If the device starts to smoke or smells strange, immediately unplug the power cable.

About the Reagent Kits

CAUTION:

- When handling any of the kits, refer to the respective handbook.

- Reagents in each kit should be handled by observing the safety information and precautions regarding the kit.

- Extraction should be performed in an appropriate laboratory or workplace.

Note:
- The kits are not supplied with the AnaPrep 48 system. Select the desired kit(s) and order it (them) separately.

About the Samples

HAZARD:

- Always wear appropriate gloves, a mask, and safety goggles, etc. when handling any infectious samples.

About Infectious Wastes

BIOHAZARD:

- When handling or disposing of infectious materials, follow the laboratory guideline or the law regarding infectious waste to perform proper incineration, fusion, sterilization, and/or disinfection.

- When you use a third-party company to dispose of waste, outsource this work to an operator licensed to handle medical waste subject to special control, and give them the medical waste manifest at the same time.

BioChain Service Center

BIOHAZARD:

- For technical problem and instrument maintenance please contact our service center:

BioChain Institute Inc.	1-510-783-8588
39600 Eureka Dr.	1-510-783-5386
Newark, CA 94560, USA	techsupport@biochain.com

1.0 Installation

1.1 Composition of the AnaPrep 48 system

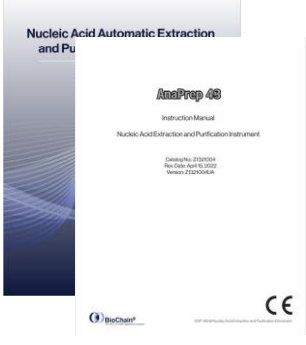
Check that the following items are included in the package. Contact your local representative if you notice any missing part(s).

A. AnaPrep 48
B. Power Cord
C. User Manual

A. AnaPrep 48

B. Power Cord

C. User Manual



Note:

- BioChain's global warranty does not cover damages from transportation or improper operation.

1.2 Operating Environment / Condition

Use the AnaPrep 48 system in a location that meets the following conditions:

• The AnaPrep 48 system must be placed at a minimum distance of 5-10 cm from all sidewalls to allow for good air circulation. The space for the allocation of the AnaPrep 48 system must remain 5-10 cm from instrument to sidewalls. The bottom vent below the instrument should also be clear of any materials that may cause blockage.

• A location where power supply is provided safely.

• A location where the temperature ranges from 15 to 30°C and humidity ranges from 30% to 80% RH. (non-condensing)

• A location that is flat and stable, with no vibration.

• A location away from direct sunlight. (Block the sunlight by closing curtains or blinds as necessary)

• A location which is well-ventilated and not dusty.

• A location where the temperature does not go up and down suddenly. (Warming a cold room suddenly or moving the AnaPrep 48 system from a room with low temperature to a warm room may cause condensation inside the device, resulting in abnormal extraction)

• A location where the temperature and humidity are kept within the specified range (far from water taps, water heaters, humidifiers, air-conditioners, and heaters)

• A location far from objects that generate strong magnetic fields. (motors, transformers, TV, audio speakers, magnets, etc.) Bringing the AnaPrep 48 system close to any type of magnetic field may cause a malfunction.

WARNING:

• Do not use the AnaPrep 48 system in a location where it is wet or can be splashed with water. It may cause device failure, fire, or electric shock.

• When relocating the AnaPrep 48 system, disconnect the plug from the outlet first. If the power cable is damaged, this may cause device failure, fire, injury, or electric shock.

CAUTION:

• Do not use the AnaPrep 48 system in an unstable place such as a slanted surface or a place subject to vibrations. It may cause injury or device failure.

• Do not use the AnaPrep 48 system under direct sunlight or close to a heating device. It may shorten the life of the AnaPrep 48 system, or cause malfunction.

• Do not open the maintenance door while performing the experiment.

• Do not open the front door while performing the experiment.

1.3 Unpack the AnaPrep 48 system

Open the packing box and take out the instrument and related accessories.

Important:

- The AnaPrep 48 system weighs 25 kg. It should be lifted and moved by two persons.
- Hold the moving handler of the instrument from two sides to move it out from the box. Handlers are located under the device, on the chassis' bottom.

- Do not hold the outer covering.
- Do not hold the touch screen panel.
- Do not hold the door.

CAUTION:

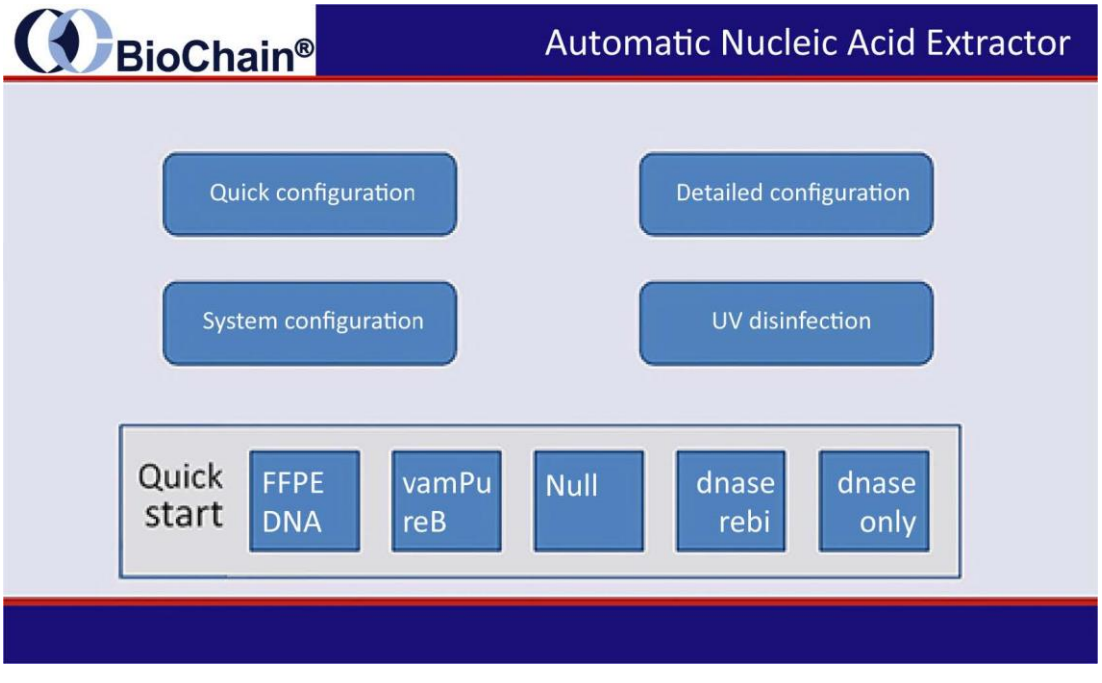
- Improper AnaPrep 48 system movement handling will lead to instrument damage. For correct and safe use of the AnaPrep 48, install the device in a location close to the electrical outlet and that has enough space for installation and main switch operation.

1.4 Overall View

1.4.1. Schematic diagrams of instrument structure

Front View

Touch operation panel



Power switch and cord socket

Power cord socket

1-4.

Experimental cabin

2.0 Operating Instructions

BIOHAZARD:

• Always wear appropriate gloves, a mask, and safety goggles during any biohazardous operation during the extraction process. Even when touching the device after any operation with a biohazard risk, wear appropriate gloves and a mask since the device may be contaminated.

Important:

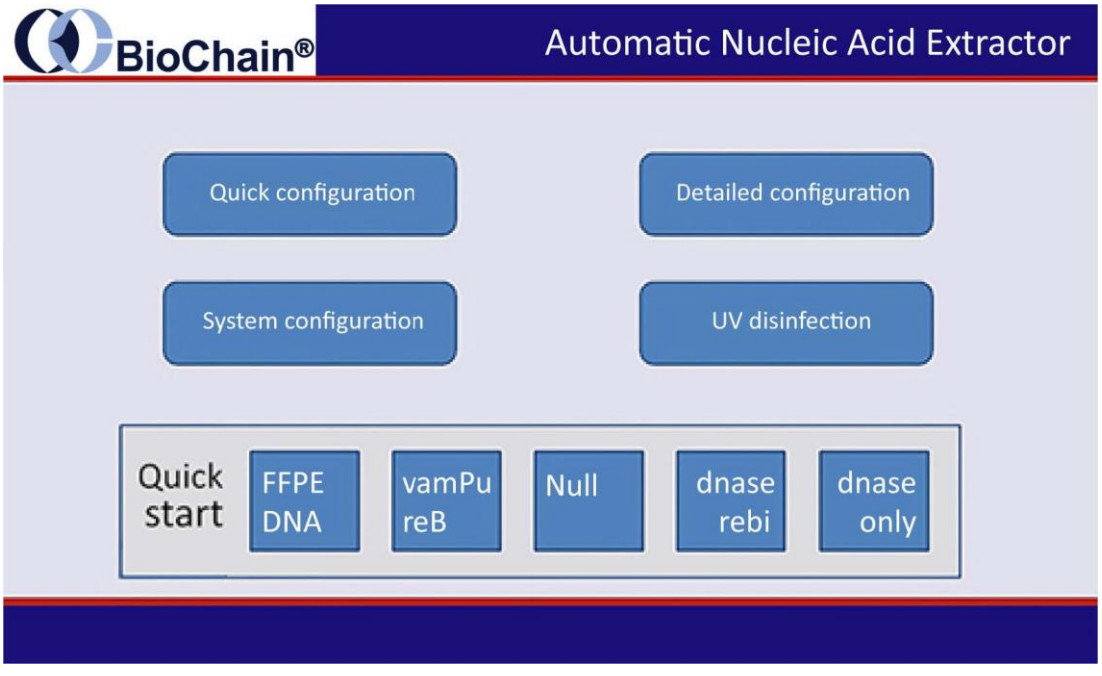
• Before starting extraction, put on appropriate gloves, a mask, and safety goggles if required by the operation. During the operation, from sample preparation to extraction completion, be careful not to expose the samples to foreign contaminants such as sweat, saliva, etc.

2.1 Operating Range

Experimental Templates	1 working mode, with at least 600 experimental programs which can be edited by the user
Waiting time (minutes)	0-30
Mixing time (minutes)	0-60
Magnetic attraction time (seconds)	0-600
Disinfection time of ultraviolet lamp (minutes	0-600
Volume (microliters)	0-1000
Lysis temperature (°C)	Room temperature -85
Elution temperature (°C)	Room temperature -85

2.2 Operating Interface

The touch screen of the instrument is used to display the main interface, and any button or editing area can be selected by touching the screen. If the function allows, you can enter the corresponding operation or carry out the corresponding working program.



2.3 Initializing the Instrument

1. Turn on the power of the instrument, and the startup screen will be displayed, followed by a lon beep.

2. The instrument will initialize, and all parts will move to their corresponding home positions.

3. The instrument will emit 2 short beeps after the initialization process is complete.

2.4 Setting Up the Plates

Materials Required

96-well deep-well plate and 8-strip tip comb (BioChain Cat. No. Z2212099)

1. Place samples and reagents in the corresponding wells of 96-well deep-well plates as specified in the user manual for the extraction kit.

2. Open the door of the AnaPrep 48 and place the deep-well plate(s) into the experimental cabin and align them such that columns 1, 6, 7, and 12 of the plate are directly on top of the heating elements; then gently push the plates down until they fit snugly on the platform as shown in the figure below.

3. Place tip combs into the tip comb holder positions such that the non-pronged end faces towards you; push the combs all the way in and make sure not to use excessive force (see above picture).

4. Close the door to the instrument. Once the extraction begins, the door should not be opened until the end of the experiment (a buzzer will sound to indicate completion).

Note:

- Position A1 of the plate should be oriented at the upper-left corner when inserting into the unit.

- Ensure that the tip comb has been pushed into place. If it is not, it may cause abnormal instrument performance and affect the results.

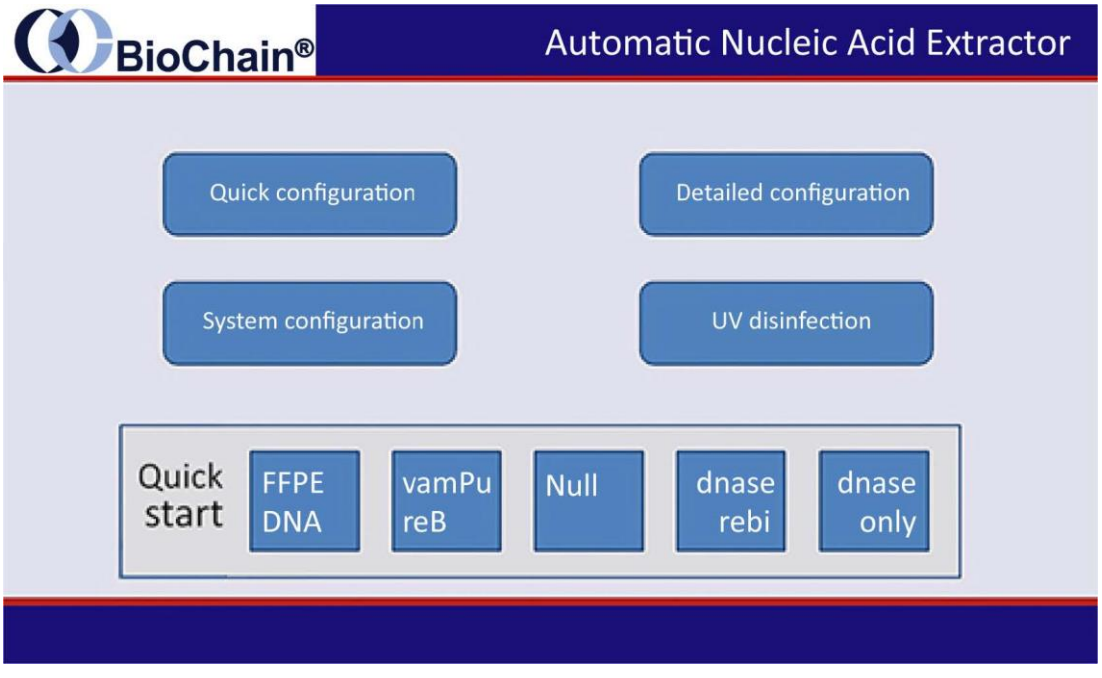
- Do NOT run the program without tip combs in place. The magnetic rods should never contact the solutions directly.

- Avoid touching the heating elements directly, as they may be hot from operation (e.g. elution steps may require elevated temperatures).

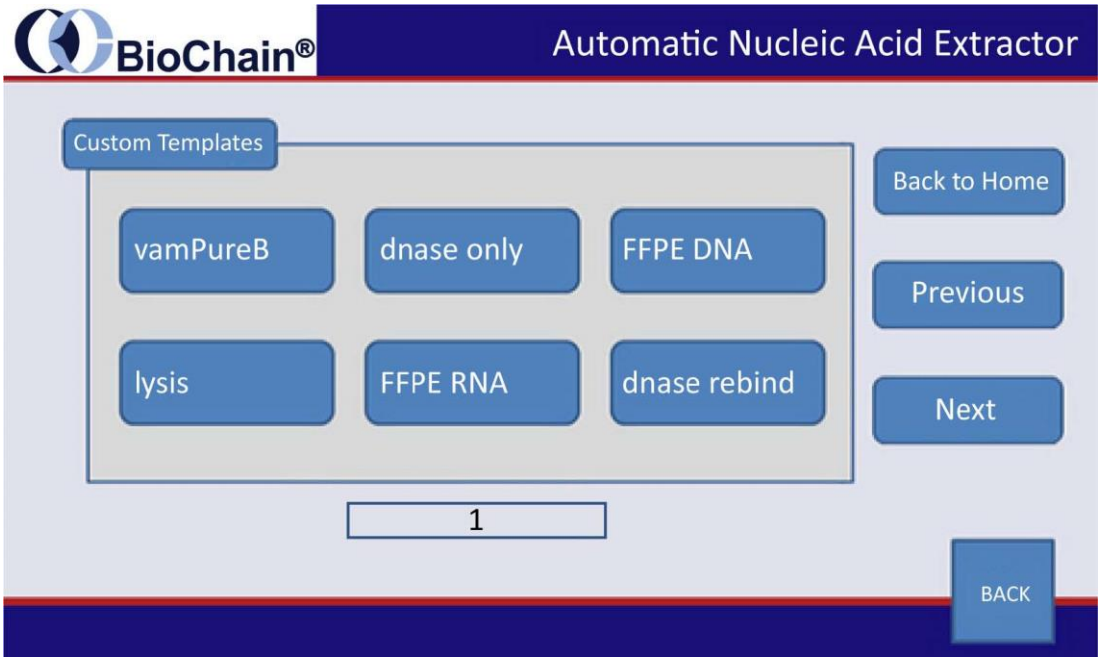
2.5 Running a Program

Main Menu

1. After the instrument is turned on and initialization is completed, the main menu will be displayed on the screen.

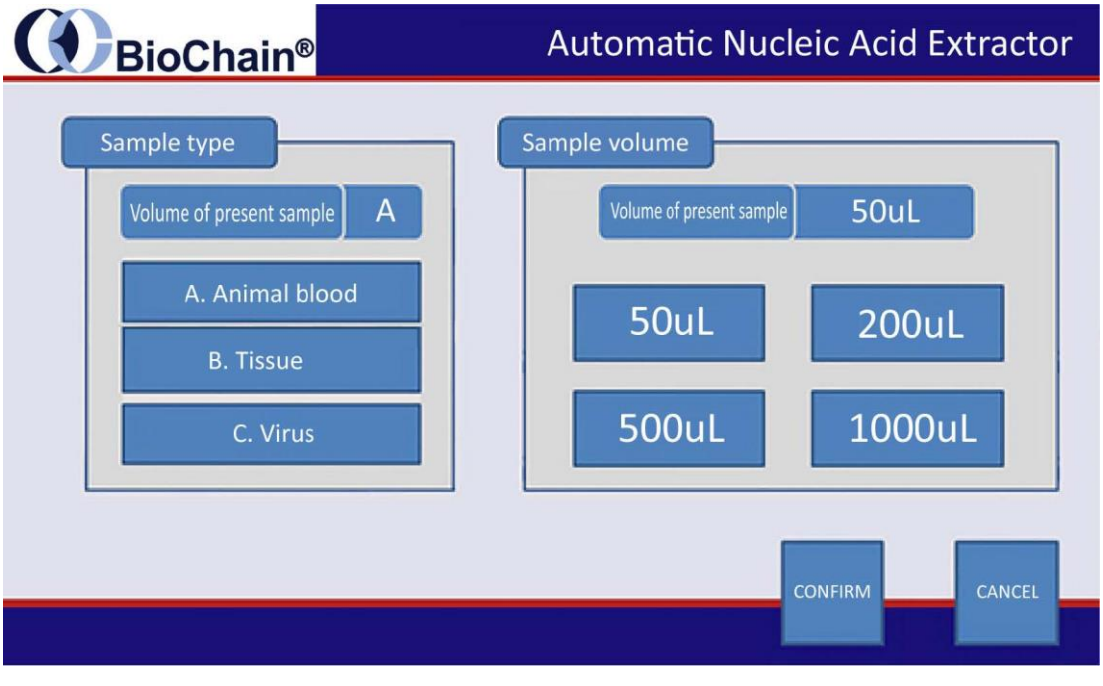


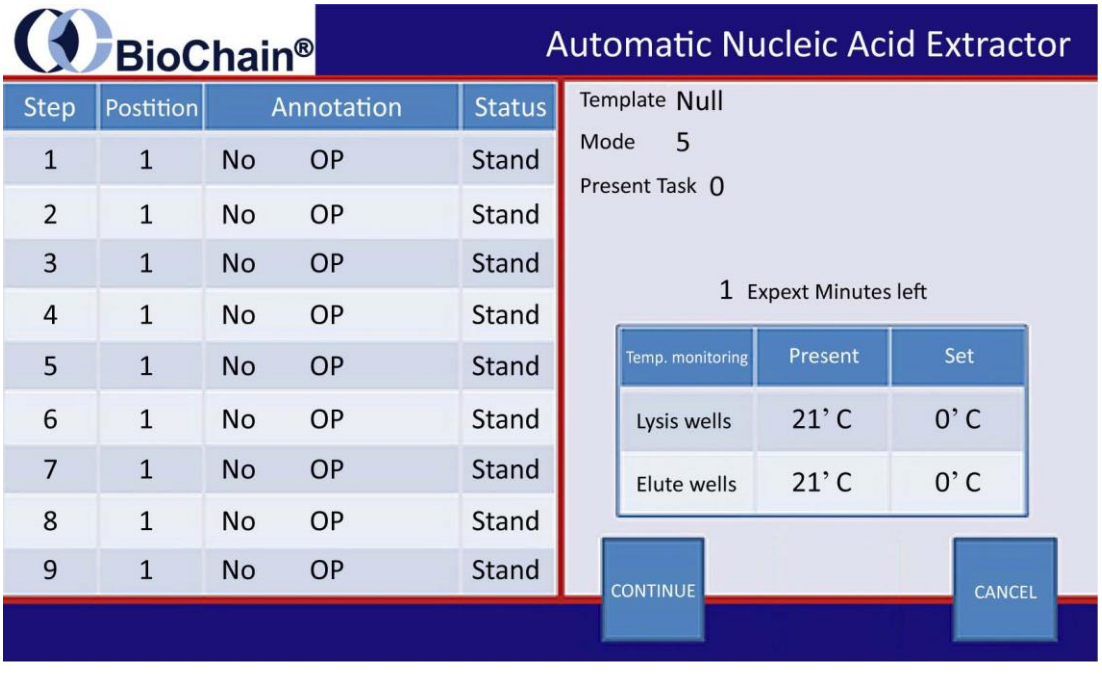
Options for Detailed Configuration, System Configuration, and UV disinfection will be available on this screen. The five most commonly used programs may also be included in the Quick start section for quick and easy access. Select “Detailed configuration” to enter the program page.



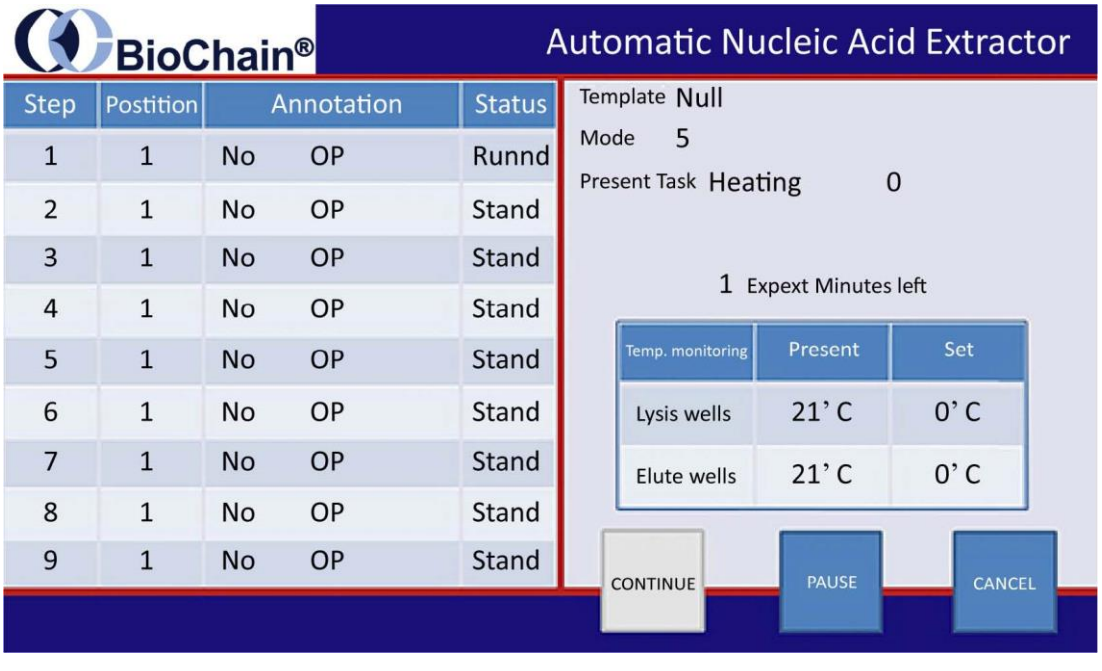
2. This screen shows a list of custom templates (programs) included in the instrument. Touch the Next or Previous buttons to cycle through the available programs. The templates that are titled "Null" are empty and ready to program by the end user (see section "Custom Program Editing").

3. Touch the name of the desired template to see the screen showing an overview of the steps associated with the program.





4. Ensure that the instrument door is closed and select "Start" to enter the program status screen. Touch "Continue" to initiate the program.



This program status screen also shows the following information:

1. Number of the steps in the program
2. The column number of the plate where this step will be performed
3. The name of this step
4. The current status of this step (standby, running or completed)
5. The name of this test
6. The working mode of this test
7. Specific status information
8. Current lysis temperature
9. Current elution temperature;
10. Setpoint of the lysis temperature
11. Setpoint the elution temperature

Select “Pause” to stop all movement of the instrument (the temperature control will still be effective).
Select “Continue” to continue the operation of the instrument;
Select “Cancel” to completely stop the instrument.

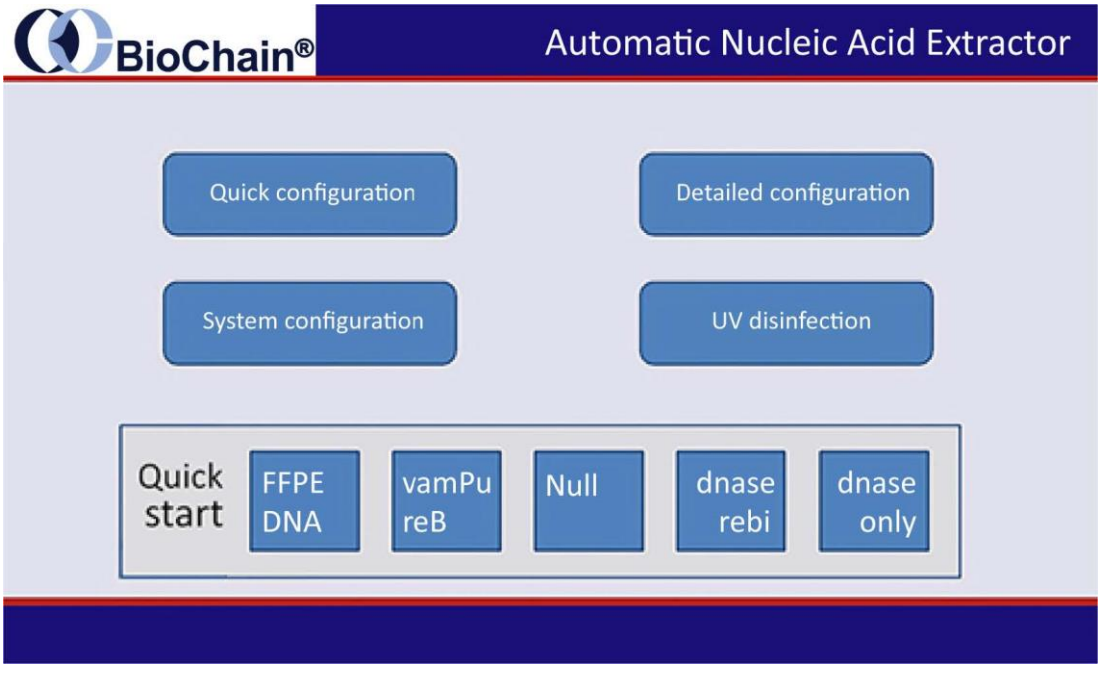
CAUTION:

• In this setting the instrument will return to the home position and the program needs to be restarted from the beginning.

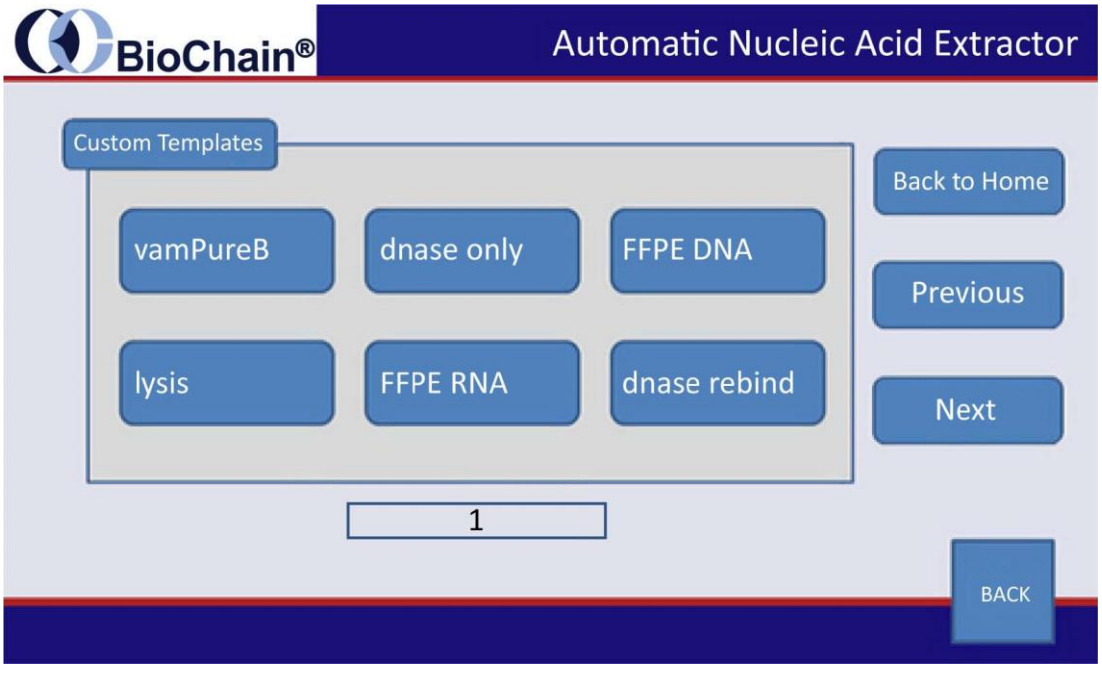
5. After the program completes the run, a buzzer will sound for several seconds. If the program is stopped manually, the buzzer will not sound.

Custom Program Editing

1. After the instrument is turned on and initialization is completed, the main menu will be displayed on the screen.

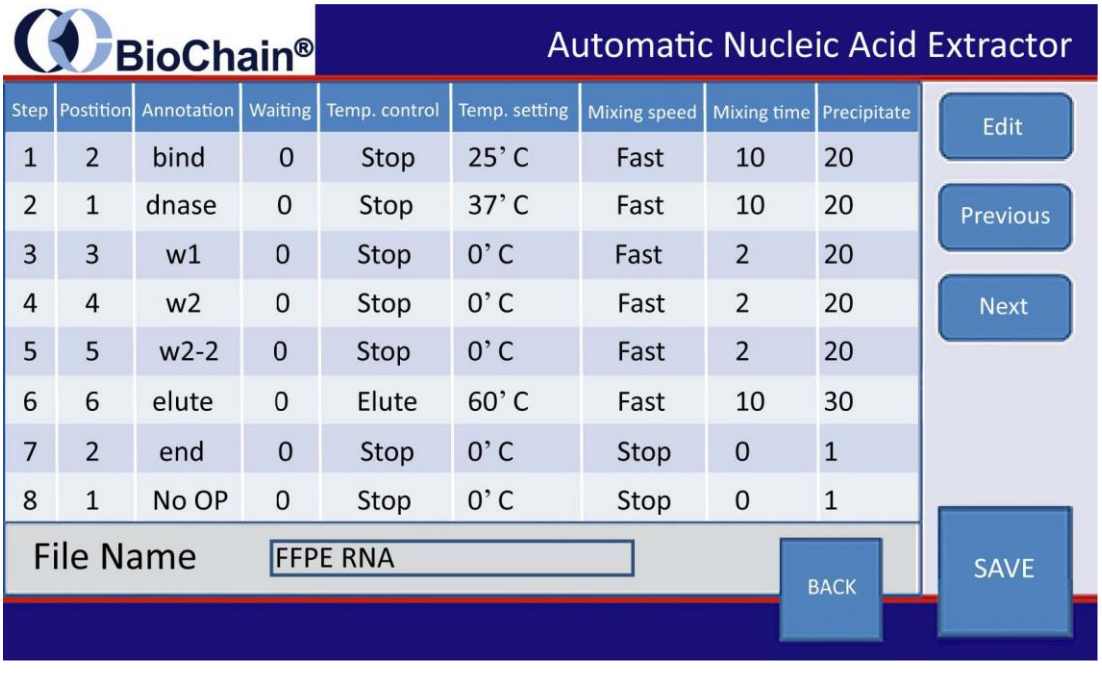


Options for Detailed Configuration, System Configuration, and UV disinfection will be available on this screen. The five most commonly used programs may also be included in the Quick start section for quick and easy access. Select “Detailed configuration” to enter the program page.

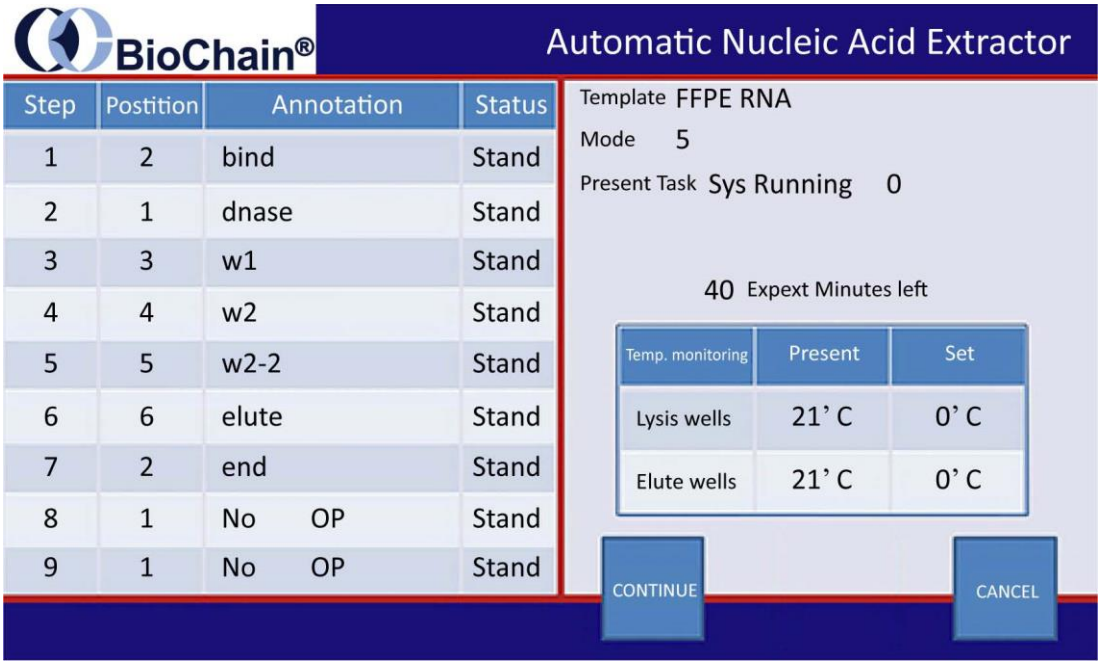


2. This screen shows a list of custom templates (programs) included in the instrument. Touch the Next or Previous buttons to cycle through the available programs. The templates that are titled "Null" are empty and ready to program by the end user.

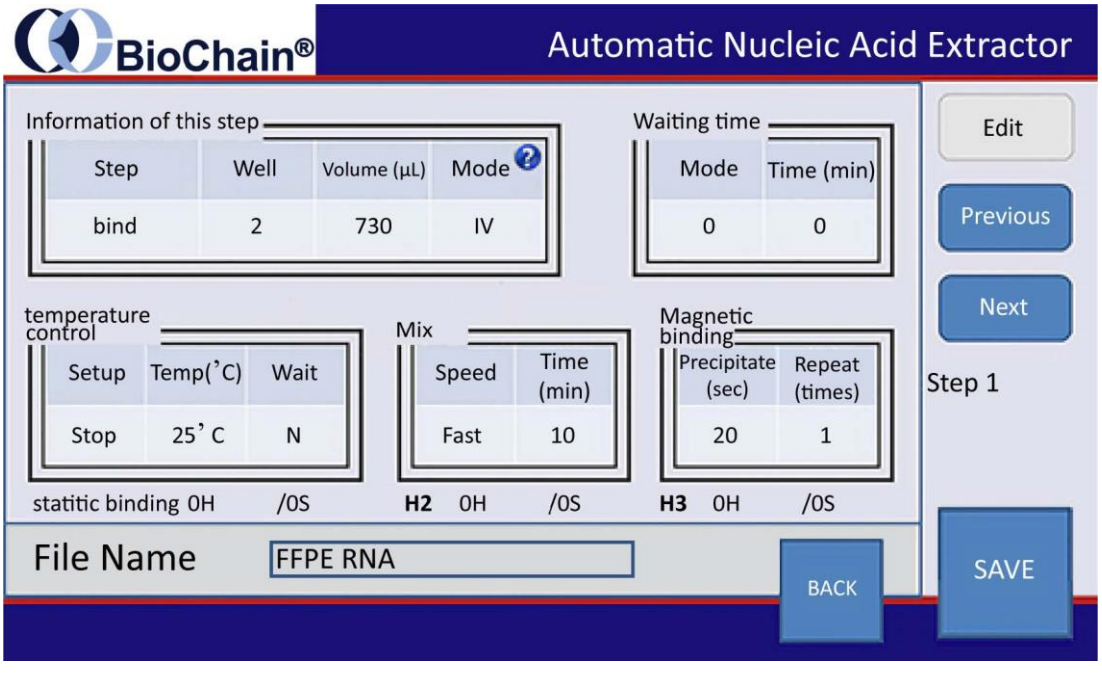
3. Touch the name of the desired template to see the screen showing an overview of the steps associated with the program.



Step	Postition	Annotation	Waiting	Temp. control	Temp. setting	Mixing speed	Mixing time	Precipitate
1	2	bind	0	Stop	25' C	Fast	10	20
2	1	dnase	0	Stop	37' C	Fast	10	20
3	3	w1	0	Stop	0' C	Fast	2	20
4	4	w2	0	Stop	0' C	Fast	2	20
5	5	w2-2	0	Stop	0' C	Fast	2	20
6	6	elute	0	Elute	60' C	Fast	10	30
7	2	end	0	Stop	0' C	Stop	0	1
8	1	No OP	0	Stop	0' C	Stop	0	1



4. Touch the "Edit" button to enter the user-defined parameter display interface.



In this screen all of the parameters for a particular step in the program may be configured, as follows:

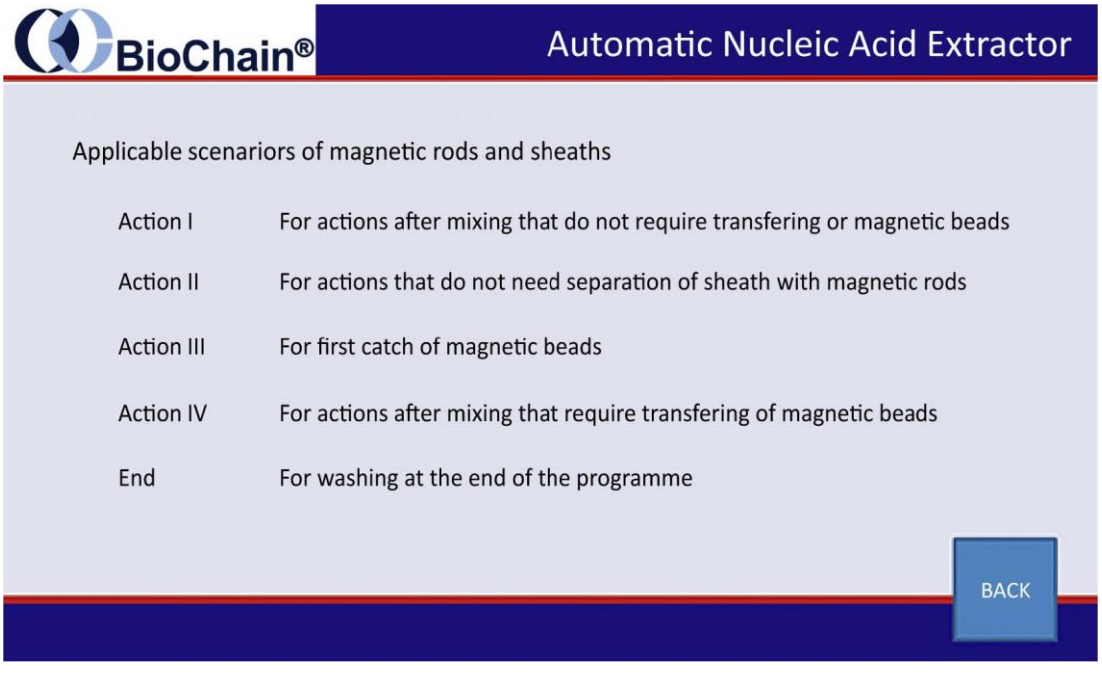
Information of this step

Step – the name of the current step

Well – column position of the plate the step will be executed on (from 1-6)

Volume (µl) – total volume of solution in the well (in µl)

Mode – tells the program how to handle the beads upon completion of this step (touch the question mark on the screen to display the specific description of the mode, and select "Back" to return to the user-defined parameter interface)



Waiting time

Mode – the working mode of the waiting time (should be left at 0)

Time (min) – time in minutes the instrument should wait before initiating this step (can be used for bead drying steps)

Temperature control

Setup – select from Lysis, Elute, Cooling, to activate the heating function and Stop if no heating is Required

Temp (°C) – temperature setpoint (in °C) of this step

Wait – determines whether the instrument should pre-heat to temperature setpoint before initiating this step

Magnetic binding

Precipitate (sec) – time in seconds at the end of the step that the beads should be allowed to collect on the magnetic rod
Repeat (times) – number of times the previous Precipitate step should be repeated before moving to the next step of the program

File name

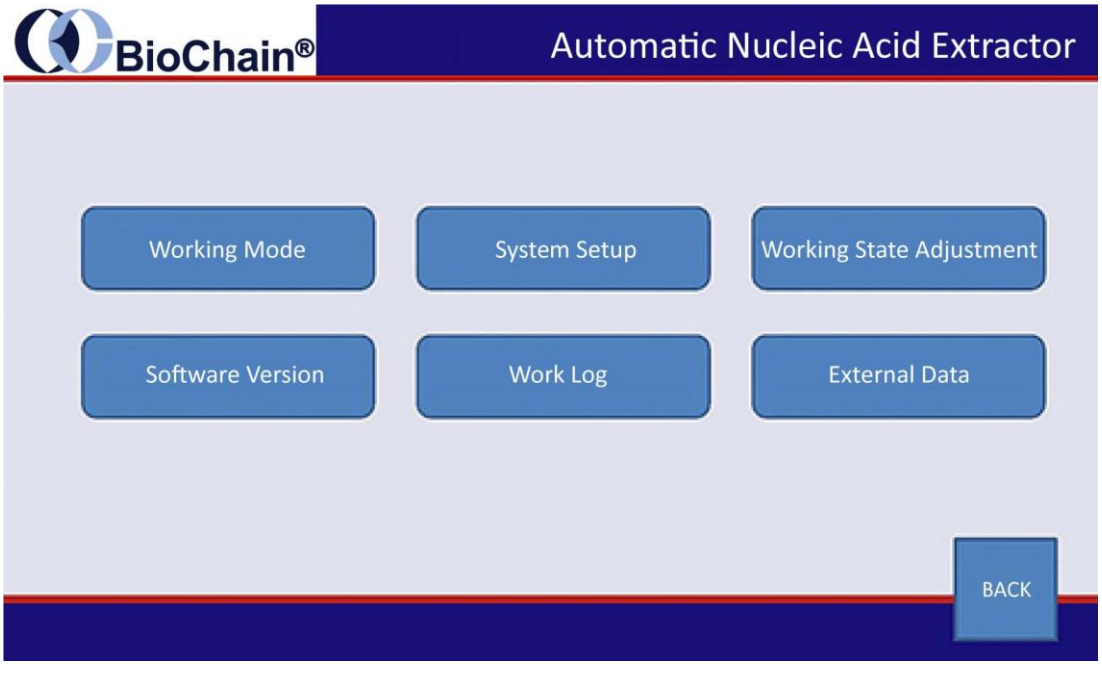
Touch the text box to bring up an on-screen keypad which may be used to name the program

5. Select “Next” to edit the next step(s) of the program as needed.

6. Select “Save “ to save the edited experiment and return to the user-defined parameter display interface.

2.6 System Settings

1. Select “System configuration” on the main menu to enter the system parameters screen.



A brief description of each option on this screen follows:

Working Mode

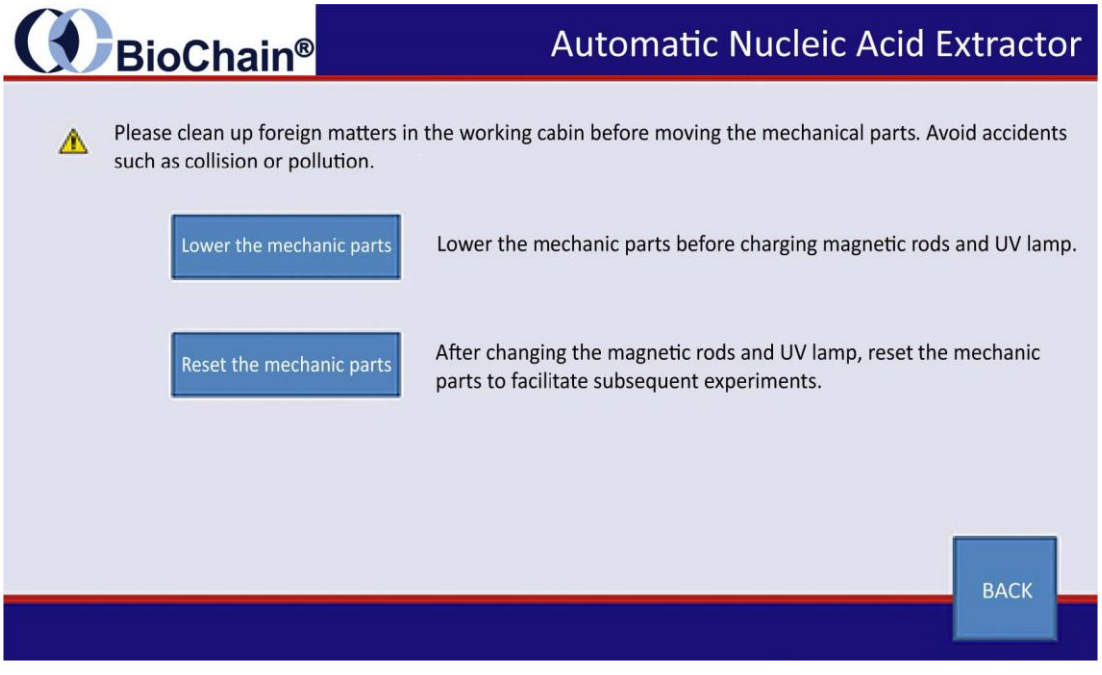
This screen shows the current mechanical configuration of the instrument. It should not be changed from mode E.

System Setup

This button is password-protected since the options within are meant for troubleshooting purposes and should only be operated by BioChain Technical Support.

Working State Adjustment

This screen allows for the ultraviolet lamp and magnetic needle to be replaced. Click “Lower the mechanic parts” to lower the magnetic rods prior to changing them or replacing the UV lamp. After completion, click “Reset the mechanic parts” to return them to their home position.

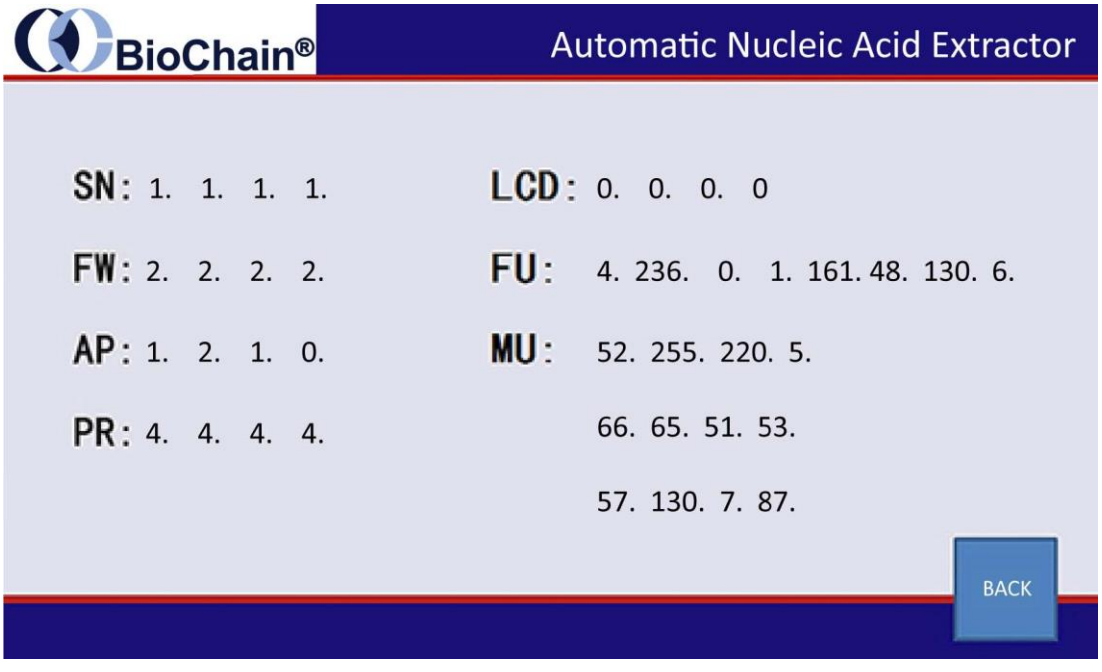


Note:

Please take care to avoid the UV lamp when replacing the magnetic rods. Too much force may damage the lamp and/or cause injury. Please contact BioChain Technical Support for additional assistance on replacing these parts.

System Setup

This button is password-protected since the options within are meant for troubleshooting purposes and should only be operated by BioChain Technical Support.

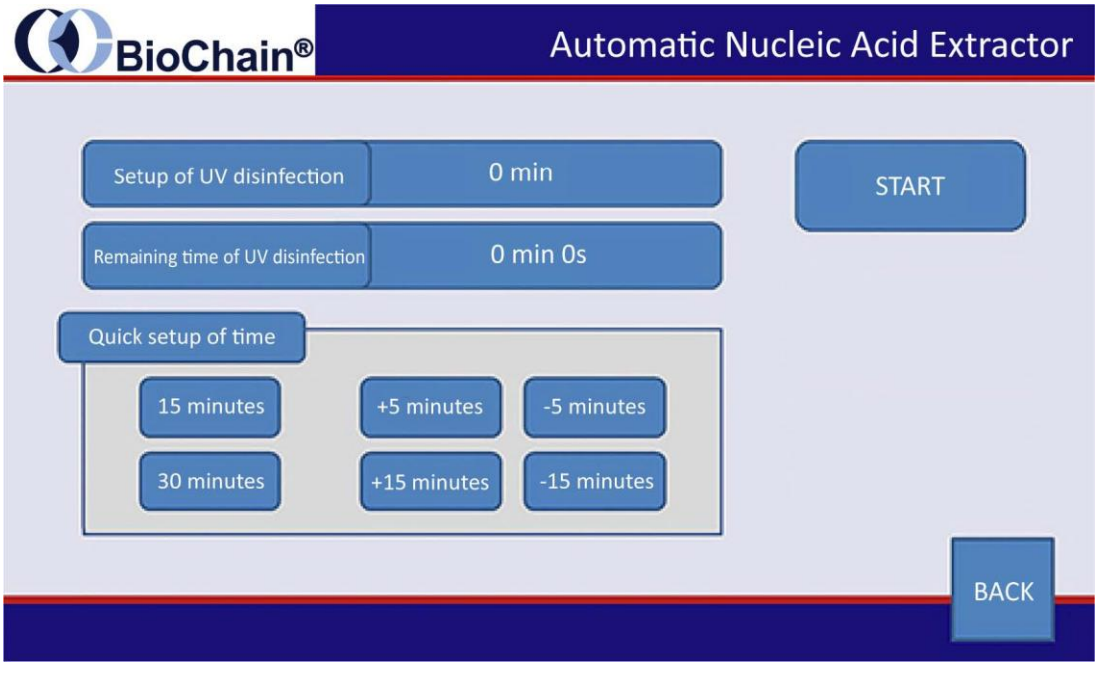


Work Log

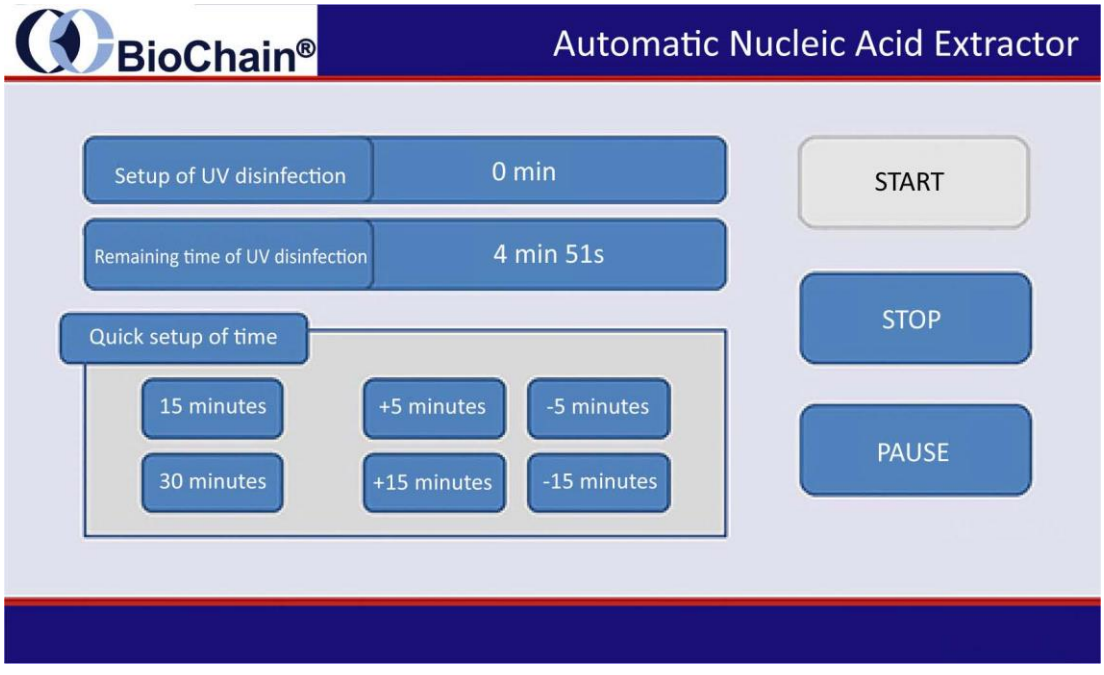
Select “Work Log” to see the most recent programs that were run on this instrument.

2.7 Ultraviolet Light Operation

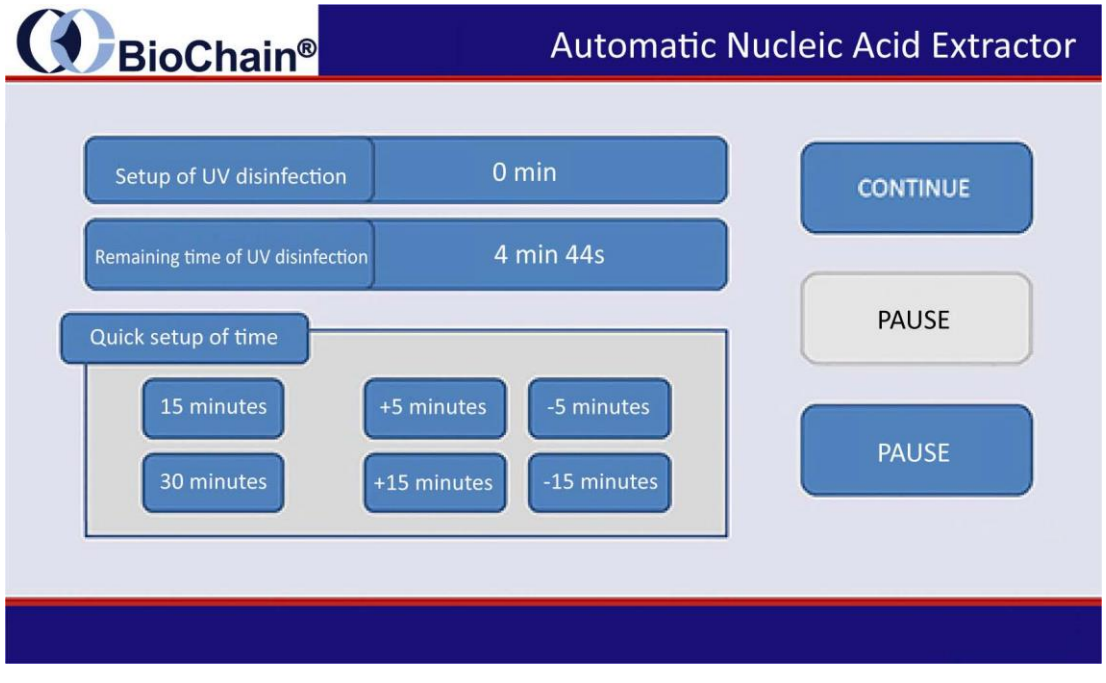
1. Click “UV disinfection” to enter the UV lamp operation page.



2. In the “Quick setup of time” box, select the desired ultraviolet disinfection time.
3. The set time of UV disinfection will be seen in the top box depending on the time selected.
4. The remaining time will also be displayed below the set time.
5. Click “Start” to turn on the UV light. The remaining time will begin to count down.



6. Click “Pause” to turn off the ultraviolet lamp and temporarily pause the UV light treatment. The countdown timer will also pause. Click “Start” to resume.



7. Click “Stop” to turn off the ultraviolet lamp and stop the timing.

8. Click “Back” to return to the main page.

CAUTION:

• The transparent front door has the function of filtering ultraviolet light. However, please take care to not look directly at the ultraviolet light!

3.0 Cleaning & Maintaining the AnaPrep 48

- During each extraction experiment, there may be a small amount of aerosol generated within the instrument chamber. Please wear appropriate personal protective equipment while operating and cleaning the instrument

- After each extraction experiment, clean the experimental cabin by wiping down surfaces with 75% ethanol and then turn on the UV lamp for 30 minutes

- Clean the instrument surface regularly by removing dust gently with a dry, soft cloth. If the outside of the AnaPrep 48 is heavily soiled, or if any sample that may cause infection is adhering to the outside of the system, wipe with a soft paper tissue soaked with 75% ethanol

- Avoid using strong alkali and/or organic solvents when cleaning the AnaPrep 48

- Always ensure adequate ventilation around the instrument when using it

- Keep the experimental cabin relatively dry and free from water stains

- Please don’t use the instrument when the voltage is unstable (e.g. too high or too low)

4.0 Troubleshooting

Instrument Problems

Problem	Cause	Solution
• No power (the Touch Screen remains blank when the power is turned on)	• AC power cord is not connected	• Check AC power cord connections at both ends. Or use the correct cords
•The instrument makes abnormal noises	• Instrument is not balanced • Plastic consumable not positioned properly • Technical problem	• Check whether all the feet of the instrument are in contact with the workbench • Check whether the tip combs and/or deep well plates are positioned properly. Adjust if necessary • Contact your local representative or agent
• The temperature does not increase at the required steps	• Incorrect program setting • Technical problem	• Check program settings and see whether the correct temperature was set for the step of interest. Also ensure that the Temperature Control button is NOT set to Stop • Contact your local representative or agent
• The magnetic rod is dirty	• Tip comb was forgotten during extraction	• Use clean cotton cloth or absorbent cotton to dip in water and wipe rods carefully - do not use organic solvents to clean the rod Remember to place the tip comb in the holder before beginning each extraction

DNA Quality Problems

Problem	Cause	Solution
Low DNA/RNA yield	• Incomplete lysis	• Decrease the amount of starting material used • Be sure to add Proteinase K during lysis, if included in the protocol
	• Poor quality of starting material	• Be sure to process the sample immediately after collection or store the sample at the appropriate temperature. The yield and the quality of DNA isolated depend on the starting material
	• Insufficient amount of magnetic beads added	• Magnetic beads should be vortexed immediately before adding to the plates
No DNA/RNA recovered	• Magnetic beads stored or handled improperly	• Store the beads at room temperature • Make sure that the beads are in solution at all times and do not dry. Dried beads are non-functional
	• Incorrect program settings	• Ensure that the default settings for each program are not changed. The settings can always be compared against those in the user manual for each extraction kit
Eluate containing DNA/RNA is discolored	• Magnetic beads present in the eluate	• Remove any magnetic beads using a magnetic separator or centrifuge the sample in a microcentrifuge for 1 minute at maximum speed
	• DNA contaminated with heme	• Minimize the amount of blood or blood stained sample used
DNA/RNA is sheared or degraded	• Purified DNA/RNA was repeatedly frozen and thawed	• Aliquot purified DNA and store at 4°C (short- term) or -20°C (long-term). Aliquot purified RNA and store at -80°C (long-term). Avoid repeated freezing and thawing.
	• DNA contaminated with DNases	• Maintain a sterile environment while working (i.e., wear gloves and use DNase-free reagents).
	• RNA contaminated with RNases	• Special care should be taken to avoid RNase contamination. Maintain a sterile environment while working (i.e., wear gloves and use RNase-free reagents). Labware and benchtop surfaces may also be treated with RNase-removal reagent (e.g. RNase AWAY) prior to extracting RNA

5.0 Specifications

Model	AnaPrep 48
Instrument Type:	Benchtop automated nucleic acid extractor
Sample Processing:	1 to 48 samples per batch
Sample Volume Handling:	20 – 200 µL
Processing Time:	See purification kit manual for details
Heat Strip Temperature:	60 °C to 70 °C (assuming the room temperature of ~25 °C)
Protocol Input:	Touch Panel
Sterilization/Disinfection Features:	Ultraviolet irradiation
Instrument Dimensions:	58 cm x 42 cm x 53 cm
Weight:	25 kg
Input Power:	AC 220V±22V, 50Hz±1Hz
Operating Temperature:	10-30 °C
Operating Humidity:	≤75 %
Atmospheric Pressure Range:	86.0 – 106.0 kPa

6.0 Warranty

Limited Warranty

BioChain warrants that each product described herein will be free from defects in materials and workman-ship for a period of 1 year from the date of delivery. BioChain agrees, as its sole responsibility under this limited warranty, and upon prompt notice of a defect, to repair or replace any product discovered to be defective within the warranty period.

Expendable items are not covered by this warranty. Warranty service may be obtained by contacting BioChain at the address stated in this book.

This limited warranty is not applicable to:
(1) normal wear and tear
(2) abuse, unreasonable use, improper installation, mistreatment, or neglect
(3) damage caused by the equipment or system with which the product is used
(4) damage caused by modification or repair not made or authorized by BioChain
(5) Mishandling by logistics company; or
(6) theft, vandalism, fire, water, or other peril.
Product may not be returned without proper authorization by BioChain.

Cost of transportation, removal, or reinstallation of the equipment will be paid by the purchaser. This warranty and the remedies set forth herein are exclusive and in lieu of all other express or implied (including any implied warranties of merchantability or fitness for a particular purpose), and no other representations or claims shall be binding on or obligate BioChain in any way. In no event will BioChain be liable for any special, incidental, or consequential damages resulting from use or malfunction of this product or the equipment or system with which it is used, loss of revenue, or cost of replacement goods. Some States do not allow limitations on the period of time an implied warranty lasts and/or the exclusion of limitation of special, incidental, or consequential damages, so the above limitations and/ or exclusions or limitation of liability may not apply to you. This warranty gives you specific legal rights, and you may have rights which vary from state to state.

AnaPrep 48

Instruction Manual

Nucleic Acid Extraction and Purification Instrument

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