

ALLSHENG

Automatic Nucleic Acid Purification System



Auto-Pure 2400 / 2400M

Auto-Pure 4800

HANGZHOU ALLSHENG INSTRUMENTS CO., LTD.



Auto-Pure 4800

Automatic Nucleic Acid Purification System

Auto-Pure series is a high-throughput automatic nucleic acid extraction equipment, based on the magnetic bead method to extract nucleic acid. The steps of pipetting, lysis, washing, elution and PCR system construction can be automatically completed in the workstation, one-stop operation without manual intervention. It can extract 48×1 mL (4800) or 24×10 mL (2400 / 2400M) sample system at the same time. Compared with manual extraction, it is more efficient and convenient. At the same time, the standardized and automated operation steps avoid human error, and the experimental results are more reliable and repeatable.

2400M includes a temperature change module with no cross-contamination. With the corresponding software, it can automate the entire process of methylation transfer, simplifying complicated experiments. In addition, the full-coverage UV sterilization system and negative pressure filter system effectively prevent cross-contamination. As an efficient intelligent workstation, Auto-Pure series can bring you a better product experience.

Instrument Function

- ◆ Auto-Pure 4800 / 2400: automated extraction + PCR setup



- ◆ Auto-Pure 2400M: automated extraction + methylation transfer + PCR setup



Note: In addition to meeting the needs of automated nucleic acid extraction as 4800 / 2400, 2400M can also automate the methylation transfer process. 4800 sample maximum reaction system 1 mL; 2400 / 2400M sample maximum reaction system 10 mL. This step of "quality control" is completed using the supporting instrument - Fluo-200 / 800 fluorometer.

Auto-Pure 2400 / 2400M**5 / 10 mL system automatic extraction & methylation transfer whole process**

PCR Reagent Area (2400)

Temperature control area for methylation (2400M)

Note: The overall layout of 2400M is basically the same as that of 2400, but some modules have been adjusted to meet the special needs in the methylation.

1 Samples Area

24-throughput test tube rack can place different consumables such as sampling tubes, test tubes, centrifuge tubes, etc. And it is equipped with a barcode scanner. The sample barcode of each test tube is automatically scanned during sample rack loading.

2 Reagents Area

2400 extraction and purification reagent modules include:
100 mL reagent positions
7 mL centrifuge tube positions
1.5 mL / 2 mL centrifuge tube positions

3 Tips Area

3.1 The large-volume tip area can transfer up to 5000 μL of liquid per run, especially suitable for the transfer of large volume samples and large-volume component liquids

3.2 3.3 The regular volume tip area, consisting of $1 \times 1000 \mu\text{L}$ and $1 \times 200 \mu\text{L}$ tip rack, can be used for liquid dispensing and transfer of regular components.

4 PCR Reagent Area (Auto-Pure 2400)

Room temperature PCR reagent rack, used to place PCR reagents, optional refrigeration module.

Temperature Control Area (Auto-Pure 2400M)

Multi-stage automatic temperature change can be realized to meet the needs of methylation.

5 Waste Area

Used tips will be disposed into the waste container. The waste container can intelligently calculate whether the tips are full, and it is automatically reminded the user to clean up in time when the tips are full.

6 Vortex Magnetic-beads

Specially designed for magnetic beads, the vortexing is stable which improves the efficiency of the experiment.

7 PCR Setup Area

It is used for PCR system setup, and can place consumables such as PCR tubes. 2400 can setup 4 detection item systems, and 2400M can setup 2 detection item systems at the same time.

8 Nucleic Acid Extraction Area

It adopts reagent strip design, built-in heating block, can extract 1-24 samples, and the maximum reaction system is 10 mL. Elution well 2 mL centrifuge tube design, the elution product can be used directly for subsequent experiments.

9 Pipetting Arm

Two-channel pipetting arm, $1 \times (50 - 5000 \mu\text{L})$, suitable for 1 mL / 5 mL pipettors, $1 \times (1 - 200 \mu\text{L})$, suitable for 200 μL pipettors. Integrated air pressure detection, sensitive detection of liquid level, residual volume, blockage, etc.

Features

Large volume extraction to meet special needs

- The maximum reaction system of the sample library is 5 / 10 mL, which can meet the needs of cfDNA extraction
- The elution hole is eluted in a small volume to meet the nucleic acid concentration requirements



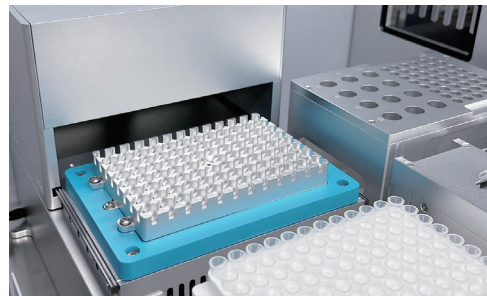
High-precision liquid handling

- Dual-channel pipetting design, 1×(50 - 5000 µL), suitable for 1 mL / 5 mL pipettor and 1×(1 - 200 µL), suitable for 200 µL pipettor
- The pipettor's pressure detection technology can not only detect the height of the liquid level, but also empty suction, residual liquid volume and blockage detection
- Detailed pipetting parameter settings for different liquids can effectively improve the accuracy



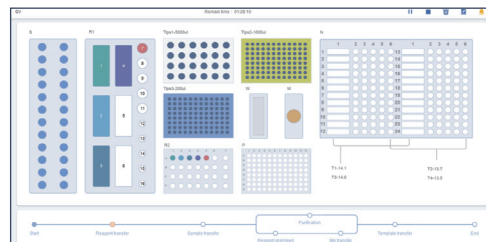
Methylation transfer special functional modules

- Module temperature control range 4 °C ~ 105 °C
- In order to meet the methylation requirements, 2400M adds a temperature control module to realize multi-stage temperature change
- Thermo lid design can prevent reagent condensation from affecting the reagent concentration in the tube, and has the technology to prevent cross-contamination



Easy-to-learn operating software

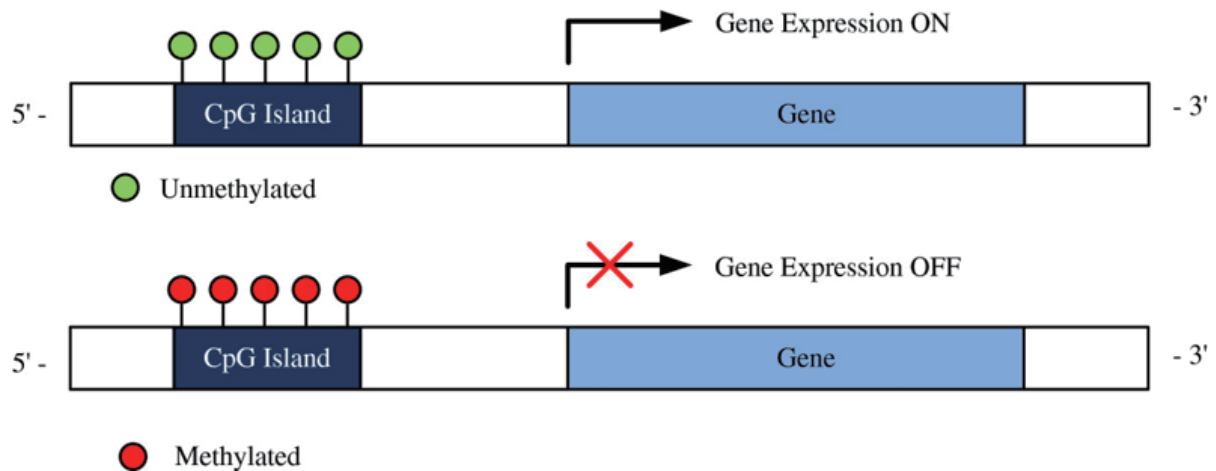
- Graphical user interface, program editing can be completed without complicated operations
- Built-in comprehensive libraries of consumable carriers, and liquids to reduce customer program matching time
- Users can simply select according to their needs to complete the whole process of liquid handling, extraction, and PCR / qPCR setup



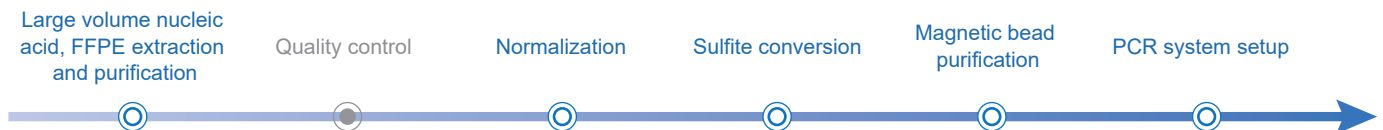
2400M Special Application

Methylation detection-sample pre-processing

DNA methylation is an important epigenetic modification that plays an important role in growth and development, environmental response and disease occurrence, especially tumorigenesis. In general, hypermethylated DNA binds tightly to histones and can recruit transcriptional repressors and inhibit the binding of transcriptional activators to promoter regions, thereby achieving the purpose of inhibiting gene expression. The hypomethylation of DNA loosens the chromosomal structure and promotes the binding of transcription activators and RNA polymerase to target sequences, thereby driving the high expression of related genes. Therefore, in the field of early tumor screening, methylation detection has been widely used.



2400M large volume extraction with special functional modules and software design meet the requirements of methylation detection sample pre-processing experiments, realize the automation of the overall process, effectively reduce labor time and improve the stability of experimental results. The process shown in the figure below can be completed within 2400M except for "quality control":

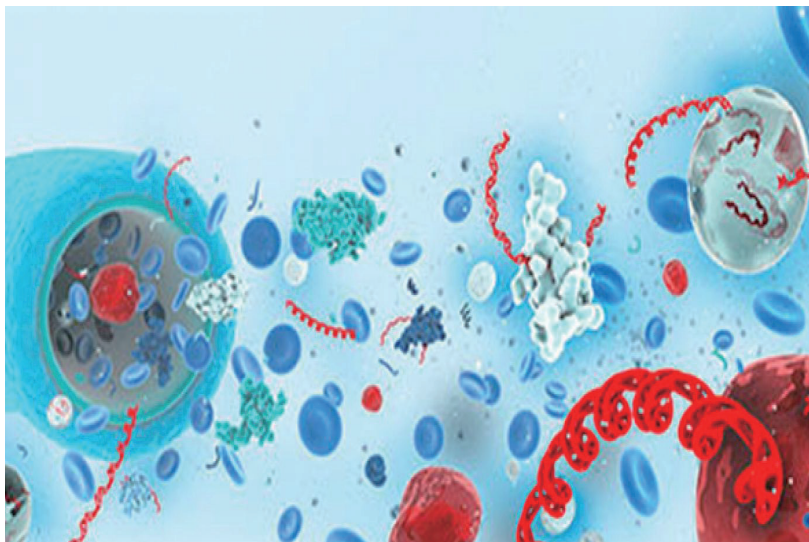


Compatible instrument: Fluo-200 / 800 fluorometer

- Fluo-200 can detect 1 sample per run, Fluo-800 can detect 8 samples per run
- Accurately quantify nucleic acid concentration by fluorescence method, with a minimum detection concentration of 0.1 pg/ul (dsDNA)
- Open design, you can use the built-in standard test kit of our company to test samples, and can also apply other brand test kits, and test samples by creating a new standard test
- Normalization calculator function to easily normalize desired mass, concentration or molarity, which replaces spreadsheet calculations for standard normalization during the homogenization process



Application - cfDNA Extraction

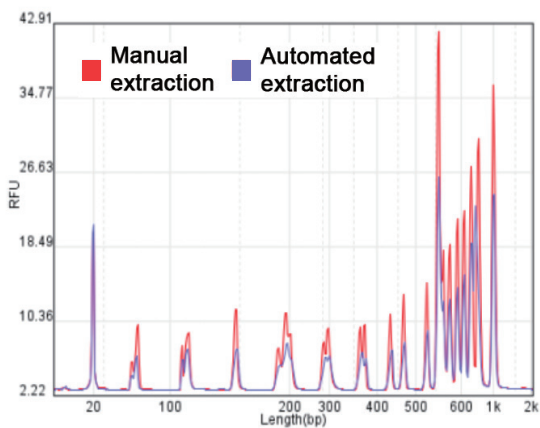


Cell free DNA (cfDNA) in blood refers to the partially degraded endogenous DNA in the peripheral blood that is free from cells. The most widely used researches mainly include cell free fetal DNA (cffDNA) and cell free tumor DNA (ctDNA), which are found in pregnant women and cancer patients respectively. cfDNA is a complex mixture of nucleic acids from benign cells, white blood cells and pathogens, of which cffDNA or ctDNA is only a small fraction. Studies have shown that the level of cell free tumor DNA (ctDNA) in tumor patients is not only significantly higher than that of normal people, but also ctDNA has the same gene mutation type as the DNA of tumor tissue cells. The tumor cell DNA gene can be used as a new generation of non-invasive tumor detection landmark.

1. DNA Ladder Automatic Extraction Effect

In the process of cfDNA extraction, the sample volume is often large, and the overall processing volume is the largest or even close to 10 mL, while the maximum sample processing volume of common nucleic acid extractors in the market is only 1 mL, which makes the automatic cfDNA extraction restricted.

Allsheng Auto-Pure 2400 makes it possible to automate large-volume nucleic acid extraction with special mixing methods and consumables. The experiment first tested the collection efficiency of DNA Ladder by automated extraction. The results showed that Auto-Pure 2400 combined with Allsheng® reagents can achieve more than 90% of the manual extraction efficiency, and the fragment distribution of the two is highly consistent.

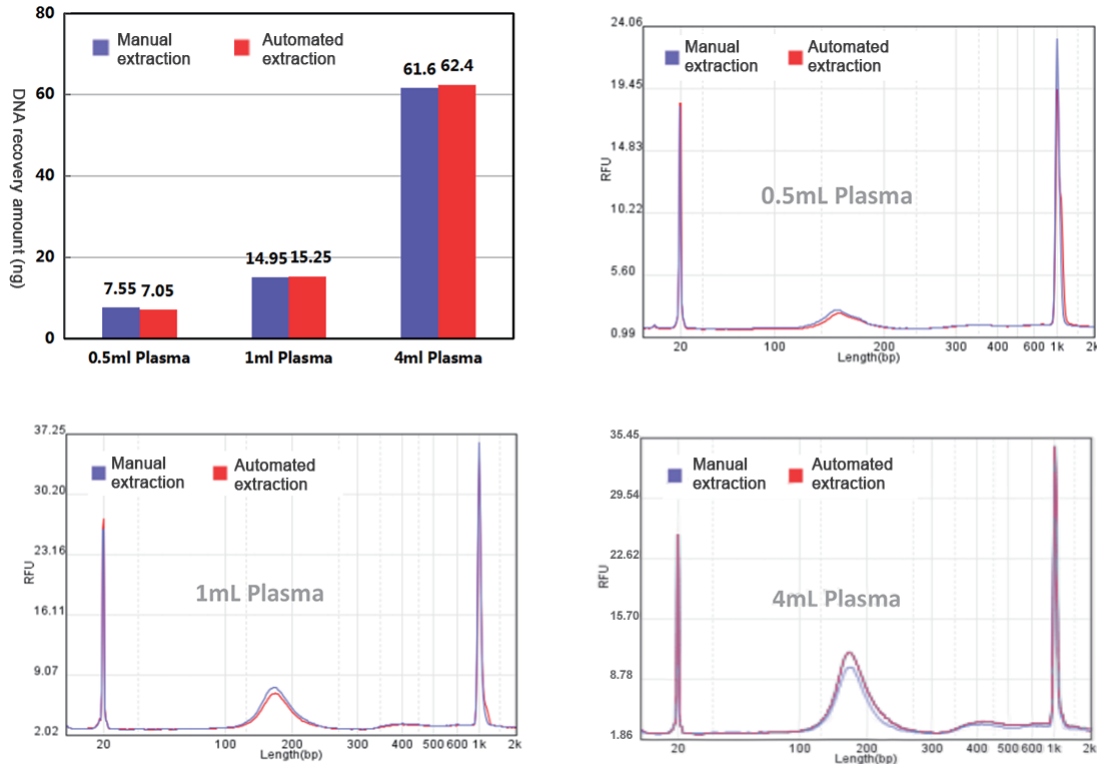


Manual extraction and automated extraction of cfDNA fragment analysis results

Fragment analysis of 1 μL of manually extracted sample and 1 μL of automatically extracted sample showed that the fragment distributions of the two were highly consistent, and the collection efficiency was over 90% according to the quantitative results of Fluo-100 fluorometer.

2. The Automatic Extraction Effect of Plasma from Tumor Patients

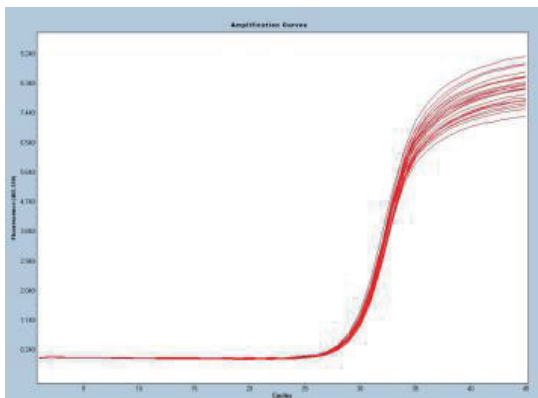
Compared with the combination of DNA Ladder and newborn bovine serum, the plasma environment of tumor patients is more complicated. In the manual method, the sample needs to undergo high-temperature lysis and other processes, while the automatic method adopts the method of directly mixing reagents such as lysis solution, magnetic beads, and binding solution with the sample and then running on the machine. In order to verify the extraction efficiency of this method for actual samples, 0.5 mL, 1 mL, and 4 mL of tumor patient plasma were taken for cfDNA extraction, and compared with the results of the same sample and manual extraction. The results showed that there was no significant difference in the yields of the two extraction methods under the three volumes, indicating that the automation of the reagents was well matched and met the needs of normal sample extraction.



0.5 mL, 1 mL, and 4 mL of tumor patient plasma were extracted using manual method and automated instruments respectively, with 50 μ L elution volume. The results showed that there was no significant difference between the manual method and the automatic method in terms of concentration or fragment size.

3. PCR System Effect

In order to test the accuracy and stability of Auto-Pure 2400 in the process of PCR system, 24 identical PCR reaction solutions were set up using the instrument and subjected to fluorescence quantitative test. The overall PCR system is 20 μ L, of which the sample volume is 3 μ L. The experimental results show that the difference between the maximum and minimum CT values of the 24 samples is 0.8, which meets the needs of daily use and is consistent with the manually constructed CT values.

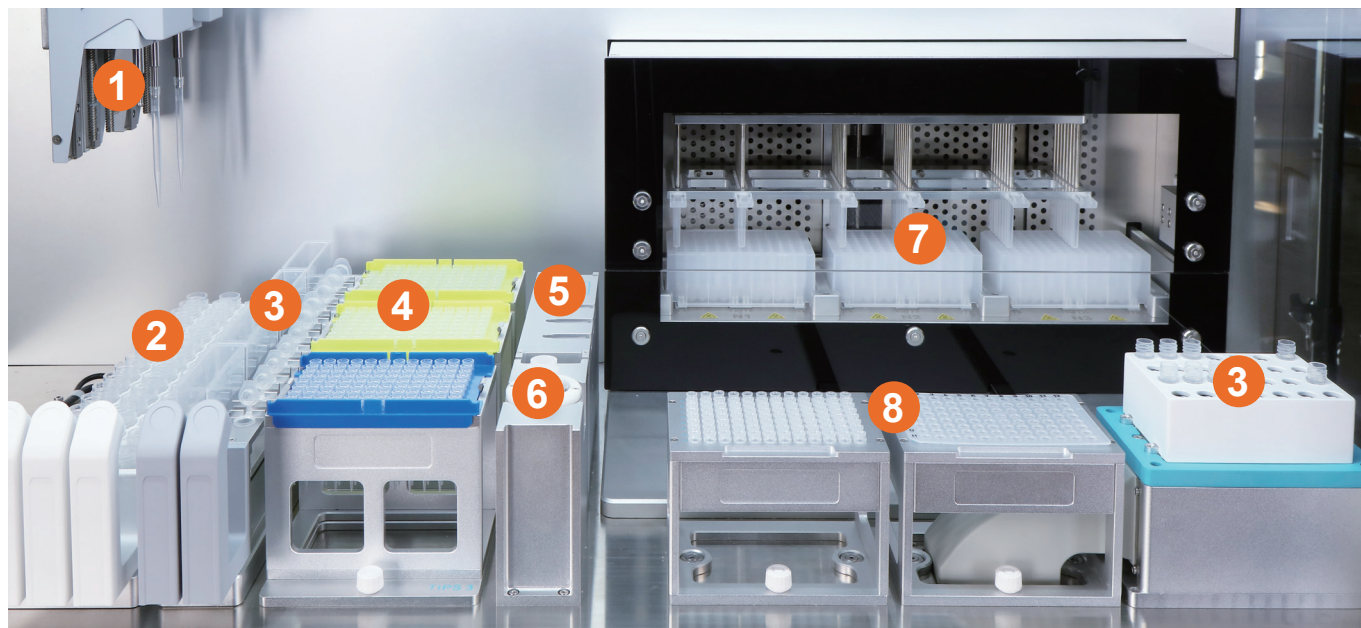


Auto-Pure 2400 System Setup Result

The difference between the maximum and minimum CT values of the 24 samples is 0.8, which meets the needs of daily use and is consistent with the manually constructed CT values.

Auto-Pure 4800

1 mL system automatic extraction

**1 Pipetting Arm**

3-channel pipetting arm, 2×1000 μ L pipettors, 1×200 μ L pipettor. Air displacement pipettor can realize non-equidistant sample addition, and integrated air pressure detection can sensitively detect liquid level, residual liquid volume and blockage, and ensure accurate pipetting.

2 Samples Area

The 48 test tube rack can hold different consumables such as sample tubes, test tubes and centrifuge tubes. And it is equipped with a barcode scanner. The sample barcode of each test tube is automatically scanned during sample rack loading.

3 Reagents Area

Two areas: nucleic acid extraction reagent and PCR reagents. The sufficient number of wells can meet the storage requirements of reagents in the extraction and PCR system setup process, and supports customization.

4 Tips Area

2×1000 μ L and 1×200 μ L tip racks, using Allsheng tips or other brands compatible tips with this instrument.

5 Waste Area

Used tips will be disposed into the waste container. The waste container can intelligently calculate whether the tips are full, and it is automatically reminded the user to clean up in time when the tips are full. It can be equipped with an instrument cabinet to increase the storage space.

6 Vortex Magnetic-beads

Specially designed for magnetic beads, the vortexing is stable which improves the efficiency of the experiment.

7 Nucleic Acid Extraction Area

Position 3 for 96 deep-well plates that can extract 48 samples at the same time. Built-in heating incubator temp. range up to 120 $^{\circ}$ C, which can process the sample lysis and nucleic acid elution.

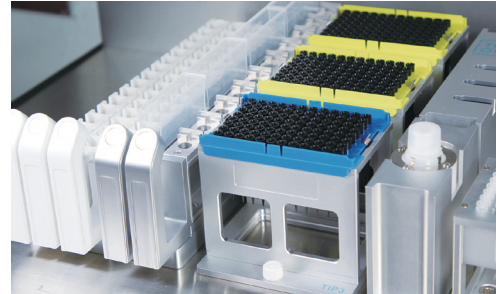
8 PCR Setup Area**Auto-Pure 4800**

2 x 96 PCR plates or 24 x 8 strip PCR tubes.

Features

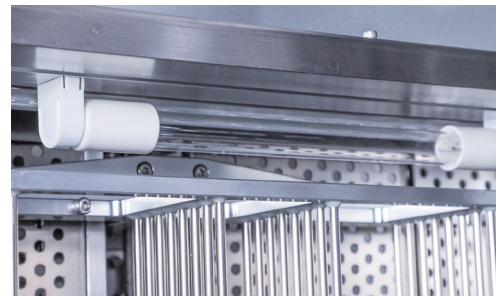
Fast & flexible experiment

- Time for the extraction: 48 samples - 15 ~ 30 min (depending on different reagents)
Time for the pipette sample: 48 samples - 13 min
Time for PCR setup: 48 samples - 10 min
- Bottled or prefilled reagents can be selected for extraction according to actual needs
- Modular design of the work-table. And it can be customized for the layout of different forms



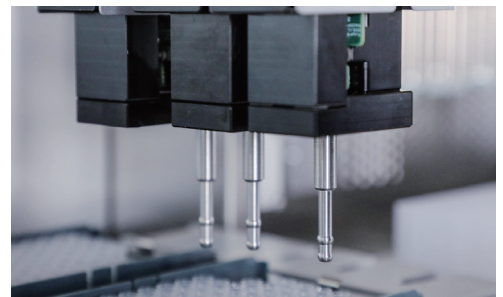
Effective cross-contamination prevention

- Air displacement pipetting principle to avoid liquid contamination
- Anti-hanging drop technology to avoid dropping contamination
- Negative pressure filter system to prevent aerosol contamination
- Full coverage UV sterilization, exhaustive to clean the worktable



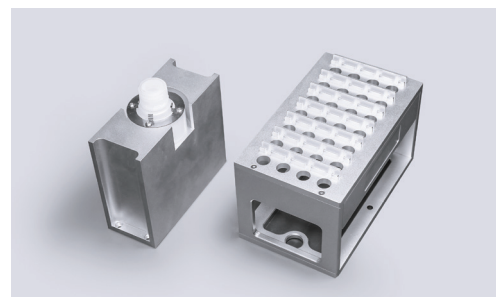
High-precision liquid handling

- 1+2 pipettors combination can meet various needs of sample, extraction reagent and PCR reagent
- The pipettor's pressure detection technology can not only detect the height of the liquid level, but also empty suction, residual liquid volume and blockage detection
- Detailed pipetting parameter settings for different liquids can effectively improve the accuracy



Vortex magnetic beads and PCR reagent block

- Specially designed for magnetic beads, the vortex is stable which improves the efficiency of the experiment
- The PCR reagent block can be customized according to customer needs

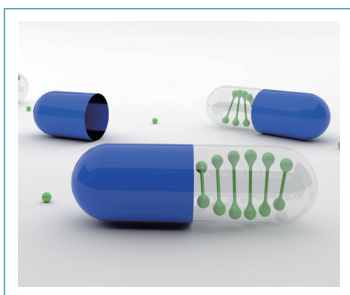


Easy-to-learn operating software

- Graphical user interface, program editing can be completed without complicated operations
- Built-in comprehensive libraries of consumable carriers, and liquids to reduce customer program matching time
- Users can simply select according to their needs to complete the whole process of liquid handling, extraction, and PCR / qPCR setup



Application



– Viral Nucleic Acid Detection

4800 realizes the unattended automatic extraction of the whole process from the original tube loading, viral nucleic acid extraction to PCR system setup. It can extract 48×1 mL samples at one time and setup PCR system. The whole process is closed in the instrument with a negative pressure filter system. Full coverage UV sterilization after the experiment prevents cross-contamination of samples and environmental pollution, and protects experimenters from the risk of infection, truly achieving large-scale, efficient, convenient and safe.

– Detection of DNA Residues in Host Cells of Biological Products

WHO, FDA, EU and Chinese drug regulatory agencies all have limited requirements for host cell-derived protein and DNA residues in biological products. Biological products, such as recombinant protein drugs, antibody drugs, vaccines and other products, are expressed and produced by serially passaged cell lines. Although they have undergone strict purification processes, there may still be residual DNA fragments of host cells in the products, posing safety risks.

4800 is very suitable for automatic detection of DNA residues in biological products, eliminating the need for manual experimental operations. Standardized and automated operation steps can avoid human errors, the experimental results are more reliable and repeatable .

Application Field	Applicable Sample
Clinical molecular diagnostics	Swab
Blood screening	Serum, plasma, whole blood
Health and epidemic prevention	Soil or environmental microorganisms
Animal husbandry and veterinary medicine	Animal and plant tissues
Food safety	Microorganism / cell culture fluid
Criminal detection	PCR / enzyme reaction substrate
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Specification

Model	Auto-Pure 2400	Auto-Pure 2400M	Auto-Pure 4800
Function	Automatic pipette samples / reagents, extract nucleic acid and setup PCR systems		Automatic pipette samples, extract nucleic acid and setup PCR systems
Information management	Support external USB scanner, barcode scanning function, automatic scanning function		
Pipetting principle	Air displacement pipetting technology		
Pipettor	One 5000 μ L pipettor and one 200 μ L pipettor		Two 1000 μ L pipettors and one 200 μ L pipettor
Pipetting range (μ L)	1 - 5000 μ L		1 - 1000 μ L
Tips	Allsheng tips, and other tips compatible with this instrument		
Liquid detection	Pressure detection: liquid level detection, tip clogging detection and residual liquid detection		
Samples per run	1 - 24		1 - 48
Process volume	50 - 10000 μ L		50 - 1000 μ L
Extraction uniformity	CV \leq 5 %		
Single sample consumables	Support		
Heating temperature	Elution and lysis temperature control: RT. \sim 120 $^{\circ}$ C		
Cooling module	--		0 $^{\circ}$ C \sim 105 $^{\circ}$ C (optional)
Temperature control module	--	4 $^{\circ}$ C \sim 105 $^{\circ}$ C	--
UV sterilization	Separate UV lamp: extraction area, pipetting area and waste container area		
Fan filter	Equipped with three HEPA filters		
Instrument port	USB port		
Power supply	220 V, 8 A, 50 / 60 Hz		
Power	Standby 30 W, maximum 600 W		Standby 30 W, maximum 550 W
Noise	\leq 60 dB		
Net weight	130 kg		

Pipetting Accuracy

Model	Auto-Pure 2400 / 2400M		Auto-Pure 4800	
Pipettor	200 μ L	5000 μ L	200 μ L	1000 μ L
Pipetting range	1 - 200 μ L	50 - 5000 μ L	1 - 200 μ L	5 - 1000 μ L
Accuracy (A)	1 μ L: \pm 12 % 20 μ L: \pm 3 % 100 μ L: \pm 1 % 200 μ L: \pm 1 %	50 μ L: \pm 6 % 500 μ L: \pm 5 % 2500 μ L: \pm 3 % 5000 μ L: \pm 3 %	1 μ L: \pm 12 % 20 μ L: \pm 3 % 100 μ L: \pm 1 % 200 μ L: \pm 1 %	5 μ L: \pm 5 % 100 μ L: \pm 2 % 500 μ L: \pm 1 % 1000 μ L: \pm 1 %
Precision (CV)	1 μ L: \leq 8 % 20 μ L: \leq 1.5 % 100 μ L: \leq 0.8 % 200 μ L: \leq 0.5 %	50 μ L: \leq 3 % 500 μ L: \leq 2 % 2500 μ L: \leq 2 % 5000 μ L: \leq 1 %	1 μ L: \leq 8 % 20 μ L: \leq 1.5 % 100 μ L: \leq 0.8 % 200 μ L: \leq 0.5 %	5 μ L: \leq 2.5 % 100 μ L: \leq 1.25 % 500 μ L: \leq 0.4 % 1000 μ L: \leq 0.4 %

Ordering Information

Code	Product name	Code	Reagent product name	Specification
AS-17200-00	Auto-Pure 2400	RS-HSCF0101	Nucleic acid extraction or purification reagents (1 mL)	10 T, 24 T, 50 T, 100 T
AS-17210-00	Auto-Pure 4800	RS-HSCF0102	Nucleic acid extraction or purification reagents (2 mL)	24 T, 50 T
AS-17220-00	Auto-Pure 2400M	RS-HSCF0104	Nucleic acid extraction or purification reagents (4 mL)	24 T, 50 T

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