

Automated NGS Library Preparation Workstation

——Series Products



HANGZHOU ALLSHENG INSTRUMENTS CO., LTD.

Auto-NGS Series

Automated NGS Library Preparation Workstation

Auto-NGS series automated NGS library preparation workstation is a pipetting workstation that can meet the needs of various throughputs and types of library preparation. The instrument is equipped with structures such as PCR block, temperature control block, mixing block, and magnetic plate, which can meet the needs of a series of conventional library preparation processes such as pipetting, mixing, amplification and purification. In addition, 100RF, 200 and 180S built-in fluorometers truly achieve convenient operation of sample-to-library, without manual intervention throughout the whole process.

INSTRUMENT FEATURE I



- The self-developed high-precision pipettor, supporting up to 24 samples for simultaneous pipetting;
- · A variety of liquid parameters setting ensure accurate control of liquid aspirating and dispensing
- PLLD / CLLD function can sensitively detect the liquid level, residual liquid and blockage, ensuring accurate control of the pipetting volume.



Full-featured

- · Multiple blocks, built-in PCR block, fluorometer, heating and mixing block, meeting various requirements for library preparation reagent kits, truly achieving sample-to-library;
- · The experimental platform can customize different blocks according to the actual needs of customers to meet various experimental solutions.



Easy to Use

- Drag-and-drop flows simplifies program setting;
- . GUI is easy to understand and edit:
- · Run detailed guidance to ensure stable program operation: new users can also guickly master the operation methods of library preparation.



- · Equipped with efficient purification and filter system (negative pressure HEPA system) and UV sterilization to prevent cross-contamination of the experimental cabin;
- · The PCR block can use disposable automatic cover or conventional sealing cover to avoid condensation on the top and eliminate cross-contamination.

I INSTRUMENT FUNCTION

Library Preparation

Fragmentation (Enzymatic Method)

Purification

End Repair + A-Tailing Adding

Adaptor Connection

Purification

PCR Amplification

Purification

Quantitation, Pooling

Concentration Determination

Normalization

Pooling

Hybrid Capture

Sample Concentration (Magnetic Bead Method)

Probe Hybridization Magnetic Bead Preparation

Magnetic Bead Capture

PCR Amplification

Purification

Note: Different models can achieve different functions

A Library Preparation Platform Dedicated to Meeting Different Needs

Throughput*

Library preparation type	Throughput
DNA library preparation	24
RNA library preparation	16
Targeted capture	1
Single cell sequencing	1

Throughput*

Library preparation type	Throughput
DNA library preparation	48
RNA library preparation	32
Targeted capture	16
Single cell sequencing	24

96 Throughput*

Library preparation type	Throughput
DNA library preparation	96
RNA library preparation	32
Targeted capture	16
Single cell sequencing	24

	Auto-NGS 100R	Auto-NGS 100RF	Auto-NGS 180S	Auto-NGS 200
Max sample throughput	24	24	48	96
Pipettor	8-channel	8-channel	24-channel	24-channel
Pipetting volume	1~200 μL	1~200 μL	1~200 μL	1~200 μL
Shaking block	-	-	✓	✓
Quality control block	-	✓	✓	✓
PCR block	✓	✓	✓	✓
Dimension (W×D×H)	799×767×775 mm	800×774×775 mm	980×793×830 mm	1420×790×800 mm





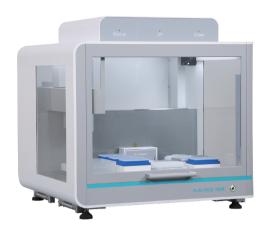




^{*}Library preparation only

Auto-NGS 100R

Allsheng basic automated NGS library preparation workstation can achieve all processes in the library preparation process except for quality control. Due to the instrument built-in high-performance PCR amplification block, it can complete the amplification process without interruption. Comprehensive functions, precise pipetting, and easy-to-use software help you achieve better library quality.



Intelligent & Visual

- Allow users to freely choose running part or all of the experimental processes;
- Program setting error reporting and prompt functions ensure that users can quickly find programming errors;
- TIP area prompts the experimental demand, current available amount and whether it is sufficient to ensure the smooth progress of the experiment;
- The PC simulation operation experiment function can enable users to find problems at any time and avoid wasting samples, reagents and time.

13 Flexible Matching Experiment Needs

- Multi-level account management system supports the different needs of new users and advanced users;
- Drag-and-drop flows simplifies program setting;
- · GUI is easy to understand and edit;
- New users can also quickly master the operation methods of library preparation.

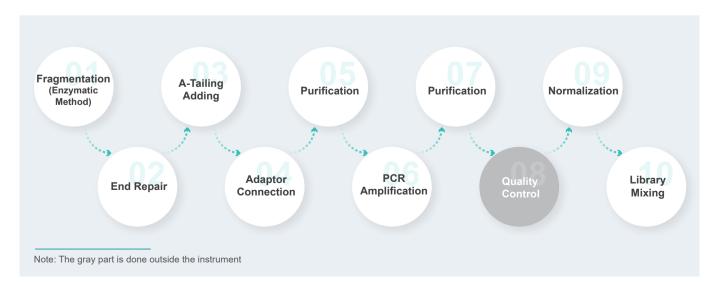
Precise Pipetting

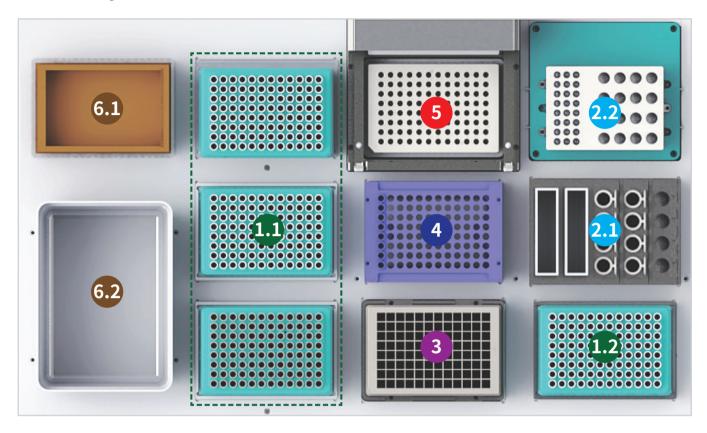
- The self-developed high-precision 8-channel pipettor can be used as a single channel;
- A variety of liquid parameters setting ensure accurate control of liquid aspirating and dispensing process;
- Capacitive and air pressure detection function can sensitively detect the liquid level, residual liquid and blockage, ensuring accurate control of the pipetting volume.

14 Efficient Pollution Prevention

- Equipped with efficient purification and filter system (negative pressure HEPA system) and UV sterilization to prevent cross-contamination of the experimental cabin;
- The PCR block in Auto-NGS 100R can use disposable automatic cover or conventional sealing cover to avoid condensation on the top and reduce the risk of cross-infection.

■ The experimental process that Auto-NGS 100R can achieve





1 Tip Area

- 1.1 200 μ L / 50 μ L TIP holders.
- 1.2 Two specifications of TIP can be combined into one plate for single channel pipetting.

Automatic loading tip mode, saving time and reducing consumption.

Magnetic Area

The bottom 96-well magnetic area can closely fit with the 2.0 mL / 1.0 mL 96-well plate, and use rising and falling function of the magnetic area to achieve the combination and separation with the magnetic beads.

Thermal Cycling Area

It is mainly used for PCR amplification step in the process of library preparation, and can be placed PCR consumables such as 96×0.1 mL full-skirted tubes.

Reagent Area

- 2.1 Normal temperature area: 2×60 mL storage tank + 12×2.0 mL / 1.5 mL centrifuge tube.
- 2.2 Temperature control area: 3×8×0.2 mL PCR tube + 20×2.0 mL centrifuge tube; temperature control range: 4~105 °C.

Sample Area

Equipped with a normal sample rack, which can place 8-strip PCR tubes; the corresponding sample rack can also be selected according to the type of sample tube.

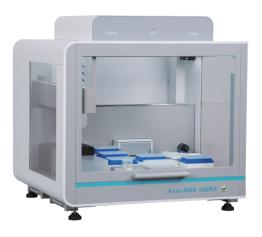
Waste Area

- 6.1 300 mL waste liquid container.
- 6.2 TIP off box.

Both the waste liquid container and TIP off box are freely accessible.

Auto-NGS 100RF

Based on Auto-NGS 100R, Auto-NGS 100RF has added a fluorometer to meet the quality control requirements during the library preparation process, truly realizing the automated process of sample-to-library. Auto-NGS 100RF plate has a more compact structure and diverse functions, making it the preferred platform for medium to low throughput library prepa-





8-well Fluorometer Block



Room Temperature Reagent Area

Comprehensive Functions Meet the Requirements of the Whole Process of Basic Library Preparation

- * Its function is consistent with Auto-NGS 100R;
- · Built in fluorometer block meets the concentration measurement requirements in the process.

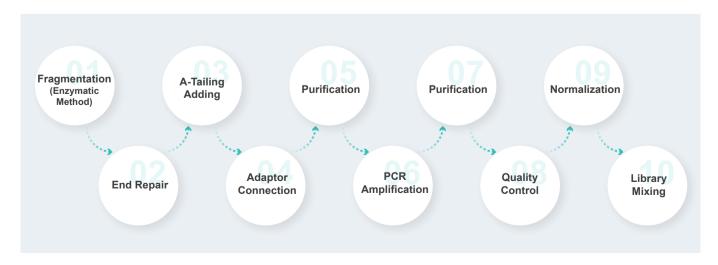
□2 8-well Fluorometer Block

- * Can detect 8 samples in one run;
- The lowest detection limit down to 0.4 ng;
- Accurate sample concentration with only 2 µL samples

Special Consumables Meet Automation Needs

- The room temperature reagent area adopts an 8-strip design, which facilitates rapid reagent dispensing;
- · Can place Allsheng PCR tube cap, combined with a pipettor to quickly transfer fluorescent detection cartridge;
- Can place Allsheng 3×8×0.6 mL special consumables for storing small and medium-sized liquids.

The experimental process that Auto-NGS 100RF can achieve





1 Tip Area

- 1.1 200 μL / 50 μL TIP holders, supporting simultaneous use of 8-channel pipettor.
- 1.2 200 μL / 50 μL TIP holders, mainly used for single channel and X-channel pipettor.

3 Temp. Control Block

Temperature control range: 4~105 °C, can store reagents with refrigeration needs.

 12×1.5 / 2.0 mL frozen storage tube+6×8×0.2 mL PCR tube, and customization is available.

5 Magnetic Bead Mixer

Used for mixing magnetic beads.

4×5 mL centrifuge tube.

Fluorometer

The quality control block can simultaneously detect 8 samples, requiring 2 μ L of samples to obtain accurate sample concentrations, with a minimum detection limit of down to 0.4 ng (dsDNA).

2 PCR Block

Mainly used for the PCR amplification step during the library preparation process. Can place 96×0.1 mL full-skirted PCR consumables.

4 Reagent Area

Used for storage of room temperature reagents.

24×0.6 mL (special consumables)+2×8×1.1 mL deepwell tube+2×8 PCR caps (special consumables)+3×8×0.2 mL PCR tube.

The block area has an automatic flip function to store fluorescent reagents in a dark place.

6 Magnetic Area

The bottom 96-well magnetic area can closely fit with the 2.0 mL / 1.0 mL 96-well plate, and use rising and falling function of the magnetic area to achieve the combination and separation with the magnetic beads.

8 Waste Area

TIP off box; the waste liquid container is freely accessible.

Auto-NGS 180S

A full-featured and compact automated NGS library preparation workstation can meet the needs of library preparation, quantitation, multiple targeting and hybrid capture only one time. The instrument is equipped with a 24-well fluorometer and PCR amplification block, truly achieving convenient operation of sample-to-library, without manual intervention throughout the whole process.

The design of 22 standard plates of the instrument, combined with grippers and plate stacking function, can meet the relatively simple library preparation requirements of 96 samples, as well as the fully automated library preparation and hybrid capture requirements of 16 sample simplification types.









24-channel Pipettor

Pipettor and Gripper

24-well Fluorometer Block

[]] 24-channel Pipettor

- Can be used as a single channel, 8-channel, 16-channel, 24-channel, or any channel, with a pipetting range of 1~200 μL;
- Can be adapted to 20 μL, 50 μL and 200 μL pipetting tips, 1 μL pipetting CV ≤5%, meeting the requirements of high-precision NGS experimental process.

13 24-well Fluorometer Block

- Can detect 24 samples in one run simultaneously. With corresponding consumables, it can detect the sample concentrations of up to 72 samples in one run;
- Accurate sample concentration with only 2 µL samples, with the minimum detection limit of 0.4ng.

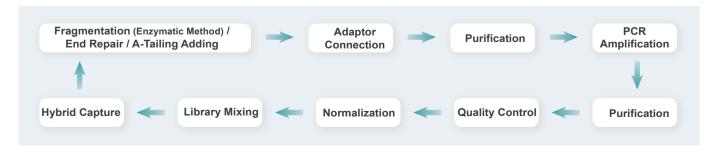
Simplified Design, 2-in-1 Pipettor and Gripper

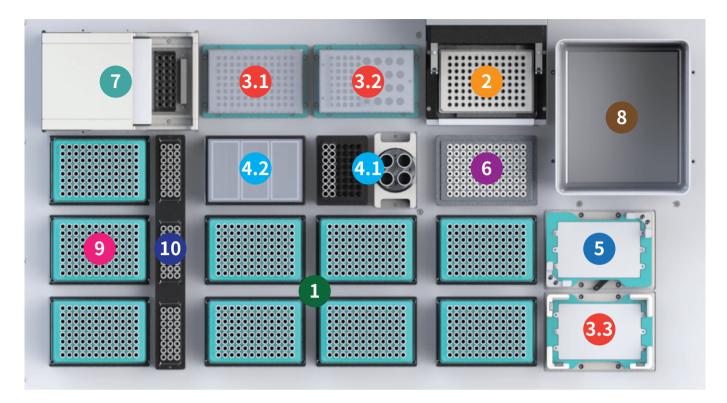
- The pipettor and gripper are designed in one, achieving dual functions while reducing additional mechanical structures;
- Realizing the transfer of well plate between plate positions can effectively reduce liquid loss compared to pipetting using a pipettor;
- With the plate stacking function, new and waste plates are planned and managed uniformly under the same experimental process, reducing manual intervention.

I Stackable Design of Consumables

- Partial area consumables adopt stackable design, effectively expanding the number of tips;
- In the later stage, Allsheng robots can collaborate to achieve tip replenishment and increase sample throughput during the process.

In the later stage, can be used in conjunction with Allsheng collaborative robots, it can achieve **continuous library preparation** for 48 samples in one run





1 Tip Area

 $200~\mu L$ / $50~\mu L$ TIP holders.

3 Temp. Control Block

Temp. control range: 4~105 °C, can store reagents with refrigeration needs.

- 3.1 30×1.5 / 2.0 mL frozen storage tube+6×8×0.2 mL PCR tube.
- 3.2 6×8×0.2 mL PCR tube.
- 3.3 96-deepwell plate

5 Thermo Shaker Incubator Block

96-deepwell plate can be heated, incubated and mixed, with an amplitude of 2 mm and a max speed of 3000 rpm.

Temperature range: 30 °C~105 °C, good temperature uniformity.

7 Fluorometer

The quality control block can simultaneously detect 24 samples, requiring 2 µL of samples to obtain accurate sample concentrations, with a minimum detection limit of down to 0.4 ng (dsDNA).

9 Expandable Area

Used for stacking supply consumables.

PCR Block

Mainly used for the PCR amplification step during the library preparation process. Can place 96×0.1 mL full-skirted PCR consumables.

4 Reagent Area

Equipped with a normal reagent rack, which can place fluorescent reagents and transfer tube caps.

- 4.1 6×8×0.2 mL PCR tube, with a magnetic bead mixing block.
- 4.2 3×120 mL large volume reservoir.

6 Magnetic Area

The bottom 96-well magnetic area can closely fit with the 2.0 mL / 1.0 mL 96-well plate, and use rising and falling function of the magnetic area to achieve the combination and separation with the magnetic beads.

8 Waste Area

TIP off box; the waste liquid container is freely accessible.

10 Fluorometer Consumables

Equipped with shading covers to store fluorescent reagents and consumables.

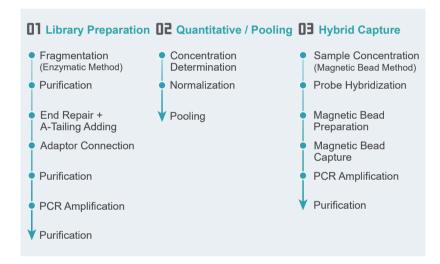
Auto-NGS 200

It is a automated NGS library preparation workstation that meets the needs of library preparation, quantitation, multi-targeting and hybrid capture only one time. The instrument has a built-in 24-well fluorometer and PCR amplification block, which really realizes the convenient operation of sample-to-library, without manual intervention in the whole process.

The 27 plate positions, together with the gripper and 24-channel pipettor, can realize the relatively simple library preparation of 96 samples, as well as the simplified type of fully automated library preparation and hybrid capture of 16 samples.

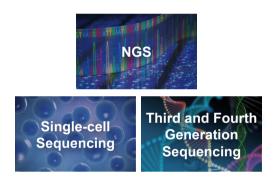


Whole Process Automation Design



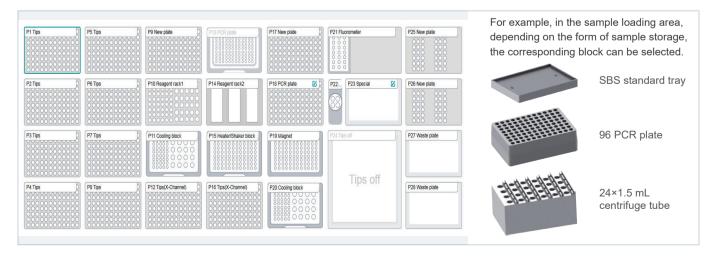
Meet more application needs

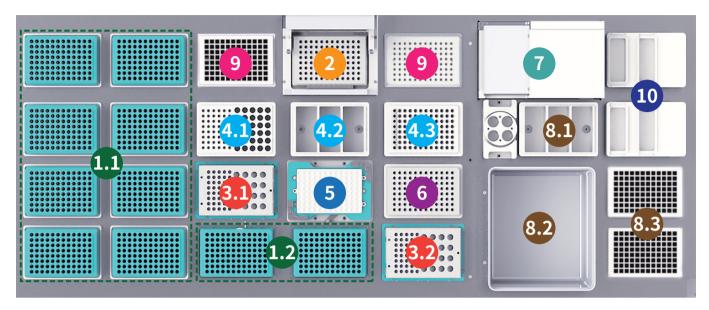
Flexible software with full-featured blocks enables the instrument to be adapted to a wide range of library preparation needs.



Fully Open Instrument Configuration

Support the customization of tabletop blocks. Based on the standard version, the plate block shape and position can be adjusted according to the application requirements.





1 Tip Area

- 1.1 200 μ L / 50 μ L TIP holders.
- 1.2 Two specifications of TIP can be combined into one plate for single channel pipetting; automatic loading tip mode, saving time and reducing consumption.

3 Temp. Control Block

Temp. control range: 4~105 °C, can store reagents with refrigeration needs.

- 3.1 30×1.5 / 2.0 mL frozen storage tube+6×8×0.2 mL PCR tube.
- 3.2 6×8×0.2 mL PCR tube.

Thermo Shaker Incubator Block

96-deepwell plate can be heated, incubated and mixed, with an amplitude of 2 mm and a max speed of 3000 rpm.

Temperature range: 30 °C~105 °C, good temperature uniformity.

Fluorometer

The quality control block can simultaneously detect 24 samples, requiring 2 µL of samples to obtain accurate sample concentrations, with a minimum detection limit of down to 0.4 ng (dsDNA).

9 Expandable Area

Used for stacking deepwell plates and PCR plates, up to 3 can be stacked.

2 PCR Block

Mainly used for the PCR amplification step during the library preparation process. Can place 96×0.1 mL full-skirted PCR consumables.

4 Reagent Area

Equipped with a normal reagent rack, which can place fluorescent reagents and transfer tube caps.

- 4.1 8×8×0.2 mL PCR tube.
- 4.2 3×120 mL large volume reservoir.
- 4.3 12×8×0.2 mL PCR tube, corresponding sample racks can also be selected according to the type of sample tube, and customization is available.

6 Magnetic Area

The bottom 96-well magnetic area can closely fit with the 2.0 mL / 1.0 mL 96-well plate, and use rising and falling function of the magnetic area to achieve the combination and separation with the magnetic beads.

8 Waste Area

- 8.1 300 mL waste liquid container.
- 8.2 TIP off box; both the waste liquid container and TIP off box are freely accessible.
- 8.3 Waste plate area.

Fluorometer Consumables

Equipped with shading covers to store fluorescent reagents and consumables.

Block Introduction



- 8-channel fixed spacing pipettor can be used as 8 channels, single channel or any channel.
- 24-channel fixed spacing pipettor can be used as 24 channels, 16 channels, 8 channels, single channel or any channel.
- PLLD / CLLD function, which can sensitively detect liquid level, residual liquid volume and blockage to ensure precise control of liquid sampling process.

8-channel Pipettor Parameter

Pipetting range	Pipetting precision (CV)		Pipetting precision (CV) Pipe		Pipetting a	accuracy (A)
1~200 μL	1 μL: ≤5 %	100 μL: ≤1 %	1 μL: ±8 %	100 μL: ±1 %		
	20 μL: ≤2 %	200 μL: ≤1 %	20 μL: ±2 %	200 μL: ±1 %		

24-channel Pipettor Parameter

Pipetting range	Pipetting p	recision (CV)	Pipetting	accuracy (A)
1~200 µL	1 μL: ≤8 %	100 μL: ≤1 %	1 μL: ±15 %	100 μL: ±1 %
	20 μL: ≤2 %	200 μL: ≤1 %	20 μL: ±2 %	200 μL: ±1 %

24-channel high-precision pipettor for faster and more accurate pipetting

	Standard volume: 2 µL				Standard v	olume: 200 μL		
Channel	Measured mean value (μL)	Accuracy	CV		Channel	Measured mean value (μL)	Accuracy	CV
1	1.99	-0.50%	2.28%		1	200.25	0.13%	0.10%
2	1.95	-2.30%	1.87%		2	200.44	0.22%	0.27%
3	1.93	-3.60%	4.16%		3	199.69	-0.16%	0.10%
4	1.93	-3.50%	3.82%		4	199.89	-0.06%	0.32%
5	1.98	-1.20%	3.08%		5	200.03	0.02%	0.16%
6	1.97	-1.60%	2.92%		6	200.04	0.02%	0.25%
7	1.98	-1.20%	5.03%		7	199.93	-0.03%	0.24%
8	1.93	-3.60%	2.48%		8	200.54	0.27%	0.33%

Note: actual measured data of 24-channel pipettor. Due to space limitations, only 8-channel are displayed, each channel are repeated 10 times to take the average value, the detection environment for the humidity 44.1 % rh; air pressure 1020 kpa; temperature 24.5 °C.



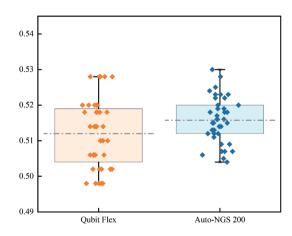
- Automation-specific block can test 8 / 24 samples simultaneously.
- Accurate quantitation and high accuracy with only 2-20 μL samples.
- Lowest detection limit down to 0.4 ng (dsDNA).
- · Cooperate with the automatic calculation of the software and high-precision pipetting to quickly achieve accurate sampling.

Repeatability	CV ≤1.5 %
Linear	R²≥0.995
Linear range	4 orders of magnitude

The built-in fluorometer quantitative method is sensitive and highly accurate, making it a reliable dsDNA measurement method

Using built-in fluorometer and Qubit Flex for concentration detection on 8 groups of 8 low concentration samples, with a sample addition

The results showed no significant difference between the two test results.



Temperature Control

PCR Amplification Block

Block temperature control range: 4 °C ~ 99 °C, the temperature range of the thermo lid is 30 °C~120 °C

Temperature precision: ≤0.2 °C @55 °C, temperature accuracy ≤±0.3 °C @55 °C

Temperature uniformity: ≤0.7 °C (@55 °C, 72 °C)



Total Number of Sequence Reads 30000 20000 - Sample --- NTC

Built in PCR block is safe and reliable, with extremely low cross-contamination rate

Interleave NTC (Nuclease-Free Water) between the samples for comparison, run the amplification program, and the results show that the number of reads in the control group is extremely low.

Thermo Shaker Incubator Block

A thermo shaker incubator applied to Allsheng automation workstation. The incubator can be used for heating, incubation and mixing of deepwell plates. The high-precision zero positioning function ensures the safe pipetting by the pipettor, with the anti-vibration technology and 2D motion control.

Temperature range: 30 °C~105 °C Amplitude: 2 mm, max speed: 3000 rpm



Temperature Control Block

Can be freely set at 4~105 °C. It's the standard temperature control block of NGS series. According to the usages, bock adapters can be customized to meet different consumables requirements.

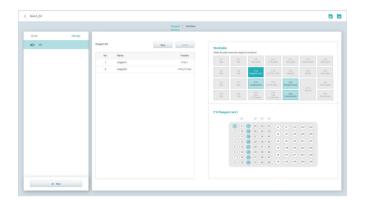
Temperature accuracy: ≤1 °C

Temperature uniformity: ≤1 °C, @55 °C



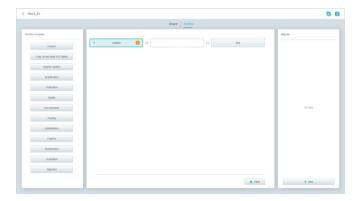
Software Application

NGS series software adopts an open design and can be freely edited and adjusted according to different cartridges. Adopting a graphical interface design, it can be mastered through simple learning.



#01

Simple reagent input, free selection of well positions, and support for pre-packaged reagents



#02

The software logic is clear, and the cartridge running framework is completed through drag and drop operations



#03

Graphical step editing, easy to get started, with built-in multiple liquid parameters matching precise pipetting requirements



#04

Detailed operation guidance, follow the software prompts to place consumables in order to run the program

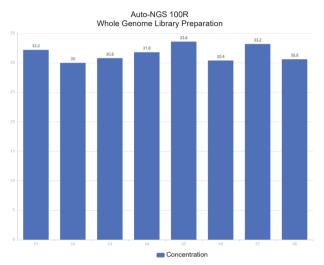
Case

Stable performance of each block ensures high quality of the final library

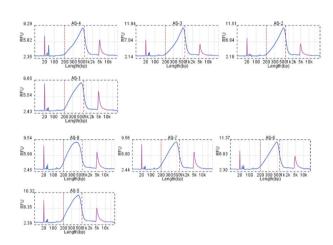
Whole Genome Library Preparation

Reagent name: NadPrep® Rapid DNA Enzymatic Library Preparation Kit V2.0

Experimental process: fragmentation end repair + A-adaptor connection - product purification - library amplification - product purification - concentration, fragmentation test



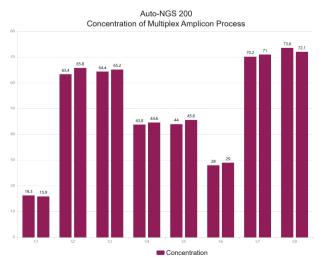




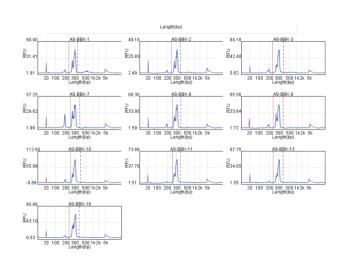
Multiplex Amplification Library Preparation

Reagent name: 5 × VAHTS RT Multi-PCR Mix, VAHTS ® HiFi Universal Amplification Mix for Illumina, VAHTS ® Multiplex Oligos Set 4/5 for Illumina, customized Panel

Experimental process: DNA template one round of PCR - product purification - purified product two rounds of PCR - product purification



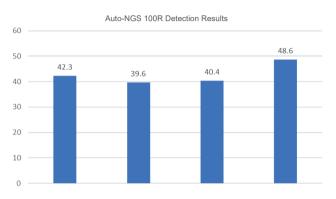
The results of genomic library preparation for DNA standards using Auto-NGS 200

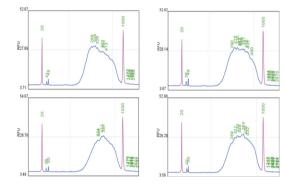


RNA Library Preparation

Reagent name: Vazyme VAHTS® Universal V6 RNA-seq Library Prep Kit for Illumina

Experimental process: RNA fragmentation - cDNA one strand synthesis - two strand synthesis - end repair - adaptor connection - fragment sorting - mutant-enriched PCR- product purification



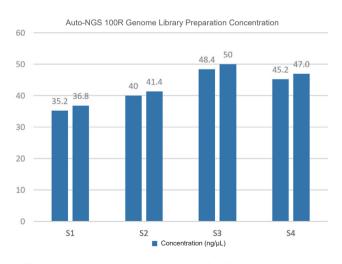


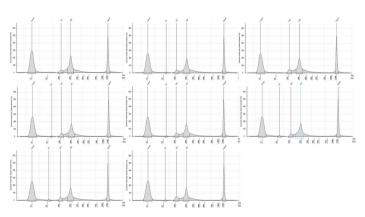
Results of genome library preparation for RNA standards using Auto-NGS 100R

Targeted Sequencing

Reagent name: Seqhealth self-developed DNA library preparation detection reagent

Experimental process: restriction endonuclease break- adaptor connection - product purification - product one-round PCR - product purification - product two-round PCR - product purification





Results of genome library preparation for DNA standards using Auto-NGS 100R

Specification

Model	Auto-NGS 100R	Auto-NGS 100RF	Auto-NGS 180S	Auto-NGS 200	
Throughput	1~24	1~24	1~48	1~96	
Tiles number	11	12	18	27	
Pipettor	200 µL; 8-channel (can be used as a single channel, including PLLD / CLLD) 200 µL; 24-channel (can be used as a single channel, including PLLD / CLLD)				
		Minimum detection	on volume: 20 μL		
Pipetting range	1~20)0 μL	1~2	00 μL	
Pipetting precision (CV)		100 μL: ≤1 % 200 μL: ≤1 %	1 μL: ≤8 % 20 μL: ≤2 %	100 μL: ≤1 % 200 μL: ≤1 %	
Pipetting accuracy (A)		100 μL: ±1 % 200 μL: ±1 %	1 μL: ±15 % 20 μL: ±2 %	100 μL: ±1 % 200 μL: ±1 %	
	Including 1 temperature control block	Including 1 temperature control block	Including 3 temperature control blocks	Including 2 temperature control blocks	
Temperature control block		Temperature contr	ol range: 4~105 °C rol accuracy: ≤1 °C niformity: ≤1 °C @55 °C		
Thermal cycling block	Temperature control range: thermo lid: 30 °C~120 °C; block: 4 °C~99 °C Uniformity: ≤0.7 °C Accuracy: ≤±0.3 °C			°C~99 °C	
Fluorescence detection throughput	1	8	24	24	
Fluorescence detection range	1	0.4 ng~100 ng	0.4 ng~100 ng	0.4 ng~100 ng	
Heating mixing block	1	1	Yes	Yes	
Magnetic bead shaking block	1	Yes	Yes	1	
Magnetic plate	Lift type 96-well ann	nular magnetic plate	96-well annular	magnetic plate	
Gripper	/	/	Yes	Yes	
Consumable stacking mode	1	1	Consumable stack	Stack plate lifting block	
UV sterilization		Equipped with UV sterilization lamp, HEPA device			
Instrument port		USB	port		
Information management	External scanner for entering sample / reagent information Expandable LIS system connection Expandable cloud database connection				
Operating environment	Temperature requirement: 20±5 °C Relative humidity: ≤80 %				
Power supply		100~240 V, 50 / 60 Hz	z, rated power 1200 W		

Ordering Information

Code	Product name
AS-27030-00	Auto-NGS 100R automated NGS library preparation workstation
AS-27050-00	Auto-NGS 100RF automated NGS library preparation workstation
AS-27060-00	Auto-NGS 180S automated NGS library preparation workstation
AS-27040-00	Auto-NGS 200 automated NGS library preparation workstation

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