NAYO

By Precision, For Simplicity

Shaker Module Series Brochure

ON DECK

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On Deck—
Shaker Module Series Brochure

The NAYO Shaker Module Series is engineered for laboratory automation. It combines compact design and excellent performance for easy integration into mainstream liquid handling workstations.

This makes the Shaker Module Series ideal for applications with stringent requirements, including high-throughput experiments.

Product Overview

The series includes three specialized modules:

- Automated Shaker Module **(ASM)**
- Temperature-controlled Shaker Module **(TCS)**
- Heater Shaker Module **(HSM)**

All modules support SBS-size microplates (1–384 wells), 1.5/2 mL centrifuge tubes, reservoir plates, and other common consumables.

The compact design features internal **PCBA** integration, eliminating the need for additional control units, and ensures stable operation.

Core Functions & Features

High-Precision Automation:

The module incorporates accurate automatic in-situ positioning (± 0.1 mm) and automatic clamping to ensure consistent operation and reliable, reproducible results.

Flexible Shaking Performance:

The series provides three amplitudes (1.2, 2.0, or 3.0 mm) and a wide frequency range of 200 to 5,000 rpm (± 25 rpm), allowing for optimal mixing of liquids across a broad spectrum of viscosities.

Secure and Stable Operation:

The module ensures secure processing through an adaptive plate-locking mechanism and a soft-start function to prevent spills. Its operation maintains smooth and stable shaking for consistent, reliable results.

Rapid Temperature Control:

1) Heater Shaker Module (HSM)
The module ensures rapid transitions between any setpoints within its full operating range of 5°C above ambient temperature to 99°C.

Heating rate:

Within the temperature range of 21°C to 95°C, heating rate **≥ 12 K/min.**

2) Temperature-controlled Shaker Module (TCS)
The module ensures rapid transitions between any setpoints within its 4°C to 99°C range.

Heating rate:

Within the temperature range of 4°C to 21°C, heating rate **≥ 36 K/min;**
Within the temperature range of 21°C to 95°C, heating rate **≥ 11 K/min.**

Cooling rate:

Within the temperature range of 95°C to 21°C, cooling rate **≥ 13 K/min;**
Within the temperature range of 21°C to 4°C, cooling rate **≥ 5 K/min.**

High Temperature Uniformity:

HSM:

Temperature	Temperature Uniformity
37°C	≤ ± 0.5°C
45°C	≤ ± 1°C
75°C	≤ ± 1.5°C
95°C	≤ ± 2°C

TCS:

Temperature	Temperature Uniformity
4°C	≤ ± 1.2°C
15°C	≤ ± 1°C
37°C	≤ ± 1°C
40°C	≤ ± 1.2°C
90°C	≤ ± 3.3°C

High Integration:

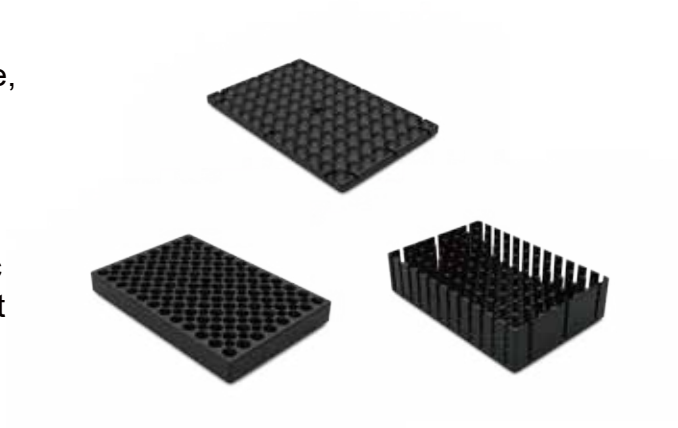
The compact design features internal **PCBA** integration, eliminating the need for additional control units.

The module communicates via the standard RS422/485 protocol.

Strong Compatibility:

They support a wide range of standard labware, including SBS-size microplates (1-384 wells) and 1.5/2 ml centrifuge tubes.

Custom adapters for specialized consumables (e.g., deep well plates, tube racks, microfluidic chips) are available to optimize thermal contact and performance.



Plug-and-Play Usability:

Designed for simplicity, they allow for direct control from a host computer, enabling easy setup and seamless integration into automated workflows.

Application Examples

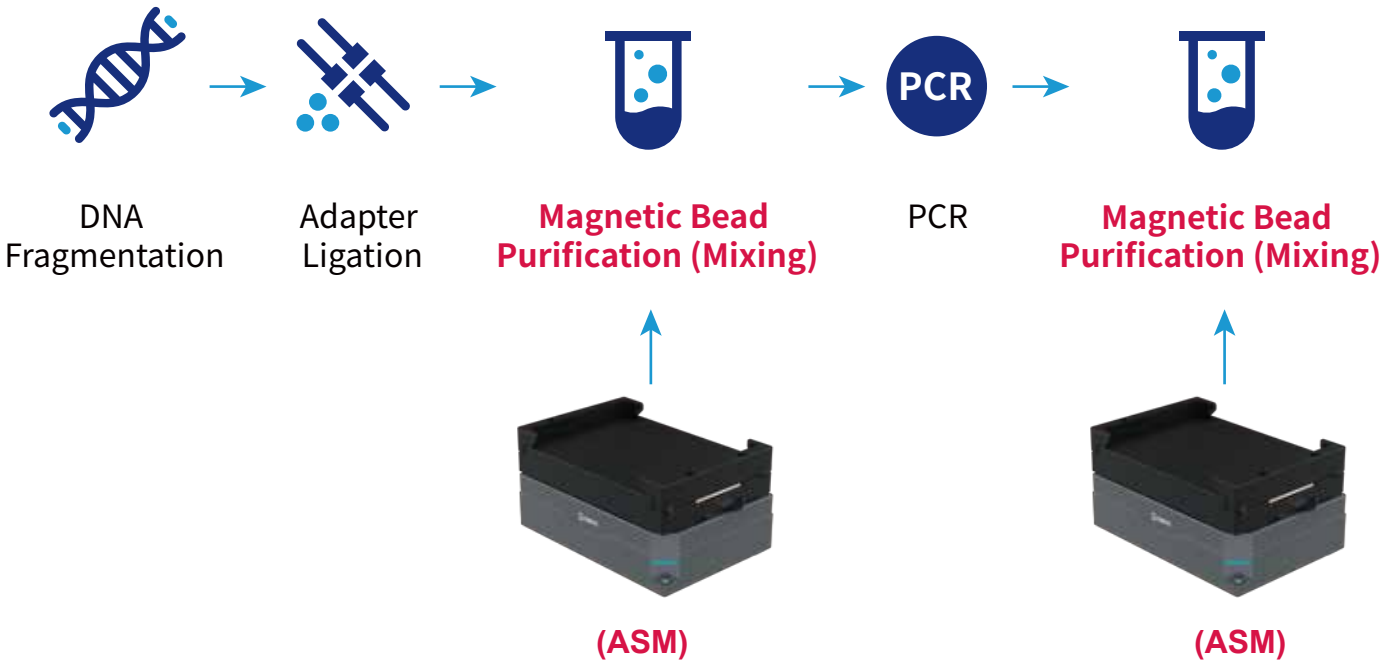
Automated Shaker Module (ASM) Application :

NGS: In automated NGS workflows, the **ASM** provides consistent agitation for magnetic beads and samples during nucleic acid purification steps.

It replaces manual mixing in magnetic bead-based purification, eliminating variation in results caused by bead sedimentation.

This ensures highly uniform nucleic acid recovery across all samples, producing sequencing libraries with consistent quality and reproducibility.

Workflow



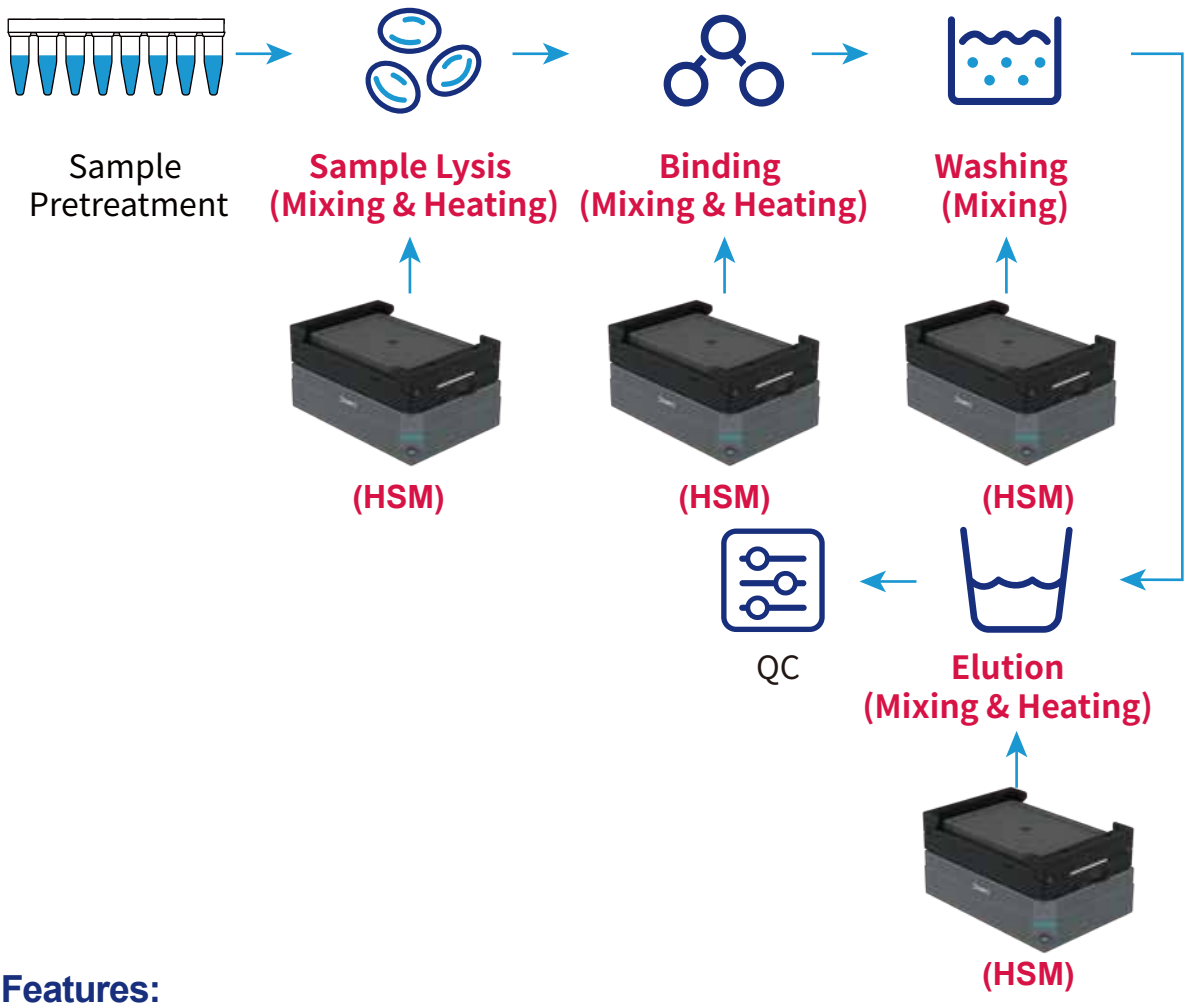
Features:

- Compact design,small footprint ideal for integrated systems.
- Wide 0–5,000 rpm speed range for processing liquids of all viscosities.
- Plug-and-play operation, eliminating the need for an external controller.

Heater Shaker Module (HSM) Application :

Nucleic Acid Extraction: During critical steps such aslysis and elution, the **HSM** integrates thermal and agitation functions to accelerate nucleic acid extraction. This simultaneous heating and mixing capability reduces lengthy static incubation to minutes while ensuring efficient nucleic acid release and recovery through consistent sample interaction.

Workflow



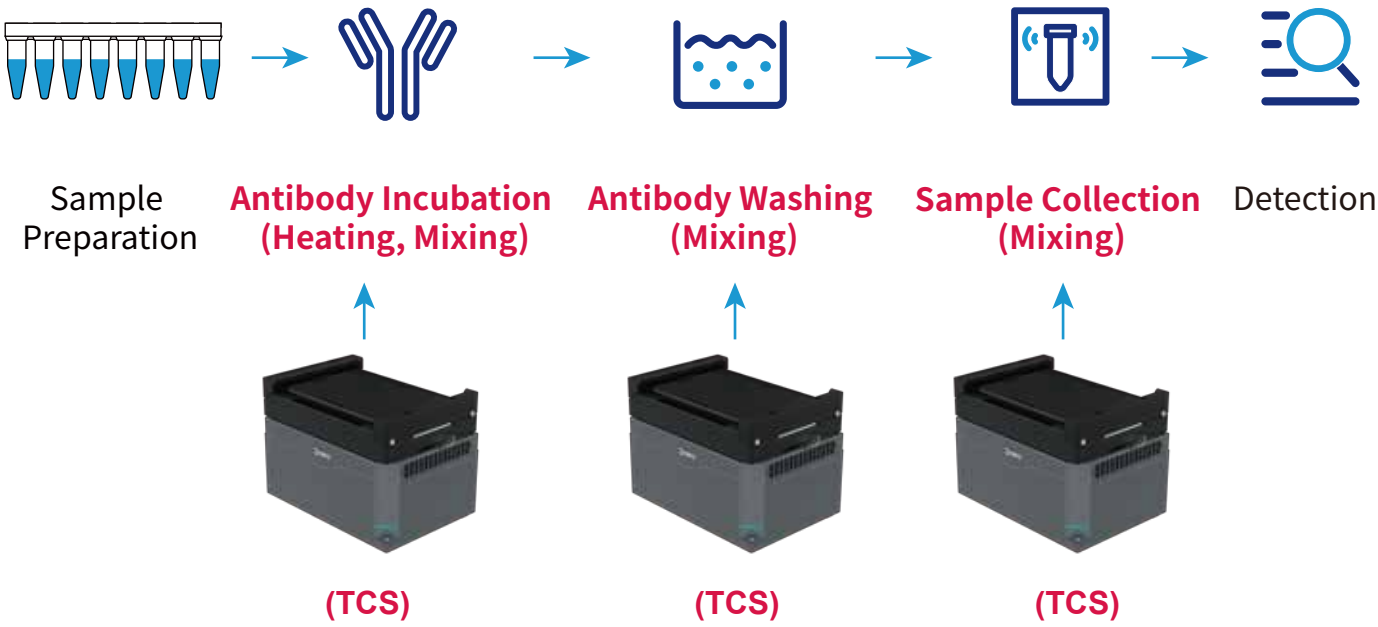
Features:

- Simultaneous heating and shaking, significantly accelerating processing times.
- Precise temperature control, ensuring nucleic acid integrity.
- Plug-and-play operation, eliminating the need for an external controller.

Temperature-controlled Shaker Module (TCS) Application:

Flow Cytometry Sample Preparation: During antibody incubation steps, the **TCS** delivers continuous gentle mixing to prevent cell sedimentation and ensure uniform antibody binding, significantly improving data accuracy and reproducibility. By integrating traditional offline "water bath + shaker" operations into an automated workflow, the module enables unattended processing from incubation through washing, streamlining the entire sample preparation process.

Workflow



Features:

- Precise temperature control with integrated heating and cooling, ensuring a stable experimental environment.
- Excellent temperature uniformity, ensuring consistent well-to-well results.
- Adaptability to various consumables, supporting customization for specific application requirements.

Product Parameters

ASM:

Model	MS-12-S / MS-20-S / MS-30-S			
Appearance	Dimensions(W × D × H)	140 mm x 98 mm x 56 mm		
	Housing Material	Aluminum		
Power Supply	Voltage	24V DC		
	Max Power	35W		
Mixing	Mixing amplitude	1.2 mm	2.0 mm	3.0 mm
	Max mixing frequency	5000 rpm	3000 rpm	2000 rpm
	Mixing regulation accuracy	± 25 rpm		
Positioning Performance	Automatic In-situ positioning			
	Automatic Clamping			
	Positioning Accuracy	± 0.1 mm		
Interface	RS422, RS485			

HSM:

Model	MHS-12-S / MHS-20-S / MHS-30-S			
Appearance	Dimensions(W × D × H)	140 mm x 98 mm x 60.6 mm		
	Housing Material	Aluminum		
Power Supply	Voltage	24V DC		
	Max Power	120 W		
Mixing	Mixing amplitude	1.2 mm	2.0 mm	3.0 mm
	Max mixing frequency	5000 rpm	3000 rpm	2000 rpm
	Mixing regulation accuracy	± 25 rpm		
Positioning Performance	Automatic In-situ positioning			
	Automatic Clamping			
	Positioning Accuracy	± 0.1 mm		

Temperature Control

Temperature range	RT+5°C - 99°C
Heating Rate (25°C to 95°C)	≥ 12 K/min
Temperature accuracy	≤ ± 0.2°C
Uniformity at 37°C	≤ ± 0.5°C
Uniformity at 45°C	≤ ± 0.5°C
Uniformity at 75°C	≤ ± 1.0°C
Uniformity at 95°C	≤ ± 1.0°C
Interface	RS422, RS485

TCS:

Model	MTS-12-S / MTS-20-S / MTS-30-S			
Appearance	Dimensions(W × D × H)	140 mm x 98 mm x 98 mm		
	Housing Material	Aluminum		
Power Supply	Voltage	24V DC		
	Max Power	120 W		
Mixing	Mixing amplitude	1.2 mm	2.0 mm	3.0 mm
	Max mixing frequency	5000 rpm	3000 rpm	2000 rpm
	Mixing regulation accuracy	± 25 rpm		
Positioning Performance	Automatic In-situ positioning			
	Automatic Clamping			
	Positioning Accuracy	± 0.1 mm		

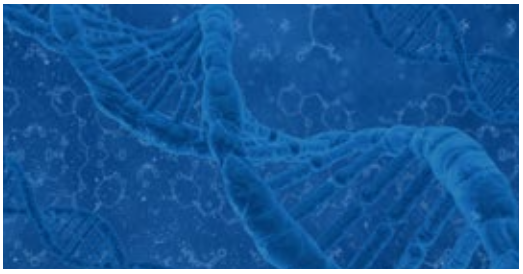
Temperature Control

Temperature range	4°C - 99°C
Heating rate (4°C to 21°C)	≥ 14.5 K/min
Heating rate (21°C to 95°C)	11 K/min
Cooling rate (95°C to 21°C)	11 K/min
Cooling rate (21°C to 4°C)	≥ 3 K/min
Temperature accuracy	≤ ± 0.2°C
Uniformity at 4°C	≤ ± 1.0°C
Uniformity at 15°C	≤ ± 1.0°C
Uniformity at 37°C	≤ ± 1.0°C
Uniformity at 40°C	≤ ± 1.0°C
Uniformity at 90°C	≤ ± 2.0°C
Interface	RS422, RS485

Application Areas

The NAYO Shaker Module Series is widely used in the following scenarios:

Drug Discovery:
LC/MS



Genomics:
DNA Extraction & Library Preparation

Proteomics:
Protein Purification

Diagnostic Testing:
Drugs of Abuse

Forensic Science:
Extraction

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Website

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