MGISP-100

ABL NGS Library Preparation + UDI Adapters (MGI)

Software Version: 1.9.3.476 and later

Hardware Version: MGISP-100 standard config

Kit Version: 203A24 (GTIN: 05407007961214) / 203A96 (GTIN: 05407007961221)

Automation Version: 1.0

Revision History

Automation Version	Date	Description
V1.0	June 2025	Initial release

NOTE: Use the latest version of the manual and use it with the corresponding kit.

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Chapter 1 Product Overview

1.1 Introduction

MGISP-100 is an automated sample preparation system independently developed by MGI. This operating note is intended to guide operators through an automated library building process based on DeepChek® NGS Library Preparation + UDI Adapters (MGI) (RUO) (ref 203A24 / 206A96) on the MGISP-100. The DeepChek® NGS Library Preparation is a collection of optimized reagents designed to convert an input DNA into indexed libraries for Next Generation Sequencing. The output libraries are compatible with different MGI platforms.

1.2 Software

The applicable software version of the manual is 1.9.3.476 and above

1.3 Hardware

The MGISP-100 standard config platform, including functional modules and adapters, which is shown in Table 1-1

Table 1-1 Modules & Adaptors of MGISP-100

Modules & Adaptors	Quantity	Position
PCR Module	1	Pos3
Magnet Module	1	Pos6
Temp. Control Module	1	Pos5_Column6,7,8
8-Tube Strips cover Module	1	Pos1
Trash Can	1	Pos7

1.4 Applicable Reagent Kits

Table 1-2 DeepChek® NGS Library Preparation kit

Modules	Cat. No.	Components	Spec & Quantity	Tube Color
DeepChek® NGS Library Preparation (24 RXN)	REF 203A24	FEA Buffer MGI	1 x 165μL	Red
		FEA Enzyme MGI	1 x 330μL	Pink
		Ligation buffer MGI	1 x 815μL	Green
		DNA Ligase Buffer MGI	1 x 165μL	Blue
		Amplification Mix MGI	1 x 815μL	Brown
		Neutralization Buffer	1 x 165μL	Clear
		Control DNA	1 x 10μL	Black
DeepChek® NGS Library Preparation (96 RXN)	REF 203A96	FEA Buffer MGI	1 x 540 μL	Red
		FEA Enzyme MGI	1 x 1090 μL	Pink
		Ligation buffer MGI	2 x 1350 μL	Green
		DNA Ligase Buffer MGI	1 x 540 μL	Blue
		Amplification Mix MGI	2 x 1350 μL	Brown
		Neutralization Buffer	1 x 540 μL	Clear
		Control DNA	1 x 10 μL	Black

The **DeepChek® NGS Library Preparation** is suited for low and high-throughput NGS library construction workflows that require DNA fragmentation, end repair, A-tailing, adapter ligation and library amplification. It is designed for library construction from a wide range of sample types, and are compatible with complex, genomic DNA; low-complexity samples such as small viral genomes, plasmids, cDNA and long amplicons; and low-quality DNA such as FFPE samples. Libraries generated by this procedure are used for Next Generation Sequencing on different MGI platforms such as E25, G99, and G400.

1.5 Equipment and Consumables Required but not Provided

Table 1-4 Equipment and Consumables Required but not Provided

Category	Description
Equipment	Vortex Mixer Desktop Centrifuge Pipets Qubit® 3.0 Fluorometer (Thermo Fisher Scientific™, Cat. No.: Q33216) Agilent 2100 Bioanalyzer (Agilent Technologies™, Cat. No.: G2939AA) / LabChip® GX, GXII, GX Touch (PerkinElmer), or Fragment Analyzer™ (Advanced Analytical)
Reagents	**Nuclease free water (NF water)** **100% Ethanol (Analytical Grade)** **DeepChek® NGS Clean-up beads** (ABL, REF N411-03 / N411-04, RUO) **Adapter DNBSEQ** Qubit® dsDNA HS Assay Kit (Invitrogen, Cat. No.: Q32854)/ Quant-iT™ PicoGreen® dsDNA Assay Kit (Invitrogen, Cat. No.: P7589) High Sensitivity DNA Kits (Agilent Technologies™, Cat. No.: 5067-4626) Agilent DNA 1000 Kit (Agilent, Cat. No.: 5067-1504)
Consumables	Pipette Tips Qubit® Assay Tubes (Invitrogen, Cat. No.: Q32856) or 0.5 mL Thin Wall PCR Tubes (Axygen, Cat. No.: PCR-05-C)

Table 1-5 Customer-prepared Consumables

Consumables	Brand	Cat. No.	Quantity
250 µL automated filter tips	MGI	1000000723	4 Boxes
1.3 mL 96 Well U-bottom Deepwell Plate	MGI	1000004644	2 Plate
Hard-shell Thin-wall 96-well Skirted PCR Plates, White Shell/Clear Well	MGI	091-000165-00	2 Plate
Break-away PCR Plate and Cover, 96-Well	MGI	100-000016-00	10 Strips
2 mL SC micro tube, PCR-PT	MGI	1000001553	5 Tubes
0.5 mL SC micro tube, PCR-PT	MGI	1000001558	2 Tubes

1.6 Precautions

- It is necessary to master the operation methods and precautions of the instruments before the experiment.
- Before experiment, carefully read DeepChek® NGS Library Preparation + UDI Adapters (MGI)
- Use the recommended consumables only.
- Before first use, follow the instructions in *3.1.1 3)* of this manual.
- Before first use, make sure that the PCR program has been imported into the control software of local device according to *MGISP-100 & MGISP-960 Application Script Installation Instructions*.
- Perform Pre-clean after powering on the device and before experiment; perform Post-clean after experiment and before powering off the device according to *MGISP-100 & MGISP-960 Application Script Installation Instructions*.
- The volume of reagents and the amounts of consumables can be calculated through the *DeepChek NGS Reagent and Consumables Calculation.xlsx* in the zip file.
- Dispose of the samples and wastes should be in accordance with relevant regulations.
- If you have questions, contact the technical support: *MGI-service@mgi-tech.com*.

1.7 Principles and Workflow

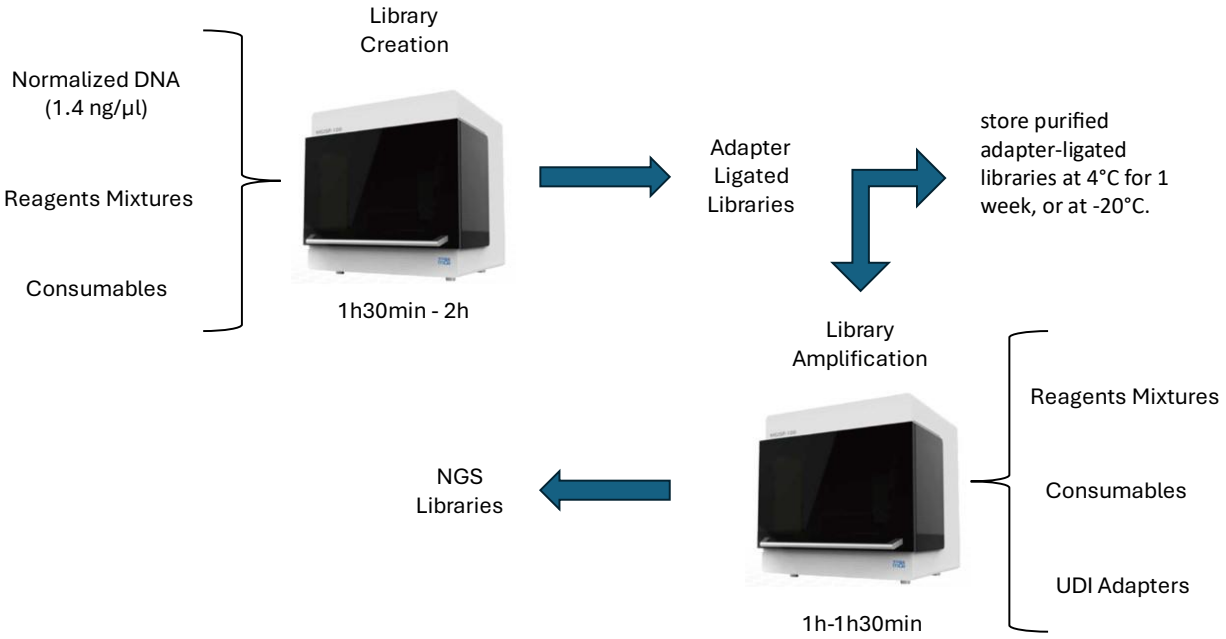

Figure 1-1 Workflow

Note: If customers need to automate the subsequent steps of make DNB, please refer to the corresponding MGISP-100 operating instructions.

Library quality control

Electrophoretic profile (optional)

Proceed to quality control with Agilent High Sensitivity chip or similar product (for instance Agarose gel 0.8-2%).

Library quantification:

Proceed to Library quantification and Normalization. Use Qubit quantification.

Next Generation Sequencing

After library preparation, use MGIEasy Circularization Kit (MGI).

Chapter 2 Applicable Conditions for Automated Workflow

When using the kit for library preparation, sample numbers are flexible. Conditions for automated library preparation should be based on sample numbers and starting amount.

2

2.1 Sample Requirements

- Sample types: dsDNA library.
- Samples in water. Sample buffer must not contain EDTA. If so, proceed with the neutralization steps at the Library preparation manual protocol, “Important points before starting”.

2.2 Sample Numbers

MGISP-100 supports library preparation of 1-16 samples.

2.3 Sample Preparation

- A total of 50 ng DNA in 35µl (corresponds to 1.4ng/µl) of molecular grade water is necessary for the library construction.

Chapter 3 Standard Workflow of Automated Library Preparation

3

3.1 Pre-preparation

3.1.1 Preparing the Device

1) Power on the device of MGISP-100.
2) Before first use, import the *DeepChek_NGS_Library_Preparation_methods.xml* to the control software of local device according to the *MGISP-100 & MGISP-960 Application Script Installation Instructions*.
3) Before first use, copy the folder JB-A06-xxx-DeepChek_NGS into the following path: **C:\MGISP-100\Engineer\ScriptLib.**
4) Open MGISP-100 Software (Figure 3-1) and Initialize the system (Figure 3-2)

Figure 3-1 MGISP-100 Software Icon

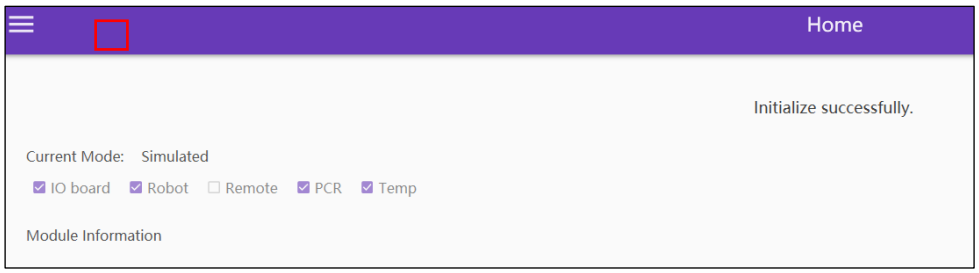

Figure 3-2 Initialize the system

5) Perform pre-clean before experiment according to the MGISP-100 & MGISP-960 Application Script Installation Instructions.

3.1.2 Preparing Consumables

Take out the consumables required for one workflow for further use, as listed in the table below:

Table 3-1 Customer-prepared Consumables

Consumables	Brand	Cat. No.	Ligated-Libraries protocol	Library Amplification Protocol
250 µL automated filter tips	MGI	1000000723	2 Boxes	2 Boxes
1.3 mL 96 Well U-bottom Deepwell Plate	MGI	1000004644	1 Plate	1 Plate
Hard-shell Thin-wall 96-well Skirted PCR Plates, White Shell/Clear Well	MGI	091-000165-00	1 Plate	1 Plate
Break-away PCR Plate and Cover, 96-Well	MGI	100-000016-00	4 Strips	4 Strips
2 mL SC micro tube, PCR-PT	MGI	1000001553	3 Tubes	2 Tubes
0.5 mL SC micro tube, PCR-PT	MGI	1000001558	1 Tubes	1 Tubes

3.1.3 Preparing Samples for Ligated-Libraries protocol.

MGISP-100 automated sample preparation system can process 1-16 samples at a time. Take out the dsDNA library, thaw, and centrifuge shortly under room temperature.

Take out a new Break-away PCR strip (1 or 2 for 8 to 16 samples respectively) and mark them. Add 35µl of normalized DNA of concentration 1.4ng / µl as Figure 3-3.

Figure 3-3 DNA samples

Note: Make sure that no bubbles exist at the bottom of the tube and no liquid remains on the tube wall.

3.1.4 Preparing UDI-Adapters for Library Amplification protocol.

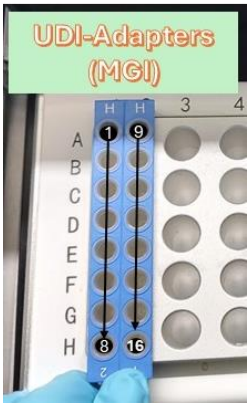

Figure 3-4 UDI-Adapters

Take out the UDI Adapters plate, thaw, and centrifuge shortly under room temperature. DeepChek® UDI ADAPTERS (MGI) (24) / (ABL, REF 204A24, RUO); DeepChek® UDI ADAPTERS (MGI) (96) / (ABL, REF 204A96, RUO).

Take out a new Break-away PCR strip (1 or 2 for 8 to 16 samples respectively) and mark them. Add 6μl of individual UDI-Adapter in each well of the PCR strip for direct use.

3.2 Preparing Reagents

1) Take out the reagents as is listed on the Table 1-2 DeepChek® NGS Library Preparation kit. Thoroughly mix the enzymes by reversing for several times and mix the buffer components by vortex mixer. Centrifuge shortly and place them on ice for further use.
2) Prepare 80% ethanol by using the absolute ethanol and Milli-Q water.

Note：The 80% ethanol should be used immediately after preparation.

3) Remove beads from the refrigerator and bring to room temperature for at least 30 min beforehand. Vortex and mix thoroughly before use.
4) The volume of reagents and the amounts of consumables can be calculated through the *DeepChek NGS Reagent and Consumables Calculation.xslx* in the zip file.

3.3 Library Operation

Double-click the **MGISP-100** icon on the desktop to start the software.

Figure 3-5 MGISP-100 Software Icon

1) After selecting the **Real** mode, click **Create**.

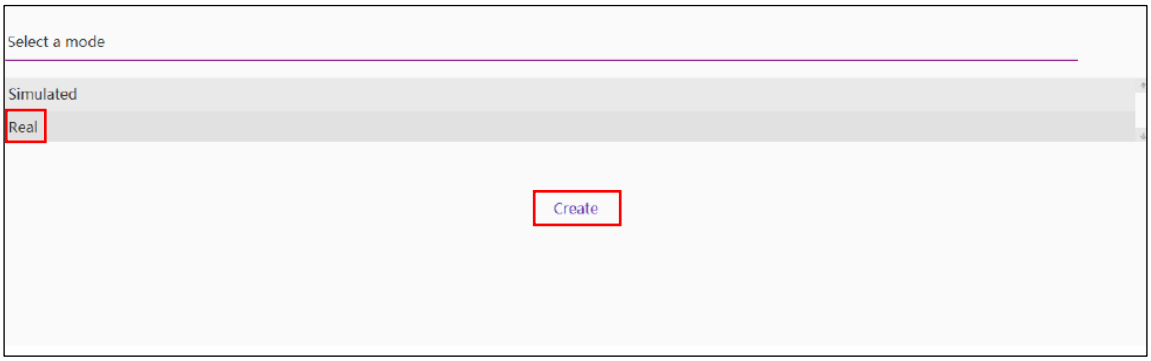

Figure 3-6 Login Interface

2) Enter identity authentication interface, as shown in Figure 3-6, and click **User Entry** in the lower right corner of the pop-up workflow.

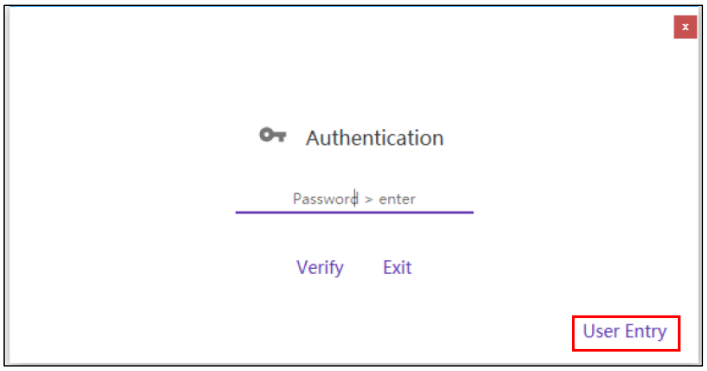

Figure 3-7 Identity authentication interface

3) In the workflow interface, click **Initialize**, wait for about 2 minutes, you will see the notice **Initialize Successfully**, indicating that the device is connected normally.

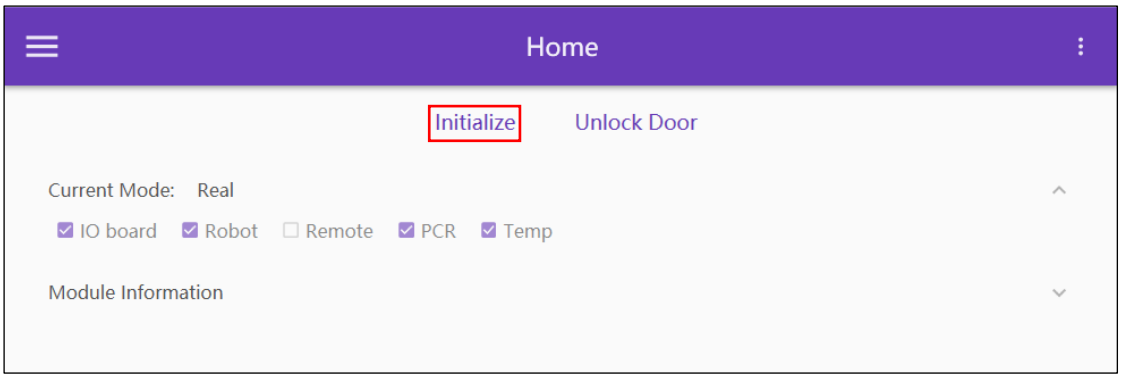

Figure 3-8 Initialize Interface

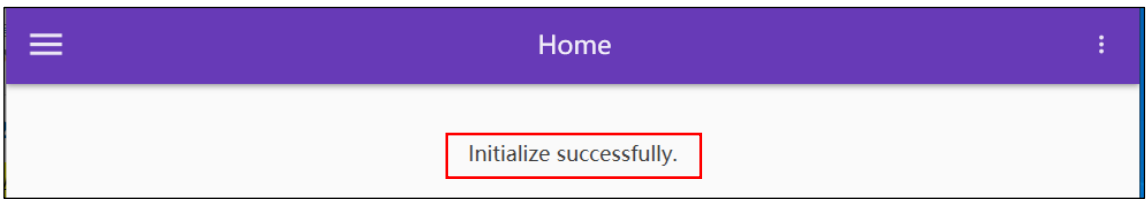

Figure 3-9 Initialize Successfully Interface

Note: If the initialization fails, check whether the machine and the external electric control box are turned on,

and whether more than one software program is running. Try to restart the software. If the problem persists, contact the technical support.

4) Open the left-side navigation pane and select **Run Wizard**.
5) On the **Run Wizard** interface, as shown in Figure 3-10, click **Solution** to select *JB-A06-xxx-DeepChek_NGS_Library_Preparation*, click **Script** and select *DeepChek_NGS_Library_Preparation*.

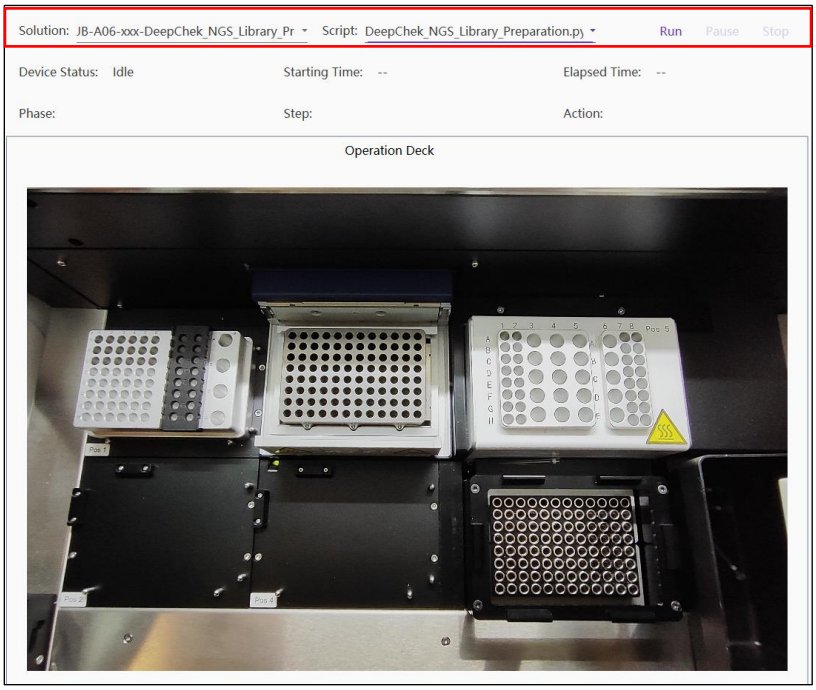

Figure 3-10 Run Wizard

6) Click in **Run.**
7) **A pop-up window,** as figure 3-11, will appear to select the protocol, number of samples and pop-up guidance. Pop-up guidance activated is a series of pop-up windows that will guide through the preparation of the deck. It is strongly recommended to familiarize with the protocol.

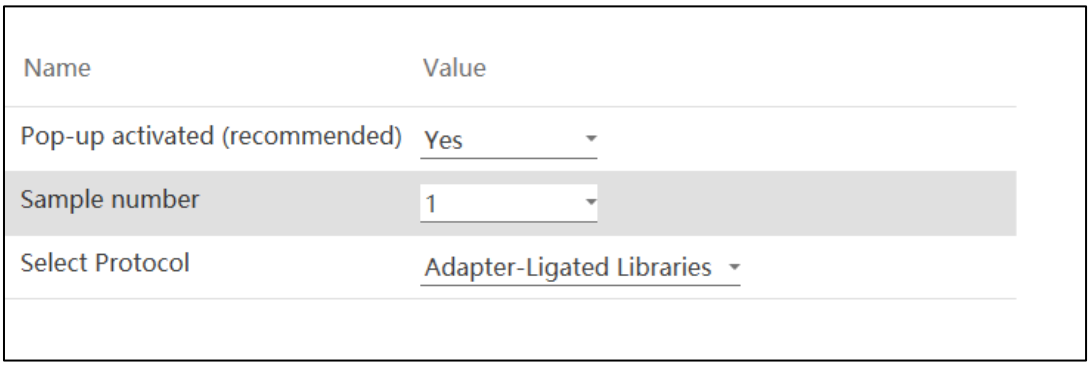

Figure 3-11 Protocol options

8) The Figure 3-12 or 3-13 (Adapter-Ligated Libraries protocol or Library amplification respectively) will appear at **Operation Deck**. The samples, reagents, and consumables prepared will be placed and confirmed as shown in the Figure 3-14 or 3-15 (Adapter-Ligated Libraries protocol or Library amplification respectively),

and close the instrument door and window after confirming that they are correct.

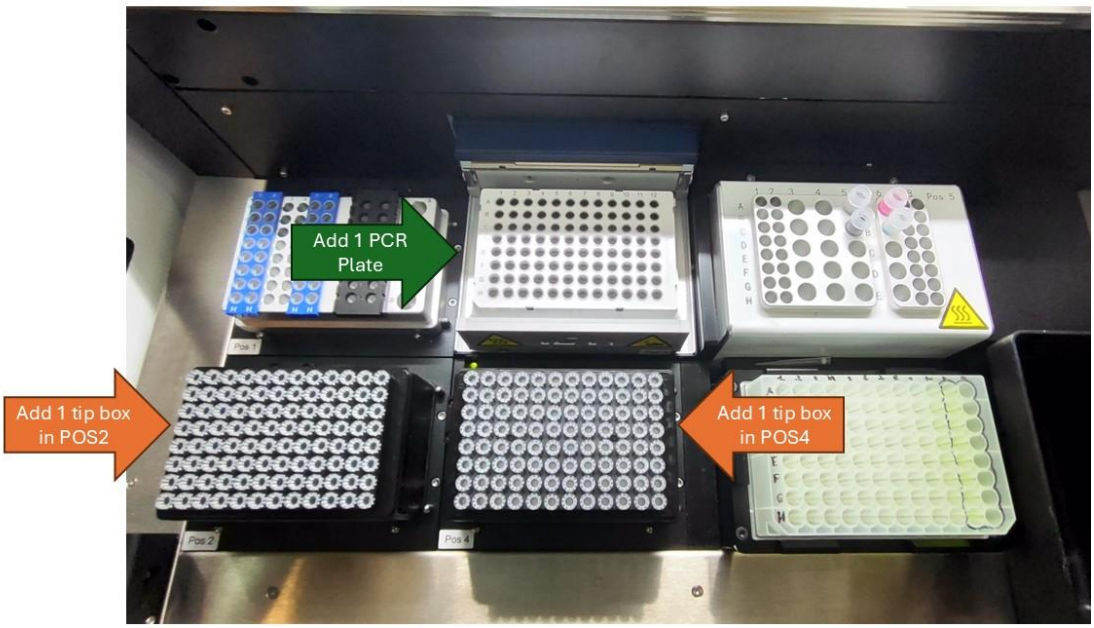

Figure 3-12. Adapter-Ligated Libraries protocol deck example.

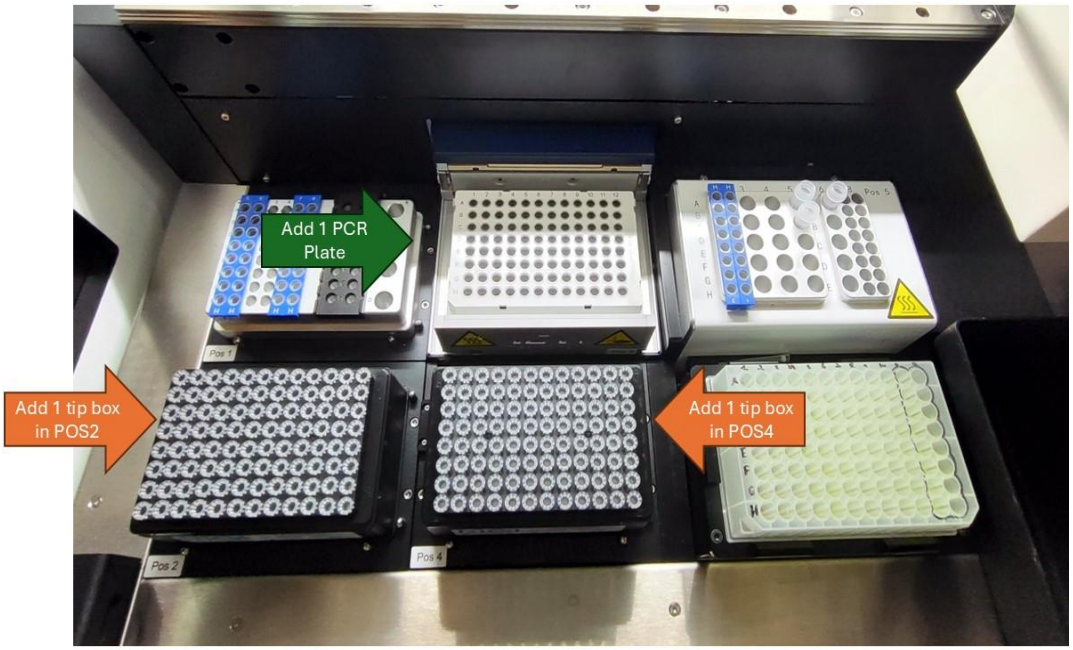

Figure 3-13. Library amplification protocol deck example.

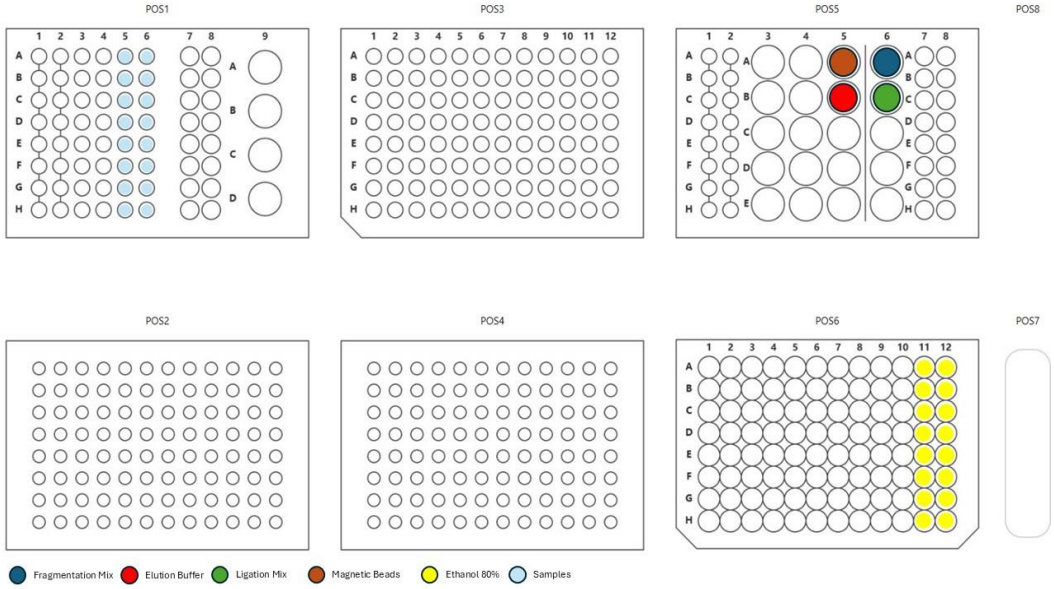

Figure 3-14. Adapter-Ligated Libraries deck layout

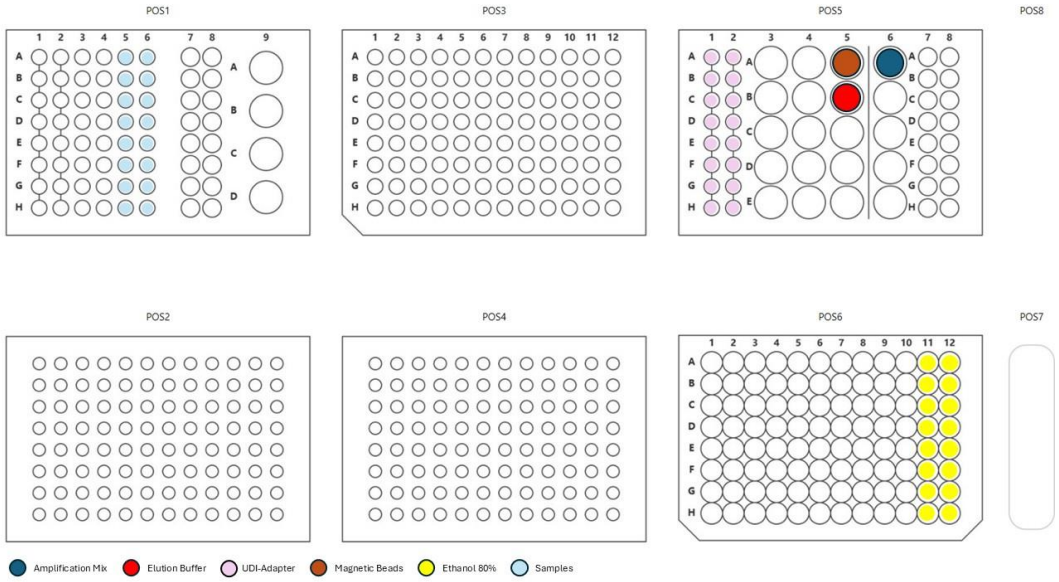

Figure 3-15 Library amplification Deck Layout

Table 3-5 Reagents and Consumable layout Adapter-Ligated Libraries protocol

Position in Deck	Reagents and Consumable
Pos1_Column1,2	Break-away PCR Plate and Cover, 96-Well
Pos1_Column5,6	Break-away PCR Plate: **DNA samples.**
Pos2 (and Pos4 if samples=16)	250 µL automated filter tips
Pos3	Hard-shell Thin-wall 96-well Skirted PCR Plates, White Shell/Clear Well
Pos5_5A	2ml SC Tube: MGIEasy DNA Clean Beads
Pos5_5B	2ml SC Tube: Elution Buffer / Nuclease free water
Pos5_6A	0.5ml SC Tube: Fragmentation Mix
Pos5_6B	2ml SC Tube: Ligation Mix
Pos6	1.3 mL 96 Well U-bottom Deepwell Plate
Pos6_Column11,12	80% Ethanol

Table 3-6 Reagents and Consumable layout Library Amplification protocol

Position in Deck	Reagents and Consumable
Pos1_Column1,2	Break-away PCR Plate and Cover, 96-Well
Pos1_Column5,6	Break-away PCR Plate: **Adapted-ligated libraries**
Pos2 (and Pos4 if samples=16)	250 µL automated filter tips
Pos3	Hard-shell Thin-wall 96-well Skirted PCR Plates, White Shell/Clear Well
Pos5-1_Column1,2	Break-away PCR Plate: **6µl UDI-Adapters**
Pos5_5A	2ml SC Tube: MGIEasy DNA Clean Beads
Pos5_5B	2ml SC Tube: Elution Buffer / Nuclease free water
Pos5_6A	0.5ml SC Tube: Amplification Mix
Pos6	1.3 mL 96 Well U-bottom Deepwell Plate
Pos6_Column11,12	80% Ethanol

9) Confirm the placement, close the door, click **Continue**,

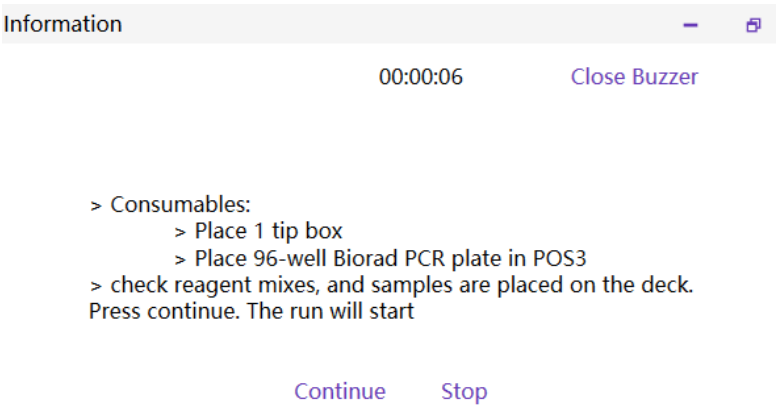

Figure 3-16 Pop-up window

10) After the experiment, you will see a pop-up window. Click **Continue** to close the pop-up window and end the process. Then, take out the product from Pos1_Column1,2.

11) Dispose of the waste Deep-well plate, PCR plate, and waste bag and so on. Put them into the designated waste area. Perform Post-clean before powering off the device according to *MGISP-100 & MGISP-960 Application Script Installation Instructions*

Contact us

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