# LabTurbo

# 24 COMPACT SYSTEM

ADVANCED AUTOMATION FOR
DNA/RNA PURIFICATION


2017-01-V03

www.labturbo.com

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# PREFACE

## 1.1 Purpose of this manual

This operation manual is written for laboratory personnel and researchers who conduct automated sampling, barcode reading, DNA/RNA extraction, and PCR setup using LabTurbo 24 Compact System (LabTurbo 24C).

# SAFETY PRECAUTIONS

This manual contains information and warnings that must be followed by the user to ensure safe operation of the LabTurbo workstation and to maintain the instrument in a safe condition. Potential hazards that may harm the users or result in damage to the instrument are clearly stated at the appropriate places throughout this manual.

Warning Notes

The following signs are used to warn the users against:

 WARNING: Ignoring this symbol could be potentially lethal.

 CAUTION: Ignoring this symbol may lead to physical injury and/or damage to the machine or hardware options.

Before running the machine, please read and follow the manual in detail.

## 2.1 Normal use

⚠WARNING: Improper use of the LabTurbo may cause personal injuries and/or damage to the instrument. The use of the machine should be under the direction of trained technical staff. Qualified personnel should follow the manual to operate the device.

⚠ WARNING: It is mandatory that suitable protective equipment must be worn at all times when using the machine. The machine should be turned off when cleaning, repairing, or lubricating.

⚠CAUTION: In case of emergency, switch off the LabTurbo 24-Compact power which is on the façade of the device.

⚠CAUTION: We strongly recommend the users to choose accessories and disposables of LabTurbo 24-Compact. Damage caused by using non-LabTurbo accessories and disposables may happen.

⚠CAUTION: Please do not eat, drink, smoke, apply cosmetics, or handle contact lenses near the machine. Wash hands thoroughly after handling samples and reagents.

## 2.2 Equipment's assembling, carrying, and positioning requirements

⚠CAUTION: LabTurbo 24-Compact is a device manufactured and assembled in the certified factory. There are no special requirements for the device's installation. While carrying the machine, please be sure to keep passageways clear of all obstructions. Instruction must be received prior to any lifting taking place. Fix the robotic arm before moving the machine.

⚠ CAUTION: The device should be placed and anchored securely on a sturdy pedestal or platform.

## 2.3 Ventilation requirement

⚠CAUTION: This device is equipped with a ventilation fan that allows the air to circulate while at the same time removing stale air. Therefore, no additional environmental measurements are required. Any lab with adequate ventilation is sufficient enough.

## 2.4 Additional equipment positioning requirements

⚠WARNING: The device's main power cord is on the right side of the equipment. Be sure to keep the right side of the device at least 15cm from the wall or other obstacles.

## 2.5 Explanation of safety marks on the equipment

All of the signs on the equipment are marked according to the standard of IEC/EN/UL 61010.

## 2.6 Biological safety

⚠WARNING: Assorted biological solutions and specimens from humans or animals (carcasses, tissues, body fluid, etc) should be treated as potentially infectious. The users must strictly adhere to waste disposal guidelines or consult the safety officer with regard to an appropriate method for disinfection.

⚠WARNING: Handle potentially-biohazardous samples with the greatest care and in accordance with the required safety regulations. Wear glove when operating the machine.

 WARNING: Used plastic wares, such as filtered tip and Eppendorf tubes, may have caustic chemicals or biohazardous reagents remained. Such waste and disposals must be collected and disposed of properly in accordance with the local safety regulations.

## 2.7 Mechanical hazard

 WARNING: This machine has a safety door. Once the power of LabTurbo 24-Compact is on, the user should not stretch into the workstation under any situations.

 CAUTION: Please confirm that the metal rack for reuse tips is empty before using. If there is any tip left before using, please press “Reset ".

## 2.8 Heat hazard

 WARNING: The Thermoblock of LabTurbo 24-Compact can heat up to 80 °C. Be aware of it when the heating step is undergoing. The Thermoblock is not allowed to use with volatile or flammable liquids.

 WARNING: The maximum continuous operating time of vacuum pump is 1 minute to keep it away from overheating.

## 2.9 Electrical hazard

 WARNING: Modification to any electrical components (wires, cables, circuit boards, etc) of LabTurbo 24-Compact by unauthorized persons is not permitted. The opening of covers or removal of parts is likely to expose dangerous voltages. Disconnect the machine from all voltage sources before starting to open.

# EXTERNAL FEATURE

LabTurbo 24 Compact is the “automated nucleic acid purification system with innovative vacuum membrane column technology.” The external part of main workstation consists of several sections including: a built-in touch screen, a safety door, the power button, the side ports, and machine feet with wheels, pump system, and the waste tank.

## 3.1 Built-in touch screen

The built-in touch sensitive screen is on the front side of the machine. This control panel uses Windows user interface. Once the panel is turned on, the LabTurbo program is automatically activated, and users can select the desired protocol to run. A stylus is included as the accessory of the touch panel.

## 3.2 Safety door


The main workstation of LabTurbo 24C has a closed cabinet with a safety door. This protects users from being exposed under any risks or dangers while the machine is running. It also isolates the worktable from the outside environment, reducing the chance of contamination. If the safety door is opened when the machine is functioning, the machine will pause.

## 3.3 Power

The red power switch is on the front of the workstation. Press the red button to turn on the workstation. The system will perform self-check then enter LabTurbo program directly. To shut down the system, turn off LabTurbo program and then press the power directly.

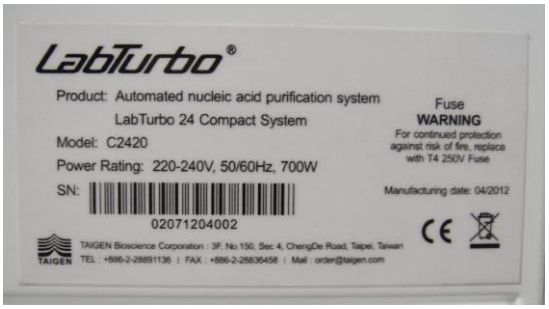

## 3.4 Automatic reagent feeder

Five automatic reagent feeders are located on the inner side of the safety door. They are the buffer supply for the buffer tanks on the worktable. The buffer from the left to the right is DLL/VLL, LTL/DRVL/RLL, CCEB, EtOH and LW1.

**Note：Buffer label may vary from actual condition**


## 3.5 Label

The label consists of the name of the model and power rating. Serial number with the barcode and the manufacturing date of the product are also included.



## 3.6 Side panel

The side panel is located on the right façade of the machine and contains:

A. **LAN Control** is for Internet connection or the remote control.

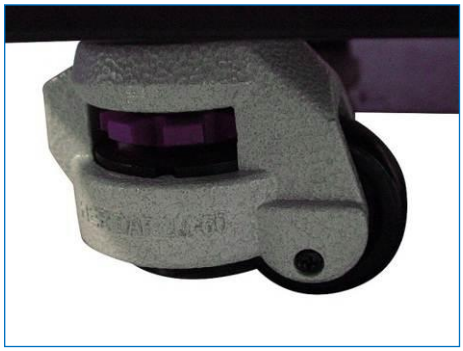
B. **USB Accessory** is for the peripheral with the USB port such as the mouse, keyboard or the flash drive.

C. **AC 110V/220V** and **ON/OFF** are the main power switch and the socket. Fuse is in between the switch and the plug-in.

**NOTE:** Voltage values on all pictures are for demonstration purpose only. Each machine's actual supply voltage may vary depends on its module.

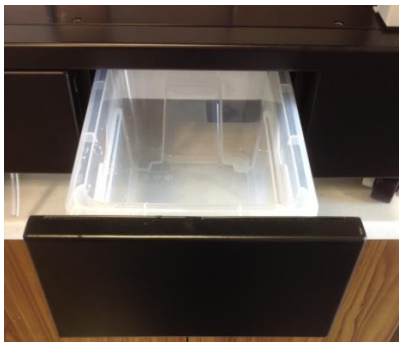

## 3.7 Machine feet with wheels

The height of the machine feet is adjustable and accompanied by the wheels. Balance the workstation by adjusting the height of the machine feet. The wheel is only for short distance movement of the workstation on the table and not for transportation of the machine on the ground.

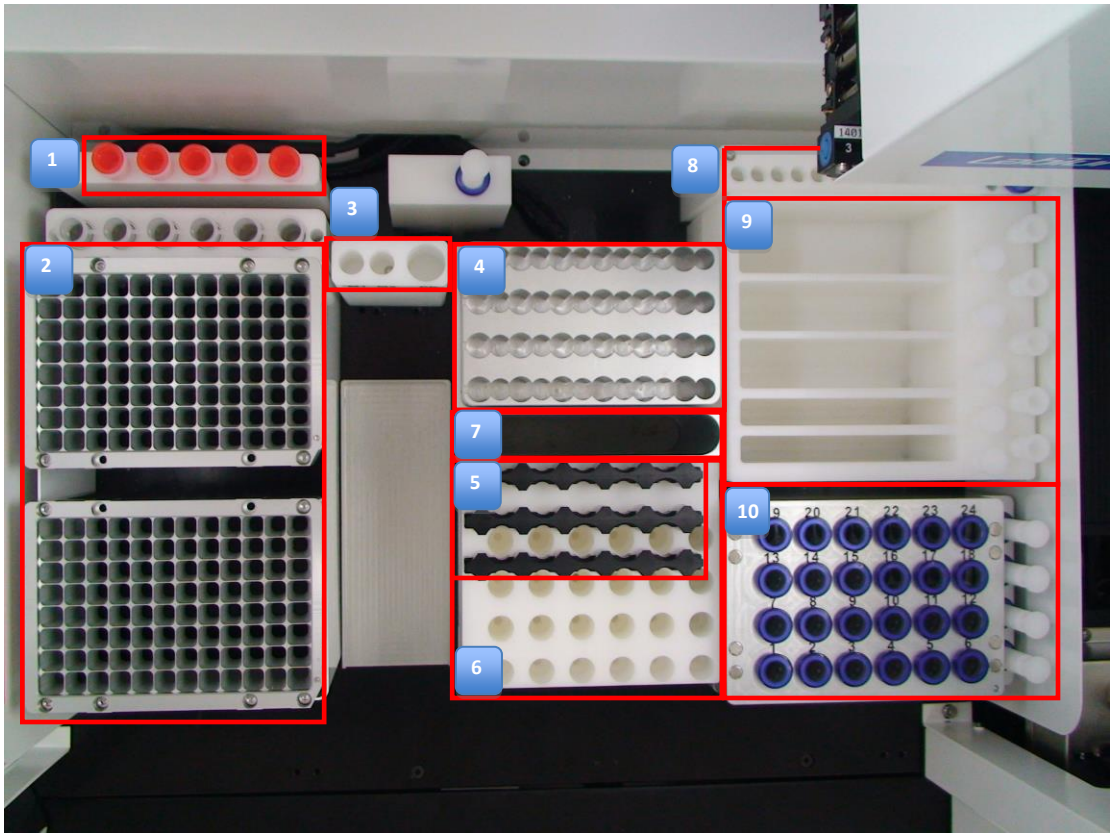


## 3.8 Waste system

Waste system is for the collection of waste and consumables during liquid handling operations. The system consists of a **Waste Tank** and **Trash bin** and is equipped with self-detection function.

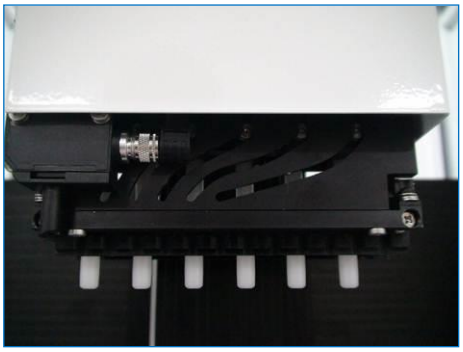
# WORKTABLE UNIT



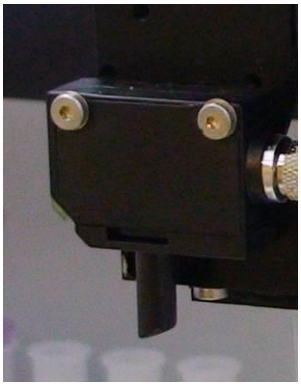

(1) **Plug tube rack**, (2) **96-well Tip rack**, (3) **Proteinase K tube rack**, **PCR master mix tube rack,** (4) **6 × 4 (24)-well Sample lysis thermoblock**, (5) **Vacuum plug set**, (6) **Binding-washing vacuum manifold,** (7) **Tip disposal,** (8) **Reuse tip rack,** (9) **Buffer tank**, (10) **Elution vacuum manifold**

## 4.1 Six-channel spacing-adjustable pipette

The pipette is equipped with 6 syringes and adjustable tip spacing (9 mm and 18 mm), suitable for liquid transfer between microcentrifuge tubes and PCR tubes. The working volume of the pipette is 5 - 1000 µl. The standard tip is the 1.1 ml filtered tip.

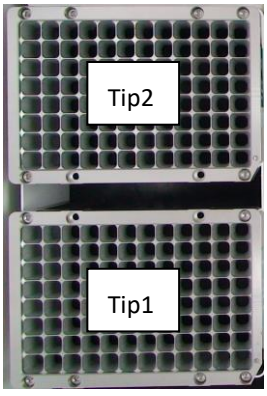


## 4.2 Ultrasonic fluid sensor



The ultrasonic fluid sensor detects clogged membrane after the steps of lysate binding and buffer washing. It also checks sufficient amount of the imported reagents for the extraction protocol and measures the sample volume one by one in the primary sample tube.

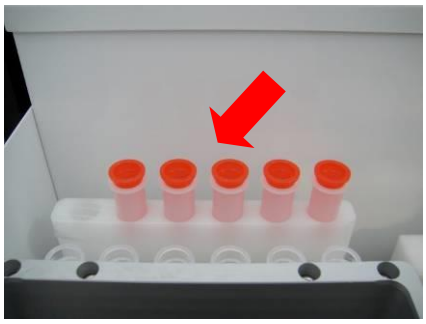
## 4.3 96-well tip rack




Two 96-well Tip racks (From bottom to top are **Tip 1** and **Tip2**) are for two 96-well plate tips, which can be 1100 µl tips for extraction or 300 µl tips and 96-well PCR tube/plate adaptor for PCR setup. The metal pin on the lower right of the rack top is an error-proof design for correct tip placement.

## 4.4 Plug tube rack

The plug tube rack is to accommodate five plug tubes.



## 4.5 HCCEB tube rack

The rack is for 6-stripped 2.0 ml tubes (the tube is the same as 6-stripped sample tube) of hot column clean elution buffer (HCCEB) for the extraction procedure.

## 4.6 PCR master mix tube rack

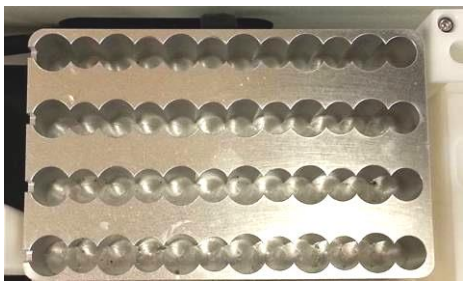
The rack is for two master mixes (M1、M2) used in PCR setup.


## 4.7 Proteinase K tube rack

The rack is for the 6 ml screw-capped tube of enzyme proteinase K for the extraction.

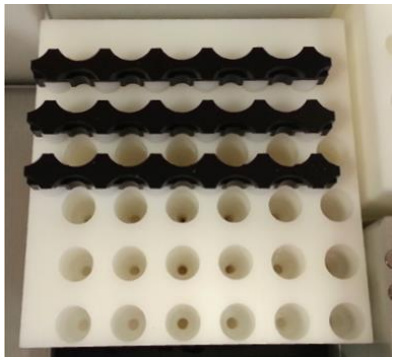
## 4.8 6x4(24)-well Sample lysis thermoblock

The Sample thermoblock is the 24-well block for sample lysis and column dry. The heat incubation can be as high as 80°C. The notch on each row is an error-proof design for correct placement of the 6-stripped sample tube.



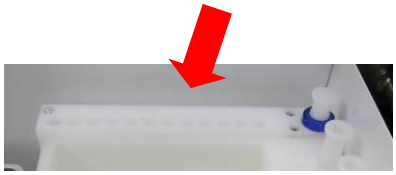
## 4.9 Vacuum plug set

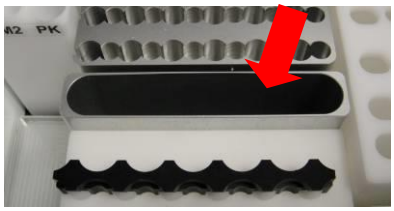
6-strip vacuum plugs are used on the binding-washing vacuum manifold. The function of the plugs is to prevent leakage during vacuum application. The Plugs must be set to left position as shown in the picture.



## 4.10 Tip-reuse rack and tip disposal

Reused reagent tips for wash buffer and ethanol transfer are placed on the rack. The tip disposal is the channel for auto-disposal of tips and consumables by the system.





## 4.11 Buffer tank

Five buffer tanks are for lysis buffer, EtOH, washing buffer, and elution buffer (CCEB). All buffer tanks are connected to automatic reagent feeders and therefore require no manual input of buffers. After the extraction, the remaining buffer in the buffer tank is automatically drained out.

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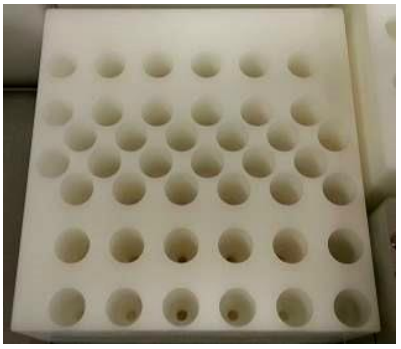
## 4.12 Binding-washing vacuum manifold



Both binding and washing steps take place here. This is the place for mounting spin column adapters, spin columns, and vacuum plugs. Up to 24 spin columns can be placed over here. Connected below is the stable vacuum system. The extra wells on the left are for the settlement of 3 sets of vacuum plugs.

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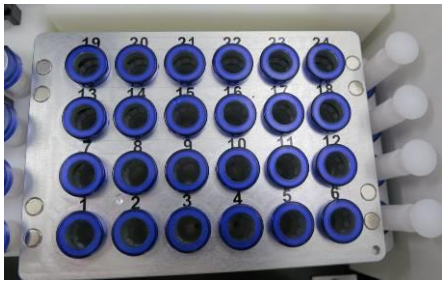
## 4.13 Elution vacuum manifold

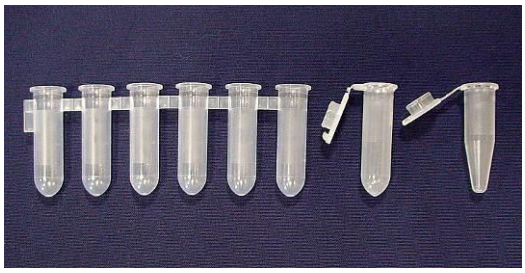



This manifold is for up to 24 product elution. Four airlocks located on the right side of the elution block are used to control the elution row. A plastic handrail with magnets comes with the metal cover of the elution block to facilitate cover handling.

# ACCEEORIES

## 5.1 Elution tube

6-stripped elution tubes (2.0 ml), 1.5 ml eppendorf with caps, or 2.0 ml eppendorf with caps can be placed on the **Elution vacuum manifold** for product collection.



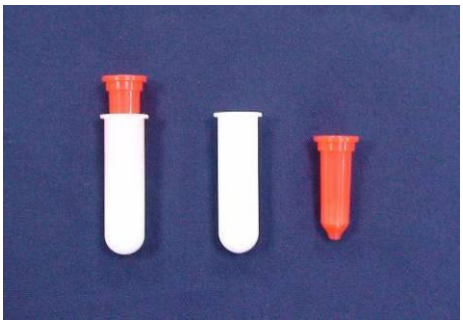
## 5.2 Sample tube

6-stripped sample tubes (2.0 ml) are placed on the **24-well Sample lysis thermoblock**. 6-stripped caps can be used for sample preservation.

## 5.3 Column set

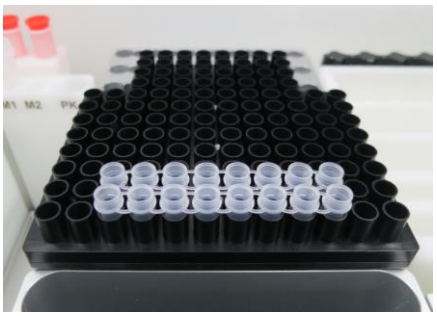
The column set contains the columns with 6-stripped spin column adapters, which is placed on the **Binding-washing vacuum manifold** for DNA/RNA extraction.

## 5.4 Plug tube combination



Five pink plug tubes are analogy to the column set and are mounted on the **Binding-washing vacuum manifold** to secure vacuum during vacuum application. It is used only on the last row of **CPU** where the sample extraction is undergoing. (ex. Sample No.23)

## 5.5 PCR setup plate adaptor



For PCR setup function, put PCR tubes or plate on the plate adaptor and apply them to thermoblock of the machine. It can accommodate 8-stripped tube, 12-stripped tube, or 96-well format plate.

# SOFTWARE INTERFACE AND OPERATION

## Main menu

After machine startup, the computer will automatically launch the LabTurbo 24 compact system software to main menu view. The main menu includes all the build-in functions for convenient accessibility and easy operation of the machine.

**Barcode:** for reagent tracking and documentation.

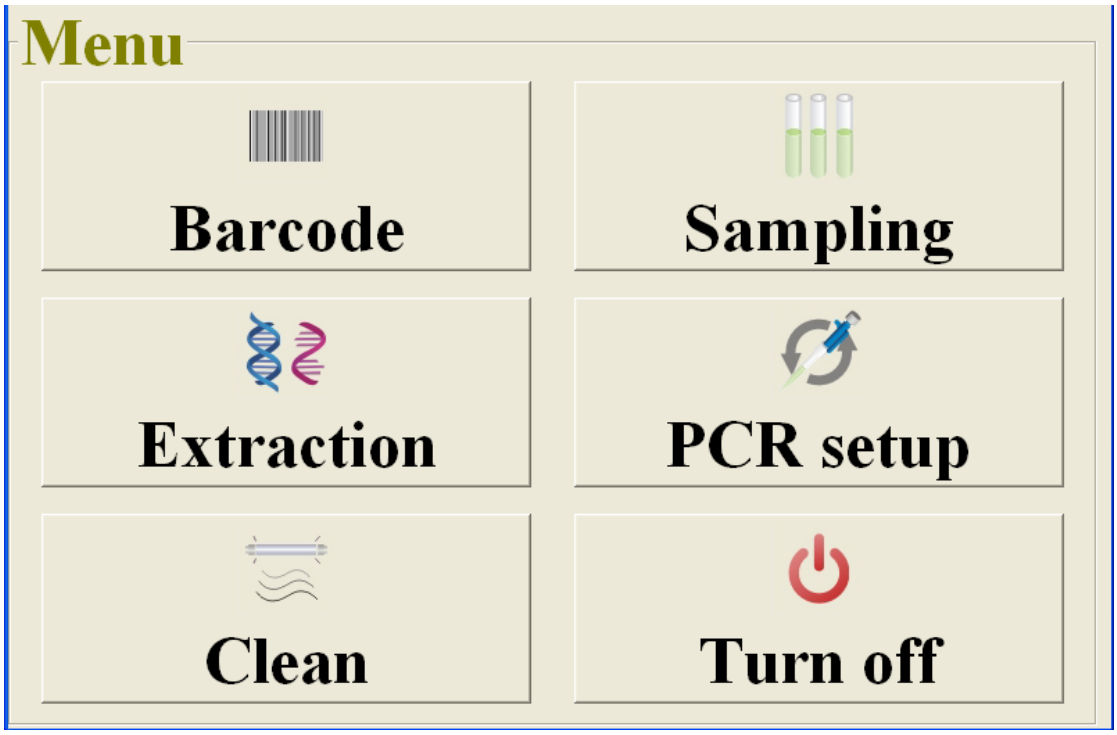
**Sampling:** for transferring sample from primary tubes to 6-strip sample tubes.

**Extraction:** for nucleic acid extraction procedure.

**PCR setup:** for liquid-handling, PCR setup, or sample transferring.

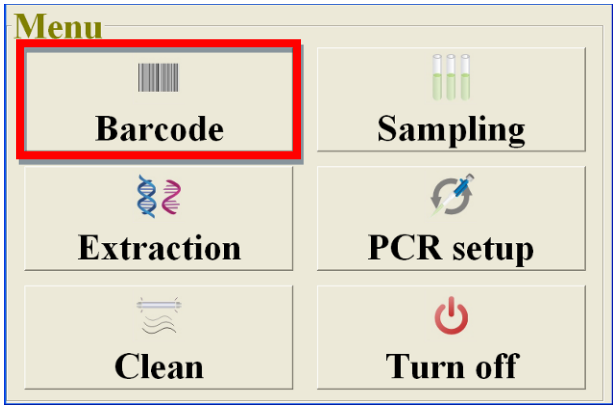
**Clean:** for machine maintenance and UV sterilization.

**Turn off:** for turning off the machine.

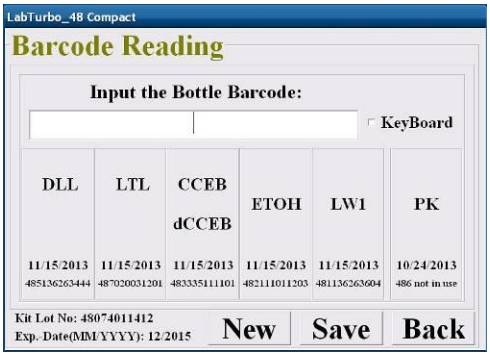


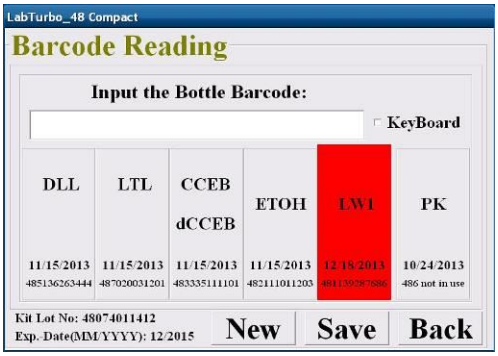
## 6.1 Barcode

1. For barcode tracking and documentation of regents, select Barcode.

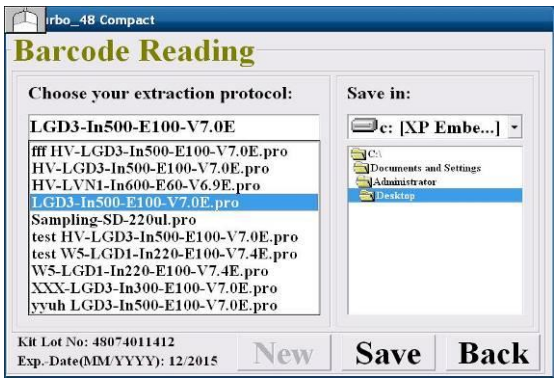



2. Please scan the barcode on the **reagent bottle first,** and then scan the barcode on the associated reagent reservoir. Once they match, the screen will highlight the position in the associated color to help users recognize the right reservoir. It also records the **refilling date**, **reagent lot number, kit lot number** and **extraction kit expiration date**. Repeat the steps to refill all the reagents for extraction.

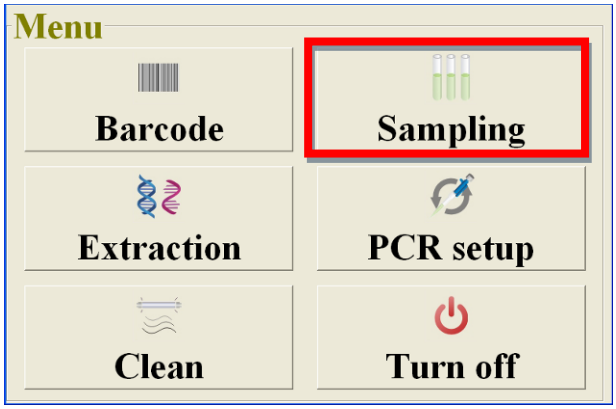



3. The reagent barcode data keyed in at step 2 are automatically saved in the system. If an independent documentation file is needed, please select **Save** to export the reagent barcode data. The data format is **txt file**.

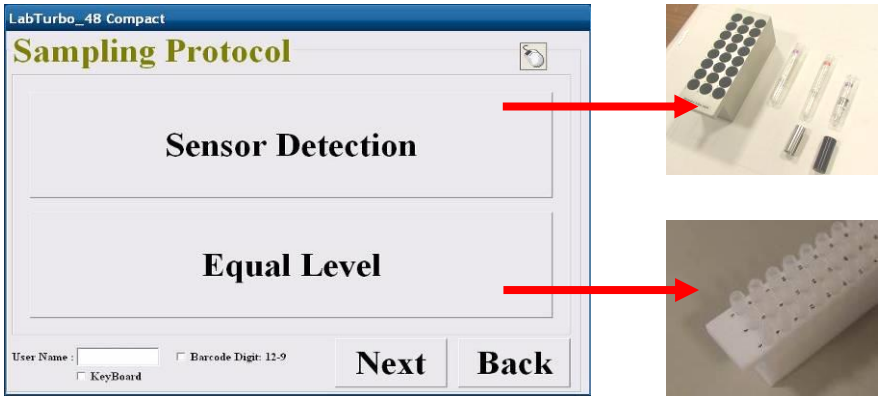


## 6.2 Sampling

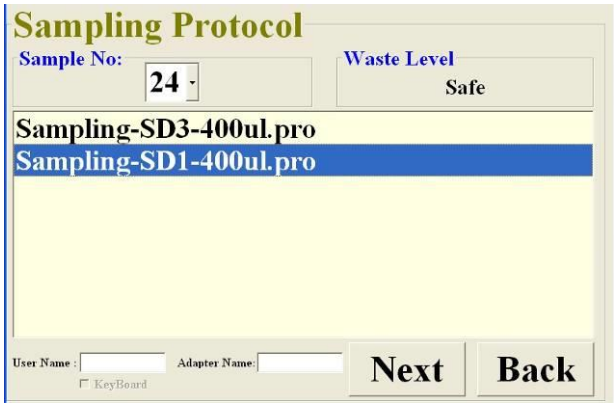
1. For sampling from primary tubes, select Sampling




2. Select “Sensor Detection” for using ultrasonic sensor to detect the liquid level of the blood primary tubes (customization) and transfer the sample with top-down aspiration. Select “Equal Level” for using the tip senor to detect the bottom of the 2 ml screw tubes and transfer the sample from the bottom of the tube. User name or adapter name could be entered by using keyboard or barcode scanning. (User name could be keyed-in at this page)



3. Put primary tube rack (samples) in the machine, select the sample number and protocol, and then select “Next”.

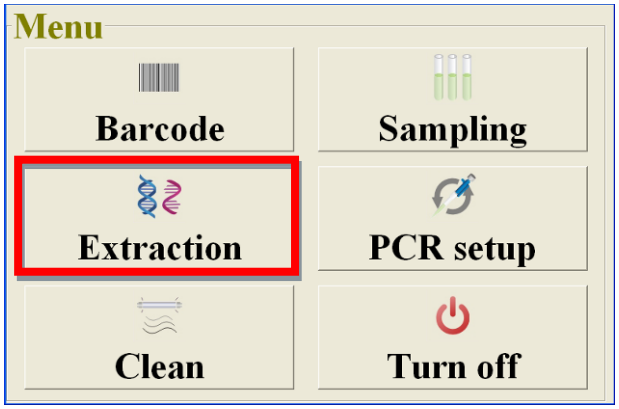



4. A Loading check window will pop up. Follow the instruction to setup the worktable. To document primary sample barcode, please select “Barcode”.

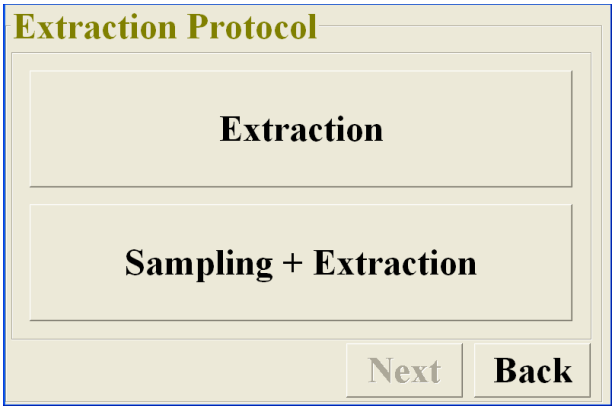
5. When finished, the System Message window will pop up. Open the safety door to check if all the samples are transferred to 6-stripped sample tubes and take out the primary tube rack. Go back to the main menu to start extraction procedure.

## 6.3 Extraction

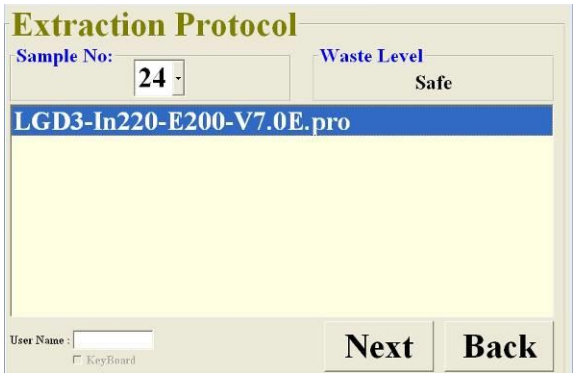
1. For DNA/RNA purification, select "**Extraction"**.



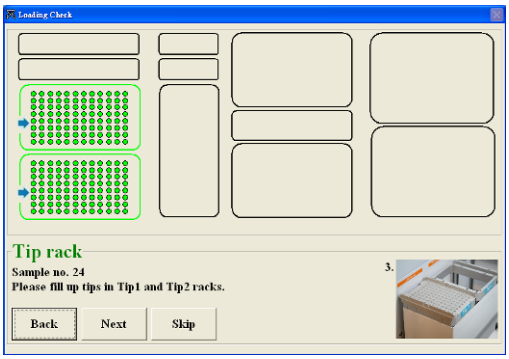

2. For extraction starting from manually transferred 6-strip tubes samples, select "**Extraction**". For extraction starting from primary tubes samples, select "**Sampling + Extraction".**



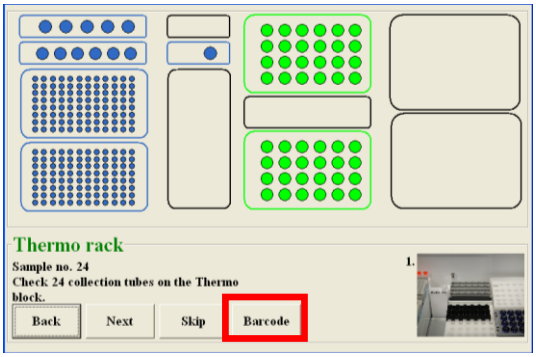

3. Select the sample number and the protocol (e.g. LGD3-In220-E200-V7.0E), then click **Next**. (LGD means the kit for extraction; In220 means the amount of input sample volume is 220 ul; E200 means the elution volume is 200 ul)

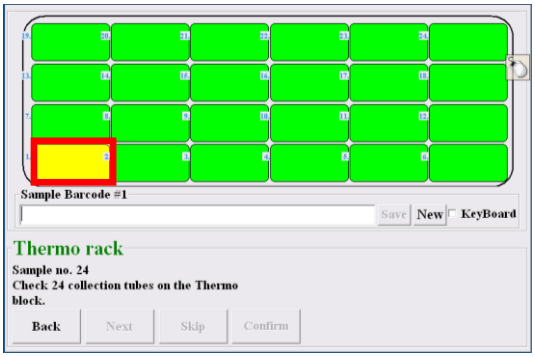


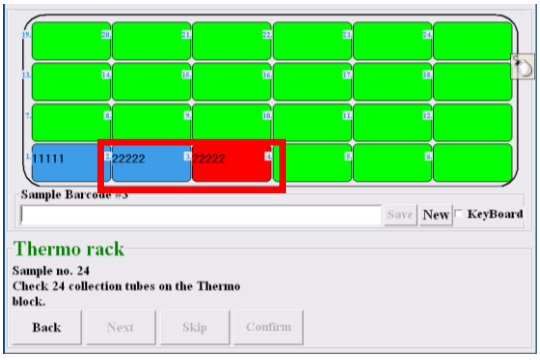
4. After clicking **Next**, the loading check window will pop up. Follow the blue arrow step by step to perform worktable setup check. For the documentation of barcode on sample or elution tubes, please follow **step 4-1 and 4-2.**

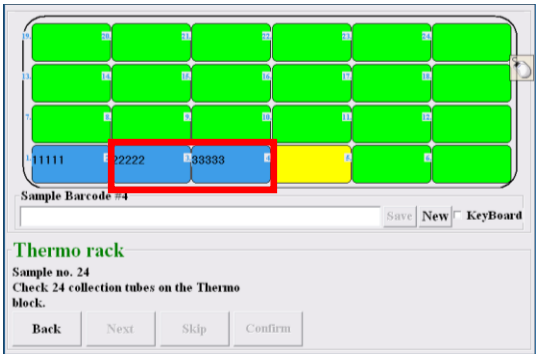



4-1 For sample tube barcode recording, please select “barcode” before checking the **sample section.** The recording map will show up. Please follow the **yellow** highlight to scan the barcodes on sample tubes. The recognized barcode will be marked in **blue**. For duplicated barcode, it will be marked in **red**. To modify a barcode, select the barcode to be modified and enter the new barcode.



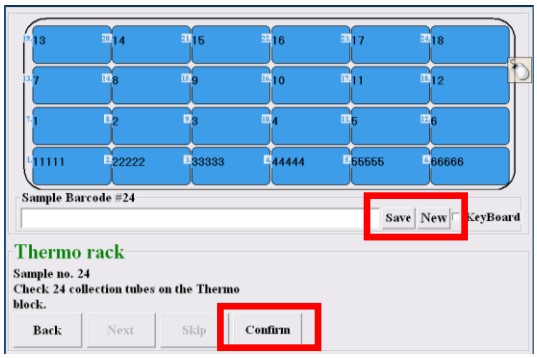



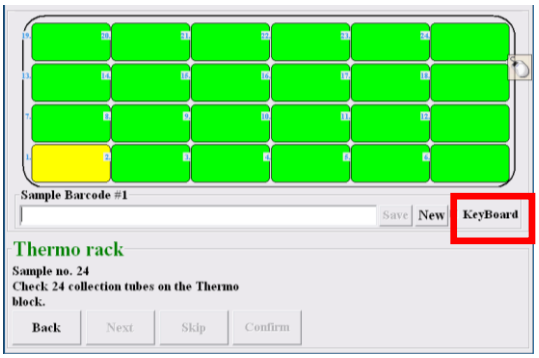



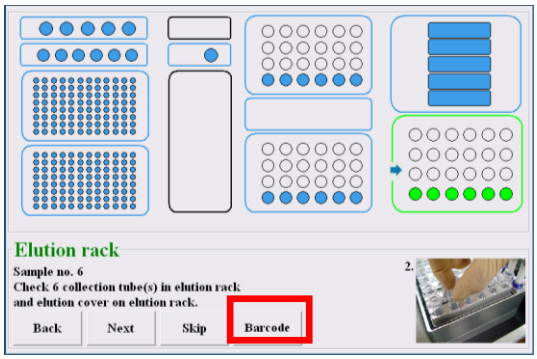

Once all barcodes are entered, select **save** to export a txt documentation file and select **conform** to continue to the next step. (Select **New** to refresh the map and re-enter all

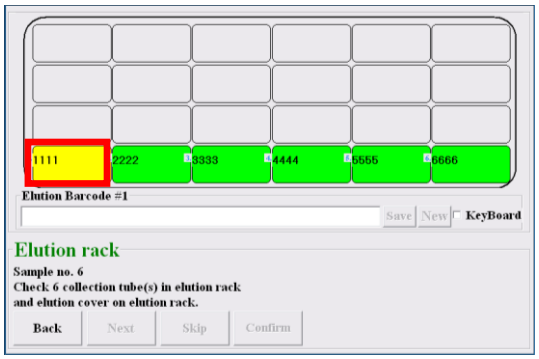
the barcode). Check the **keyboard** to manually input the sample barcode.

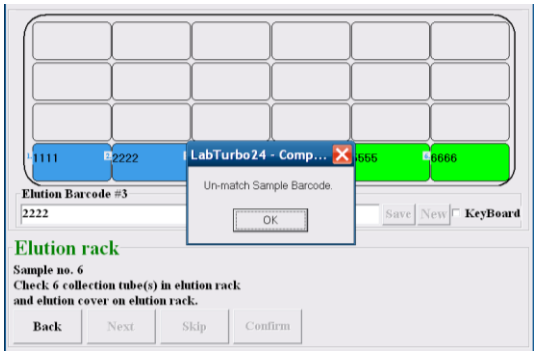


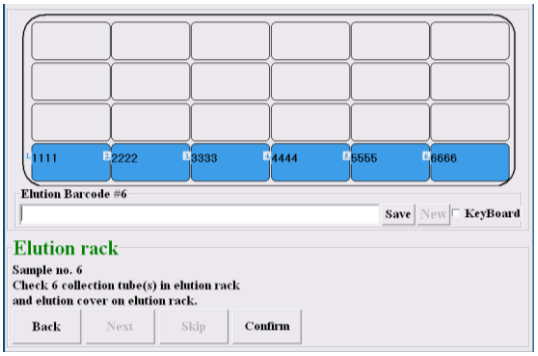




4-2 For elution tubes barcode confirmation, please select “barcode” at the last step before checking the **elution section**. The barcode map will show up. Follow the highlight in **yellow** to scan the barcode on elution tubes. Once the barcode matches, it will be marked in **blue**. For mismatched barcode, it will be marked in **red**. Please select the **red barcode** and scan the correct barcode.

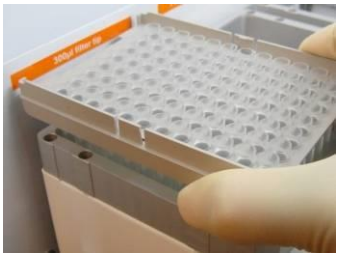
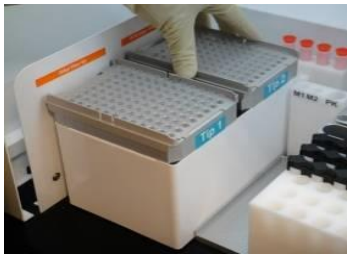


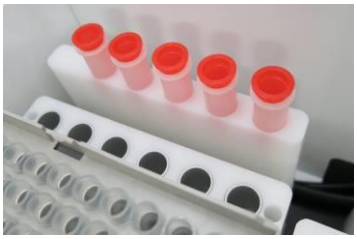
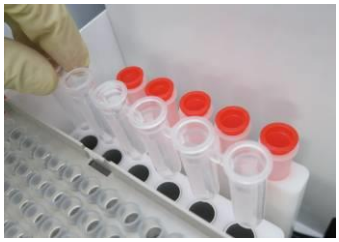



5. Remove all tips left from the previous run. Put two full 96-well tips (**1100 µl**) on **Tip rack 1** and **Tip rack 2**.

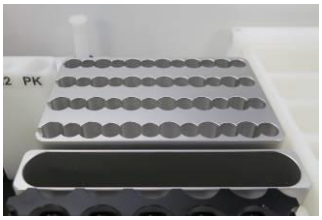
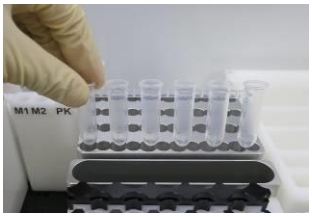
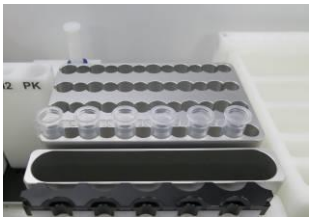
6. Place 6-stripped 2.0 ml sample tubes on the **HCCEB tube rack**.

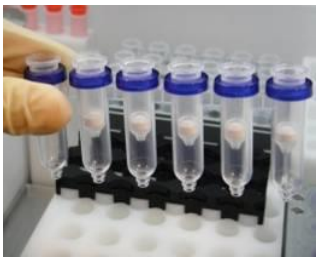

7. Open the cap of the proteinase K vial and put it on the **Proteinase K rack**.



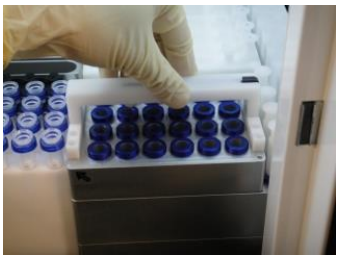
8. Carefully place 6-stripped 2.0 ml sample tubes on the **Sample lysis thermoblock** one by one. (For Sampling + Extraction function, please apply the primary tubes rack to machine as described in section and put the same number of sample tubes on **Sample lysis thermoblock.)**

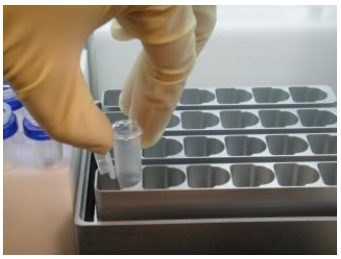




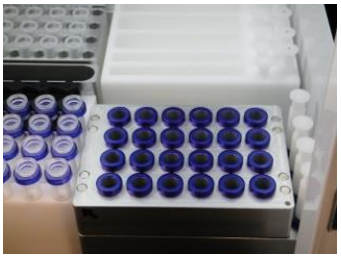
9. Place new columns sets on the **Binding-washing vacuum manifold.**



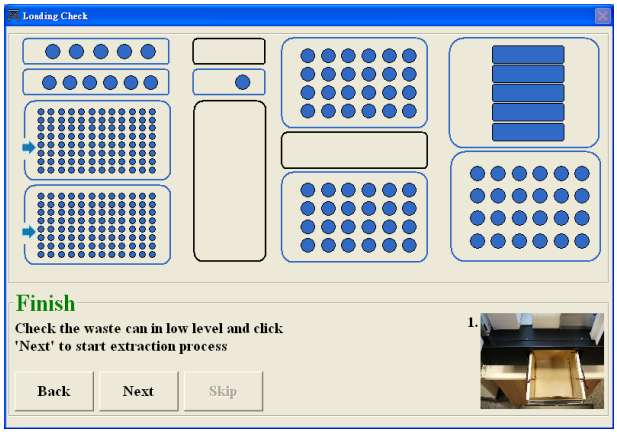
10. Insert 6-stripprd elution tubes (or 1.5 ml eppendorf / 2.0 ml eppendorf) one by one into the **Elution vacuum manifold**.



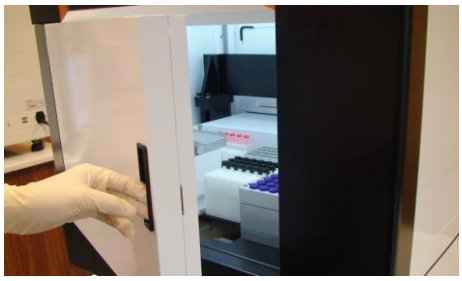


11. Once every section is loaded and confirmed, please ensure enough reagents in reagent reservoirs, empty the trash bin, and click "**Next**".

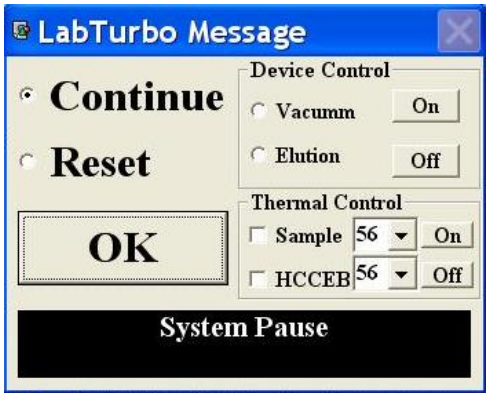


12. Close the safety door. Press  to start the protocol.

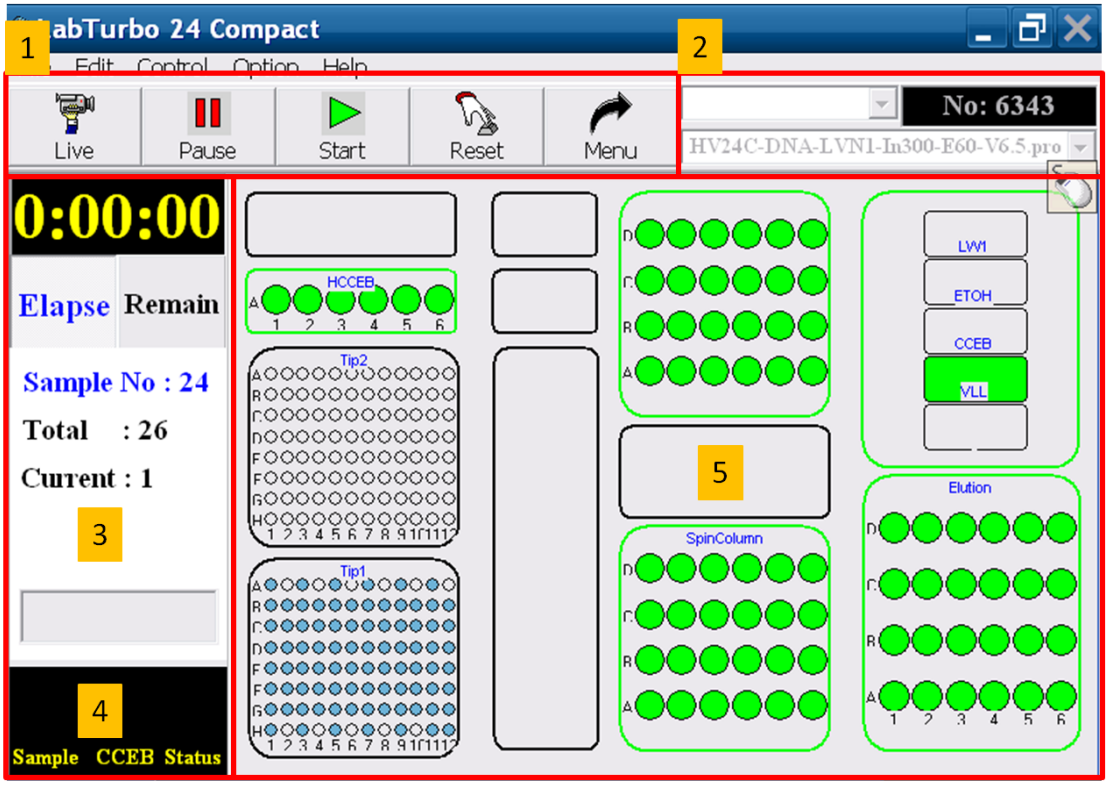


13. When finished, the System Message window will pop up. Open the safety door and take the elution tube out from the **Elution vacuum manifold**.

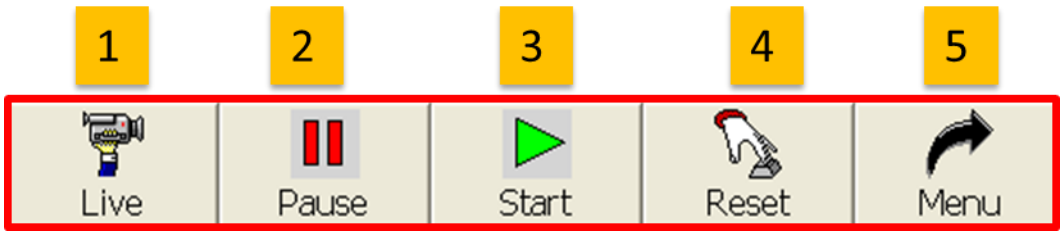

14. During the run, users can click Pause  or open the safety door to stop the run. Click Continue to continue the protocol or click Reset to terminate the run.



The following is the general control panel of LabTurbo purification program:



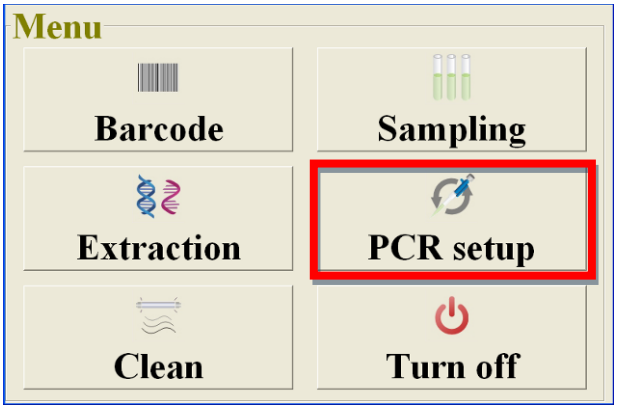

1. The “Main Toolbar” contains several shortcut buttons for convenient operation of the machine.
2. The “Protocol Window” indicates the protocol loaded for the procedure.
3. The “Timer” shows the elapsed time or remaining time (count-down). It also indicates the total and current steps of protocol.
4. The “Monitor” indicates the current heater temperature and vacuum of the machine.
5. The “Platform Configuration” mirrors the actual deck of the workstation. The green indicate the currently working position.




1. “Live”: Select this button to enable the camera to show the real-time view inside of the machine.
2. “Pause”: Select this to stop the machine (or by opening the safety door).
3. “Start”: Select this to start the procedure.
4. “Reset”: Select this to reset the machine and move the robotic arm to the original position.
5. “Menu”: Select this to go back to the main menu.

## 6.4 PCR Setup

1. For PCR preparation, select "**PCR Setup**".



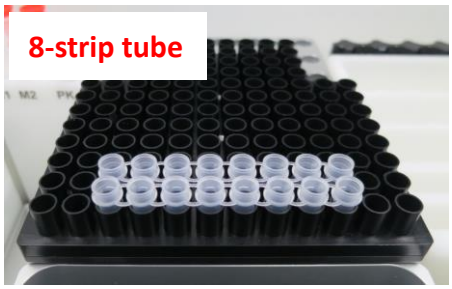

2. Template Only：Transfer template from elution to PCR rack/Tube.

   MasterMix Only：Transfer MasterMix from M1/M2 to PCR rack/Tube.

   MasterMix+Template：Transfer MasterMix from M1/M2 to PCR rack first, then transfer template from elution to PCR rack/Tube.

   Note：Comp.>MasterMix+Template is not provided on LabTurbo48C system.


3. Two kinds of MasterMix could be used on LabTurbo48C. Select the PCR tube format for 8 strip tubes/12 strip tubes.

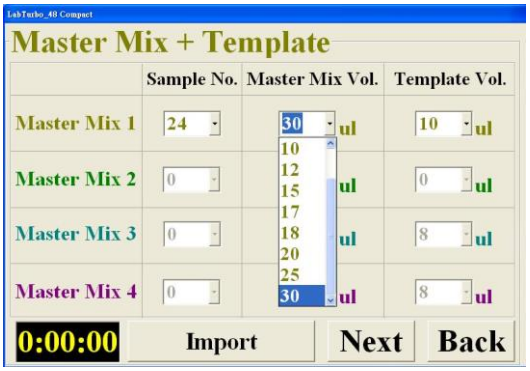




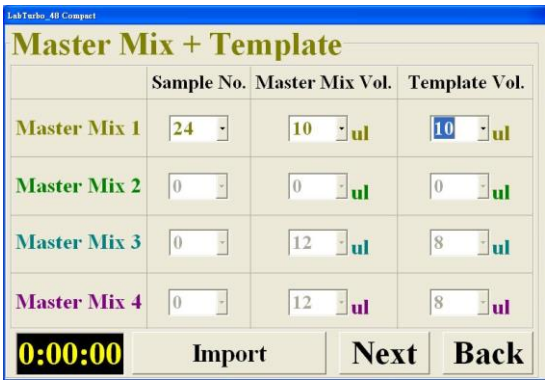
4. Next page is to select Sample number、Master Mix volume、template volume.

   Select sample number first. Maximal sample number is 24

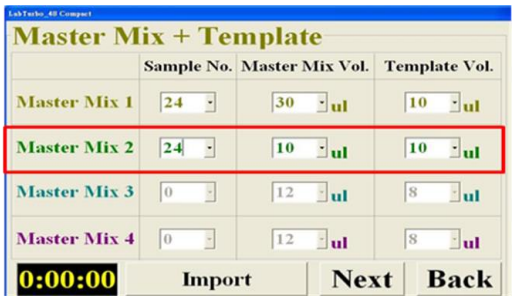

5. Select MasterMix volume. Maximal MasterMix volume is 30ul.



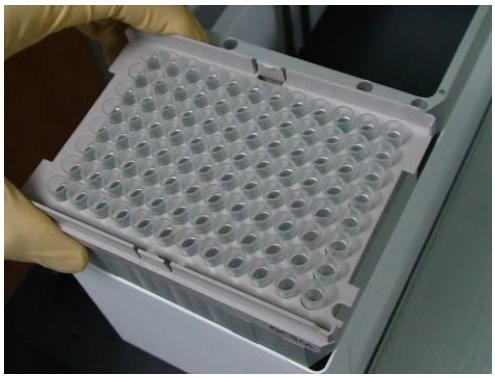

6. Select template volume. Maximal template volume is 30ul. Minimal template volume is 2ul.

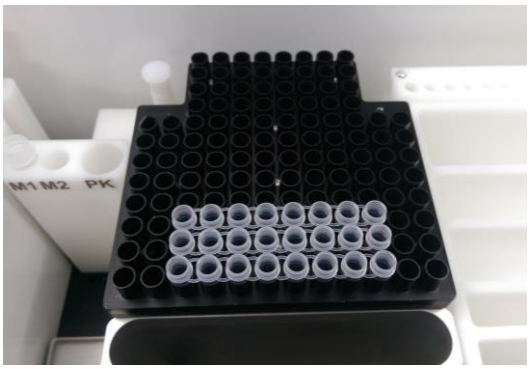


7. Chose Master Mix 2 sample number、mastermix volume、template volume.

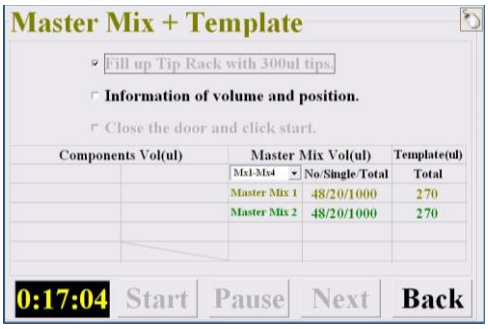



8. Next page is PCR setup loading check. Follow the instructions to fill up **Tip rack 1** with 300 µl tips, place PCR tubes (plate or strip) on the **PCR plate adapter**, then mount the assembly on **Thermoblock**.

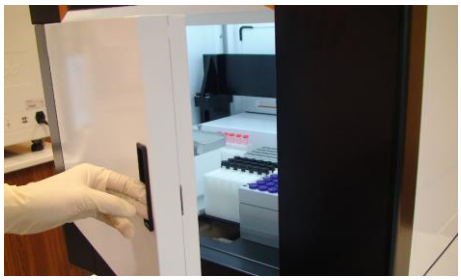



9. The required volumes of master mix and template are indicated on the loading check page. Apply sufficient amount of master mix on 2.0 ml screw tube and put it on the master mix rack. Ensure that the elution tubes are placed on the associated positions on the elution rack.





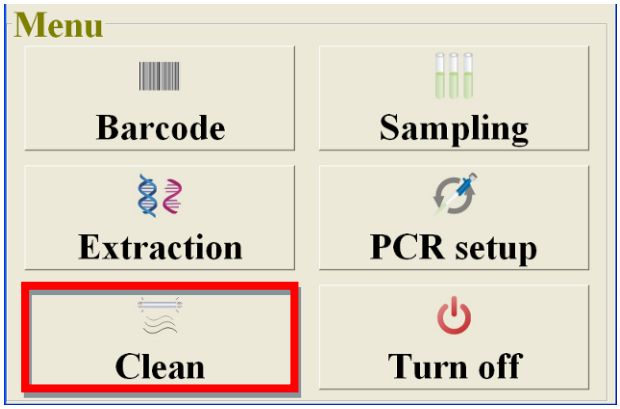

10. Close the safety door and press **Start**.



11. When finished, the System Message window will pop up.

## 6.5 Clean

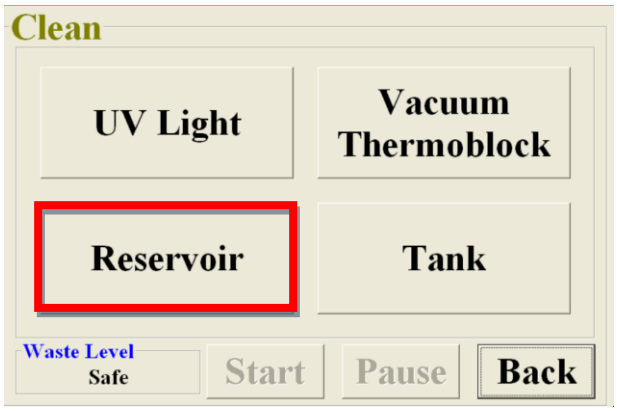
Select **“Clean”** to enter clean and maintenance mode.



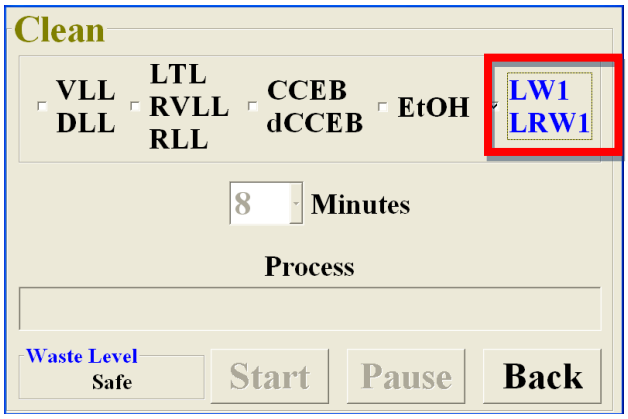

### Reservoirs Clean

1. Check the waste level in the **Waste Tank** and drain out all the waste.

2. Select “**Reservoir**”




3. Check the **Reservoir** to be cleaned at this page.



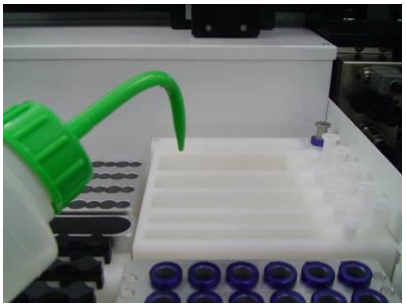

4. Close the door and press “start”. The machine will automatically drain out the remaining buffer to **Waste Bottle**.
5. After finishing the procedure, please drain out all the waste in **Waste Tank** again.
6. Select **Reservoir** again at the clean page and check the same reservoirs on step 3, add dd$H_2O$ to **Reservoirs** for cleaning

7. Close the door and press **Start**. The machine will automatically drain out the dd$H_2O$ to **Waste Bottle**.
8. After finishing the procedure, please drain out all the waste in **Waste Tank**.

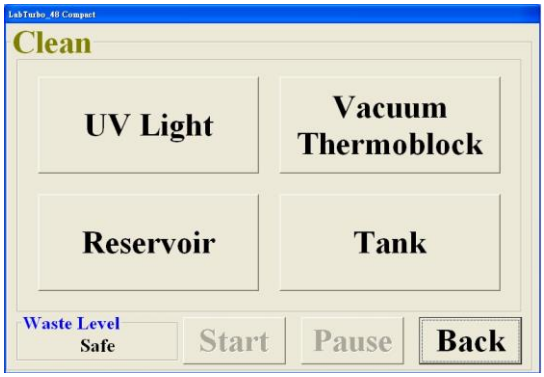
## Tanks Clean

1. Check the waste level in the **Waste Tank** and drain out all the waste.

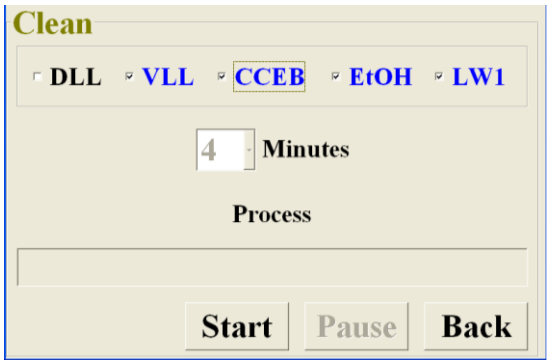
2. Add 80~90% tank volume of dd$H_2O$ to tanks intended to be cleaned.



3. Select “Tank”.




4. Check the tanks intended to be cleaned.



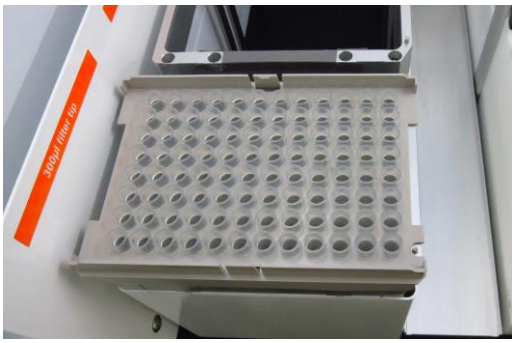

5. Close the door and press “start”. The machine will automatically drain out the dd$H_2O$ to **Waste Tank**.

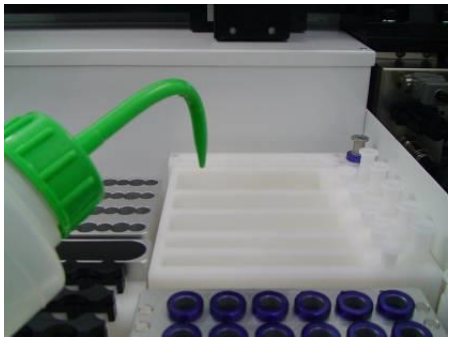
6. After finishing the procedure, please drain out all the waste in **Waste Tank**.

## Vacuum and thermoblock clean

1. Select “Vacuum/Thermoblock”

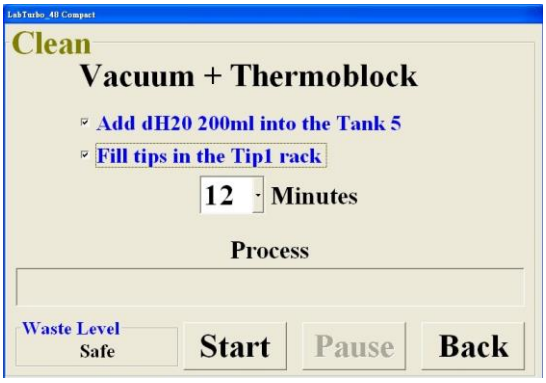
2. Add one 1100ul 96-well tips on **Tip rack 1** and add 200 ml dd$H_2O$ on **Tank 5**.





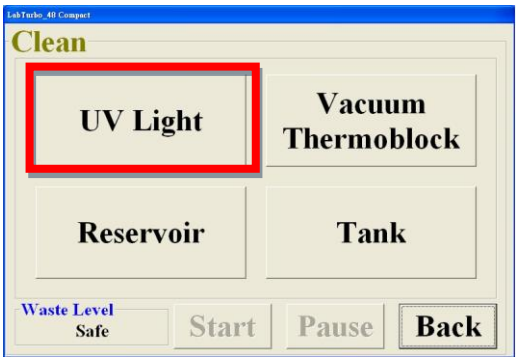
3. Empty the **Thermoblock** and **Binding-washing vacuum manifold**.

4. Follow and check the instructions on the screen and click **Start**.

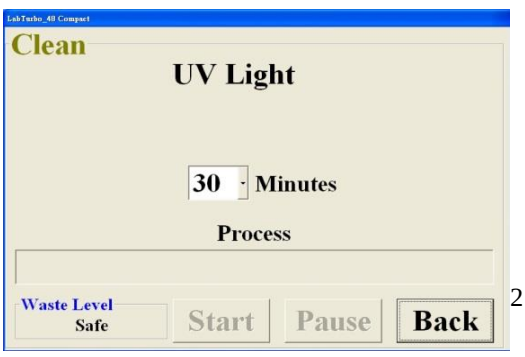


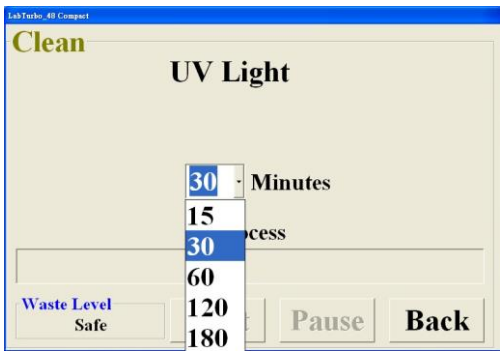

## UV light clean

1. Select “UV light”.




2. Choose the UV light duration and click **Start**.

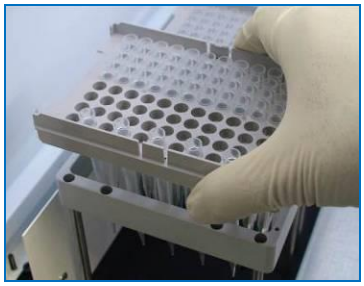


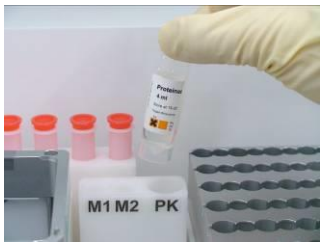
# MAINTENANCE

## 7.1 Daily clean and maintenance

1. Preserve the remaining tips left on the **Tip racks** for the next run.



2. Take out the **Proteinase K** vial and close the cap.

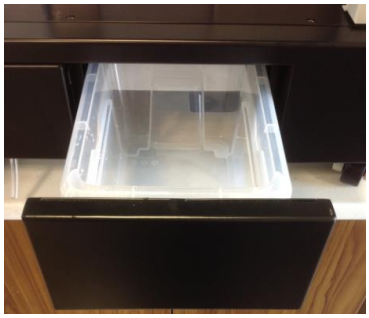



3. Wash the **Elution Cover** with tap water and air dry or wipe to dry with tissue paper.

   (**Do not** put in "Oven" or "autoclave" to dry)

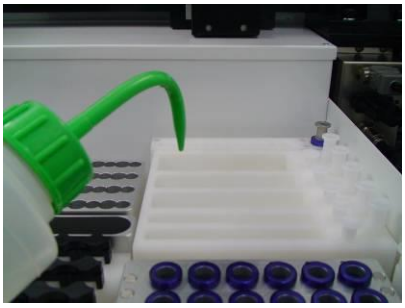
4. **Empty** the waste tank. Switch to "On" to discard the waste and switch to "Off" to close it.

5. Clean the trash bin.

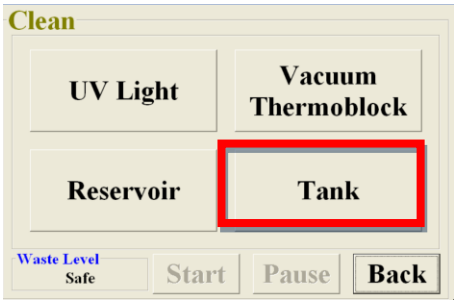


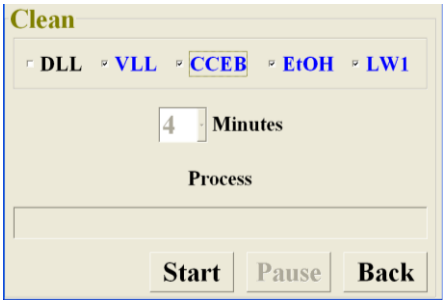
## 7.2 Weekly clean and maintenance

1. Add distilled water to each **Reagent tank**.

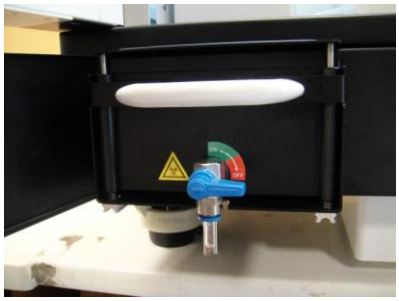


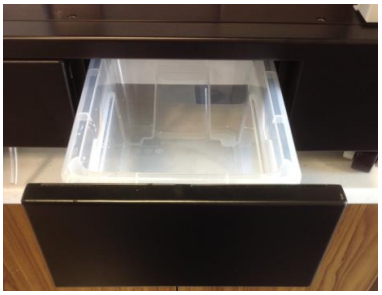
2. Select clean tank function and choose the tank for cleaning.




3. Check the level of waste bottle and trash can.

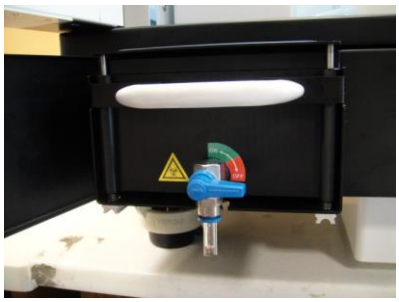
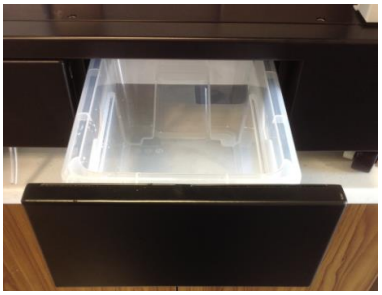




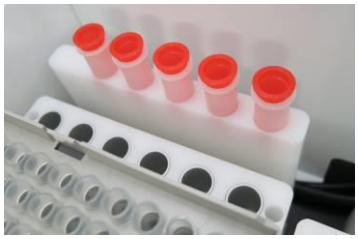
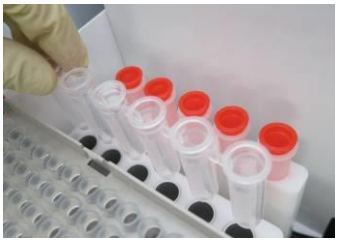
## 7.3 Monthly clean and maintenance

1. Clean each side of machine by hand towel.

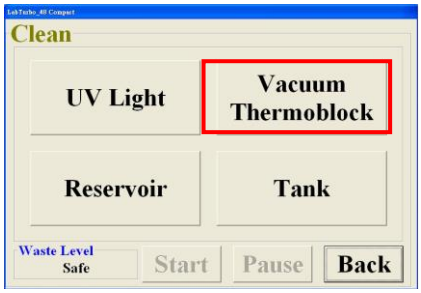

2. Check the level of waste bottle and trash bin.

3. Replace 6-strip tubes in HCCEB rack with a new one.

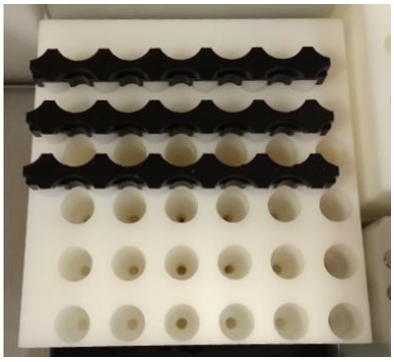



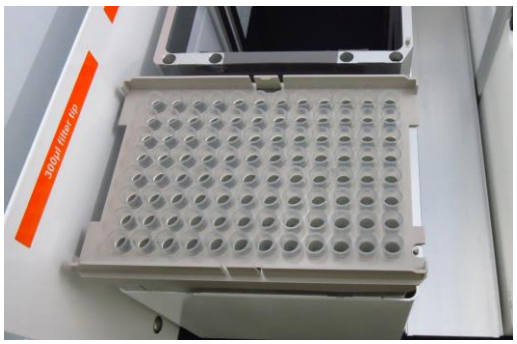
4. (**Optional)**Choose “clean” and select “Vacuum+thermoblock”.



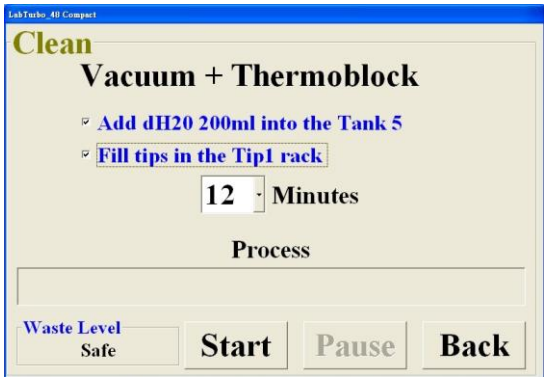
Make sure empty the **Thermoblock** and **Binding-washing vacuum manifold**.

Add 200 ml distill water into Tank 5. Place one 96-well tip on Tip 1 rack.



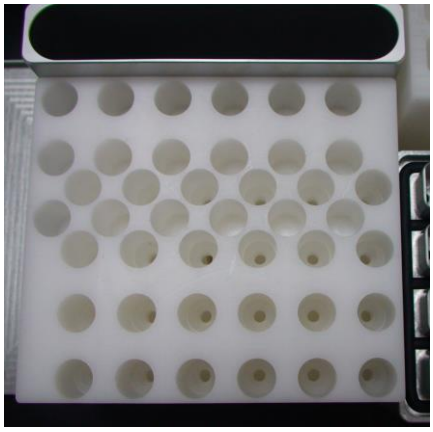


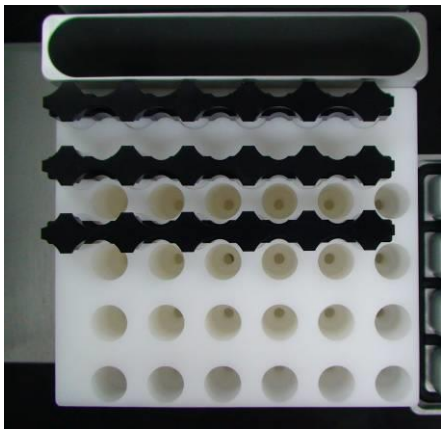
Follow and check the instructions on the screen and click **Start**.




5. **(Optional)** Wash **Vacuum plug set** with tap water and air dry or wipe to dry with tissue paper. Ensure **three Vacuum plug sets are** at the original positions.

**Three Vacuum plug sets should be placed on the left of the Binding-washing vacuum manifold.**





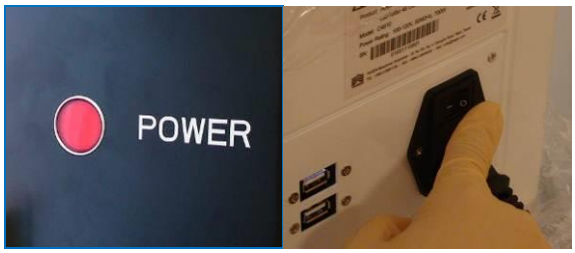
# TROUBLE SHOOTING

## System Message-

**“DAQ connection error”**

This message indicates that the controller does not connect to computer.

Please turn off the program and computer. After turning off, switch the main power off and on once. Then turn one the machine.




**“XY/ZW/T/Heater1/Heater2 connect error, checking the RS232USB connection”**

This message indicates that the controller does not connect to computer. Please turn off the LabTurbo 48 Compact software and the machine. After all are turned off, switch the main power off and on once, and then turn on the machine again. If this message remains, please contact our customer service.


**“Close the door”**

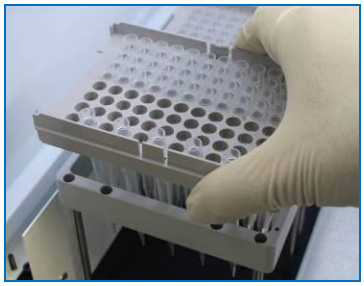
This message indicates that the door is opened.

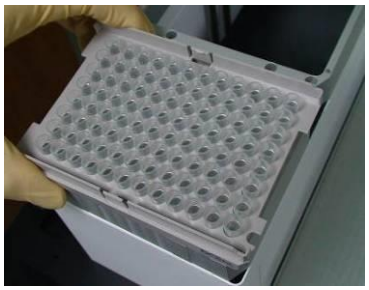
Check the sensor on the side of door. Please close the door and start the procedure again.

**“Please fill Tip 1/2 Rack and install it correctly”**

This message indicates that there are missing tips on tip rack.

Please open the door to replace the tip rack with a full one. After replacing, close the door and select “OK”. Remember to refill all two tip racks.





**“Please add PK XXX ul into the enzyme bottle”**

This message indicates the amount of Proteinase K is not enough. Take out the Proteinase K vial and replenish it. Put the vial back and close the door, then select **OK** to resume the procedure.

**“Please add LW1 XXml into the buffer tank”**

This message indicates that the amount of buffer is not enough in the reservoir.
Please open the door to refill reagent over the refill line. After refilling, close the door and select “OK”.

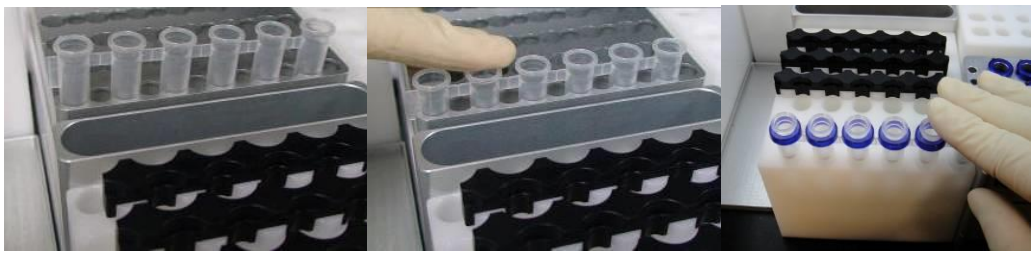
**“Open the cap of proteinase K”**

This message indicates that the cap of proteinase K vial is not opened.
Please remove the cap of the proteinase K vial, put it back onto the rack, and then close the door to start the procedure again.

**“Check the Target Bottom”**

This message indicates that columns, sample tubes, or elution cover are not set properly.

Please open the door to press the column sets or the sample tubes down to set them in right positions.



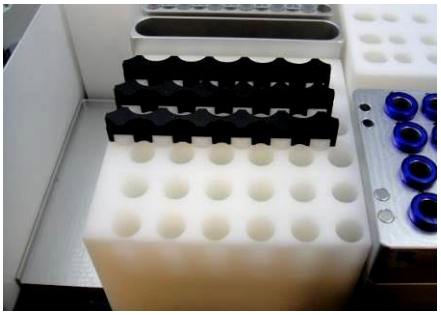
**“Run Time error”**

This message indicates that the system is overloaded and the program will terminate to prevent machine from doing anything wrong.

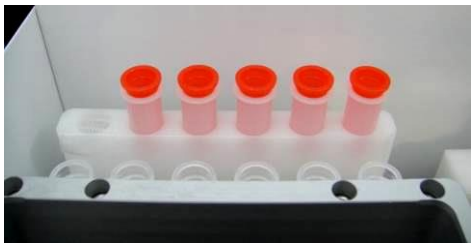
Once this message pops up, please record the current step first. This is very important because once “ok” is clicked, the program will terminate automatically. To finish the whole procedure, users can manually recover the worktable, restart the program, and then continue from the terminated step to complete the extraction.

The worktable should be recovered manually to original status by following steps below:

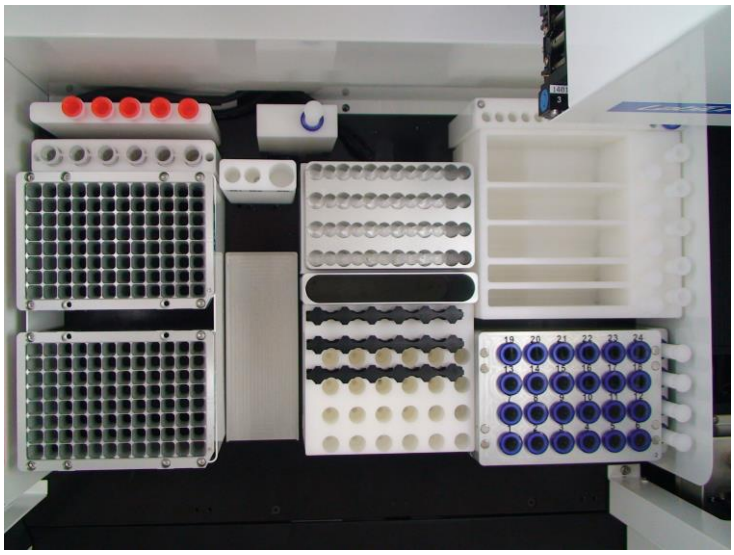
1. Put all the **plug sets** back to the original positions.



2. Put plug tubes back to plug tube rack.



3. Recover the worktable as shown in the picture.



**“X or Z or Y-Axis error”**

Please contact our customer service for more details.

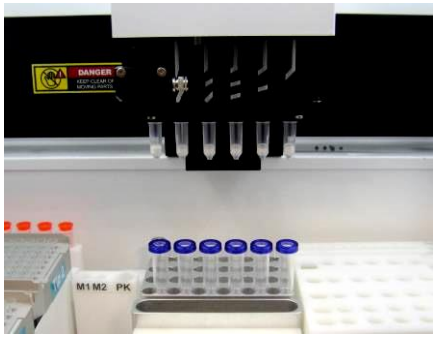
**“Windows error (CCD connection failed), turn off the main power and restart the system”**

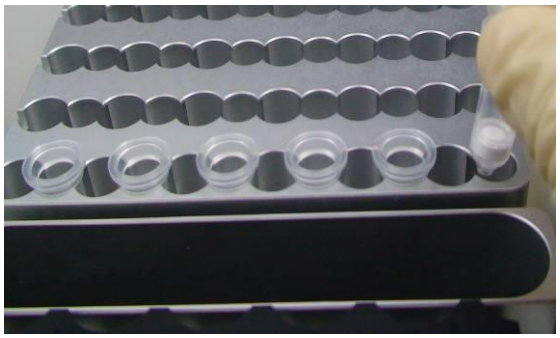
This system message indicates that the CCD camera is not successfully recognized by the system computer through the USB interface. Please turn off the software and restart the computer to let the computer recognize the CCD camera.

**“Remove the dropping Column Adaptor and then click Continue”**

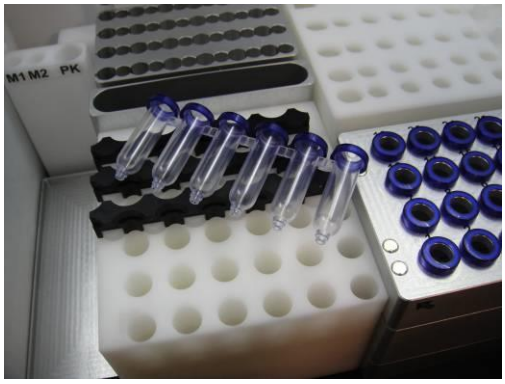
This message indicates that SC-adaptors mistakenly fall down onto the worktable.

1. If the worktable is shown picture below (The robotic arm still grip the column), please remove the SC-adaptor from worktable and put the columns into the dry spot manually. Close the door and click “continue”.



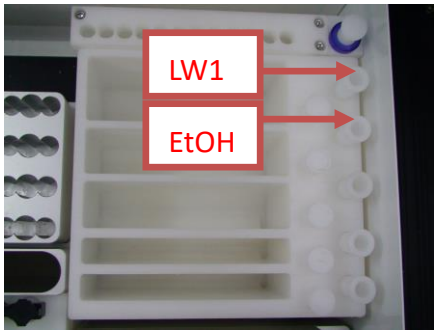
2. If the worktable is as the picture below (The robotic arm already transferred the columns to the dry spots). Please remove the fallen SC-adaptor from worktable and click “continue”.




**<u>“Vending plug aging, replace a new vending plug at EtOH/LW1 position”</u>**

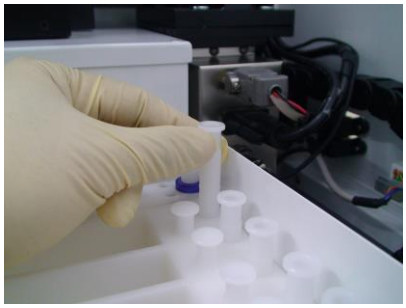
This message will pop up after extraction protocol is completed. The extraction and sampling functions will be locked down until the vending plug is replaced.

1. Identify the vending plug to be replaced. Prepare a new vending plug.

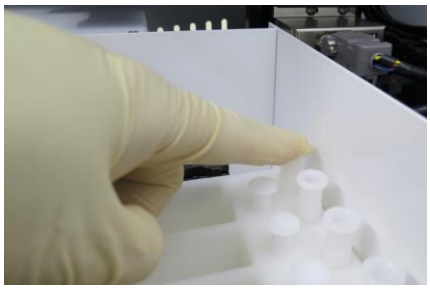



2. Pull out the old vending plug and replace it with a new vending plug immediately.

   Caution：Reagent will flow into the reagent tank when the vending plug is pulled.

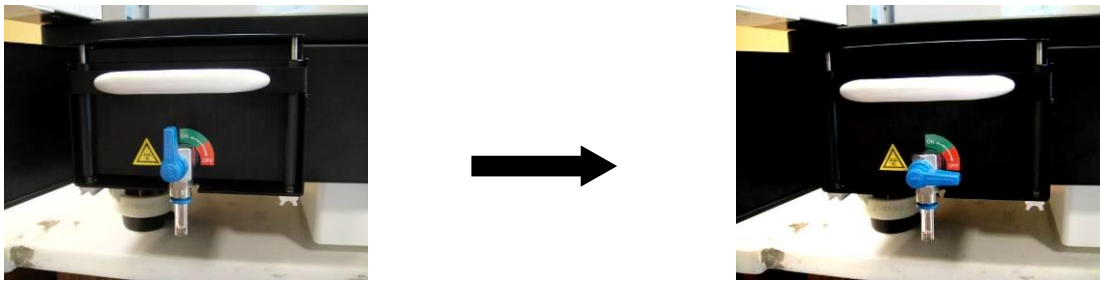


3. Push the new vending plug to the bottom. Turn off LabTurbo software and restart the program to start the next run of extraction.



**“Low vacuum pressure, switch off the Waste Tank and try again”**

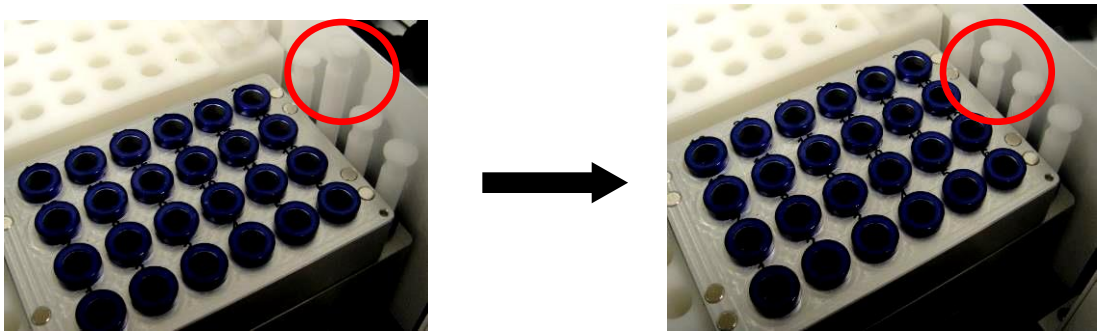
Open the door of waste system and switch off the waste bottle.



Switch on　　Switch off

**“Low elu-vacuum, check all air plug in correct position”**

Check the air plug of elution manifold. Press air plug to the correct position.



**“Low elu-vacuum, check the cover and elu-tubes in correct position”**

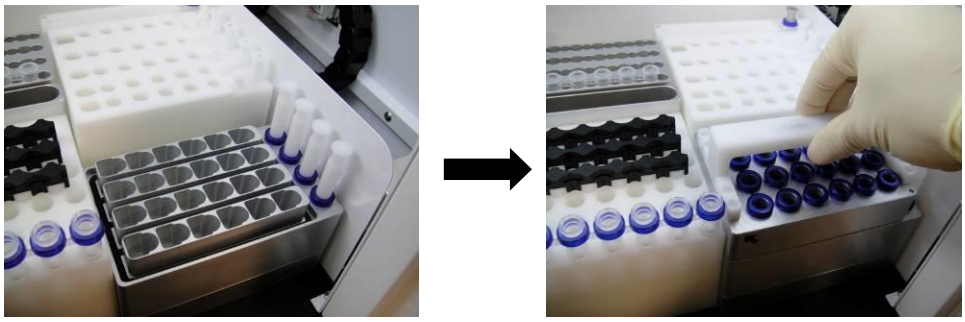
1. Open the door and check elution cover and column at correct position.
2. Close the door and choose “Yes”.
3. If this message pops up again, please choose “No”
4. Another message will pop up: **“Take row No：1 columns out and used spin down to elution”.** Open the door and take the columns out. Use a centrifuge to finish elution. The row number could be No：1- 8.
5. Close the door and choose “continue” to proceed.

**“Wrong plug tubes setup”**

This message will show at the beginning of the extraction. Check the five plug tube combinations are at correct positions.

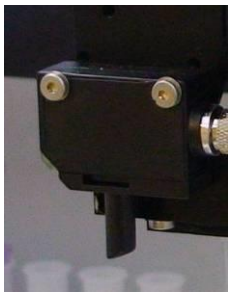
**“Elution cover miss, put Elution cover correctly”**

This message indicates that the elution cover is not correctly set at the original position. Please put the elution cover on the elution block correctly and proceed the run.



**“Sample No=X removing the excessive Column set on wash block”**

1. This message indicates mismatch of the number of columns and the sample number of the run. Please check the column setup at worktable. X means No. 1~24.
2. Check the ultrasonic fluid sensor on the robotic arm. If the sensor is damaged, please contact our customer service for more details.



**“Kit has been stored over one year”**

This message could show up during the startup of the LabTurbo program if the current extraction kit is expired. The extraction kit can be stored for one year and expiration date is shown on the top of extraction kit. Please replace the kit with a new one, and scan the barcode on the new extraction kit under the “Barcode” page.


**“XXX buffer has been stored over three months”**

This message indicates that the reagents in the reservoirs have been stored for more than three months and expired. Please perform reservoir clean (see Section 6.5) and load new reagents into the reservoir (see Section 6.1).

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