LabTurbo

96 COMPACT SYSTEM

HI-SPEED 96 NUCLEIC ACID EXTRACTION SYSTEM

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 96 Compact System (LabTurbo 96C).

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: 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.

2.1 Normal use

 WARNING: Improper use of the LabTurbo system may cause personal injuries and/or damage to the instrument. The use of the machine should be under the instruction 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 96-Compact power located on the front of the device.

 CAUTION: We strongly recommend the users to use accessories and disposables of LabTurbo 96-Compact. Non-LabTurbo accessories and disposables may result in damages of the instrument.

 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 assembling, carrying, and positioning requirements

 CAUTION: LabTurbo 96-Compact is a device manufactured and assembled in the certified factory. There are no special requirements for the installation of the device. While carrying the machine, make sure the passageways are clear of all obstructions. Instruction must be received prior to any lifting applied.

 CAUTION: The device should be placed and anchored securely on a sturdy pedestal or platform. Fix the robotic arm before moving the machine.

2.3 Ventilation requirement

 CAUTION: This device is equipped with a ventilation fan that allows the air to circulate and removes stale air. Therefore, no additional environmental measurements are required. A lab with appropriate ventilation is fine.

2.4 Additional equipment positioning requirements

 WARNING: The main power cord of the device 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 follow 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 properly collected and disposed in accordance with the local safety regulations.

2.7 Mechanical hazard

 WARNING: This machine has a safety door. Once the power of LabTurbo

96-Compact is on, the user should not stretch into the workstation under any situations.

2.8 Heat hazard

 WARNING: The Thermoblock of LabTurbo 96-Compact can heat up to 80 °C. Be aware of it when the heating step is undergoing. It is not allowed to use the Thermoblock with volatile or flammable liquids.

 WARNING: The maximum continuous operating time of the vacuum pump is 5 minute to avoid overheating.

2.9 Electrical hazard

 WARNING: Modification to any electrical components (wires, cables, circuit boards, etc.) of LabTurbo 96-Compact by unauthorized personnel is prohibited.

2.10 Work environment demand

Working environment	Storage environment	Operation environment
Temperature	0 – 60℃	7 – 40℃
Humidity	10 ~ 95% @ 40℃ (non-condensing)	
Altitude	< 1000 m	
Voltage	AC 110 ~220 Signal phase	
Watts	1250 W	
Maximum current	110V : 10A / 220V : 6.3A	

EXTERNAL FEATURE

LabTurbo 96 Compact is the “automated nucleic acid purification system with innovative vacuum membrane column technology.” The externals of the main workstation consist of several parts, including a built-in touch screen, a safety door, a power button, a side ports, four machine feet with wheels, a pump system, and a waste bottle.

3.1 Built-in touch screen

The sensitive built-in touch screen is on the top front of the machine. This control panel equips with Windows user interface. Once the panel is turned on, the LabTurbo program will automatically activate, and users can select the desired protocol to start. An included stylus is the accessory of the touch panel.

3.2 Safety door

The main workstation of LabTurbo 96C has a safety door to form a closed cabinet. This protects users from being exposed to any risks or dangers when the machine is up and running. It also isolates the worktable from the external environment, reducing the possibility of contamination. If the safety door is opened while 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 and directly enter the LabTurbo program. Emergency button is used for urgent situation to stop the machine immediately.

3.4 Automatic reagent feeder

Four automatic reagent feeders are located on the lower part of machine. Those are the buffer supply for the buffer tanks on the worktable. Check buffer level to refill line before use. The buffer from the left to the right is DLL/VLL, EtOH, LW1, CCEB.

Note：Buffer label may be vary for different purpose

3.5 Label

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

3.6 Side panel

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

B. **AC 110V/220V** & **ON/OFF** AC：main power

switch and the power cord socket. The fuse chamber is in between the main power switch and the power cord socket.

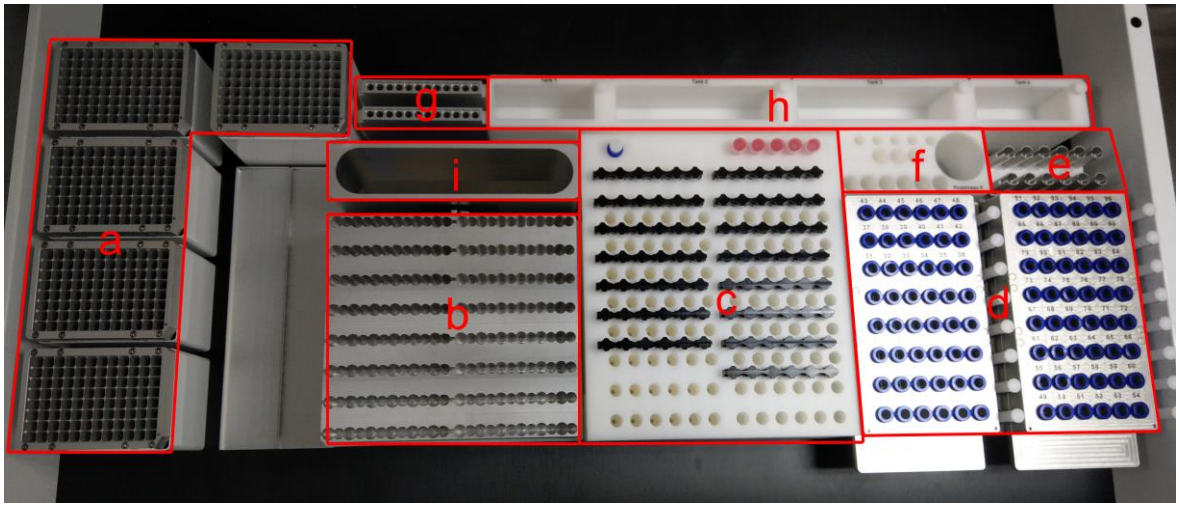
3.7 Machine feet with wheels

The height of the machine feet is adjustable and accompanied with the wheels. Manage the level of the workstation by adjusting the height of the machine feet.

3.8 Waste system

The waste system includes a **Waste bottle** for major waste collection during binding, washing, and cleaning steps with liquid level detection function and a **Trash can**.

WORKTABLE UNITS



a. 96-well tip rack

b. Sample lysis thermoblock

c. Binding-washing vacuum manifold

d. Elution vacuum manifold

e. HCCEB rack

f. Proteinase K、LTL buffer、PCR master mix Rack

g. Tip-reuse rack

h. Buffer tank

i. Tip disposal vent

4.1 12-channel pipette & Ultrasonic fluid sensor

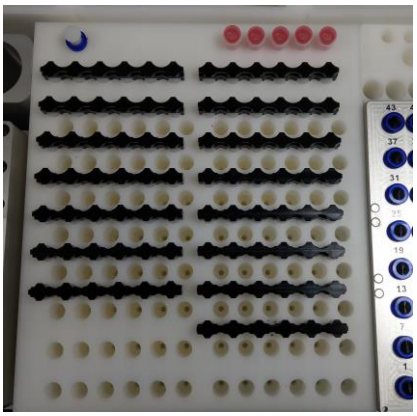
The pipette is equipped with 12 syringes. The back row of pipette is included ultrasonic sensor. It is used to detect liquid level of column and reagent tank.

4.2 96 well Tip rack

Five tip racks located at worktable for 1100ul tip/300ul tip/PCR plat. The metal pin on the lower right of the rack top is a foolproof feature for mounting the tip plates.

4.3 Binding-washing vacuum manifold

This is the unit for applying spin column adapters, spin columns, and plug set. Up to 96 spin columns 15 plug set can be placed on this unit. Connected below is the stable vacuum system



4.4 Sample lysis thermoblock

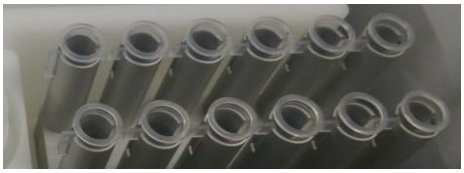
The Sample thermoblock is the 96-well block for sample lysis and drying column. It can heat up to 80°C for heat incubation. The notch on each row is a foolproof feature for placing the 6-strip sample tube.

4.5 Plug tube rack

The plug tube rack is to accommodate six plug tubes

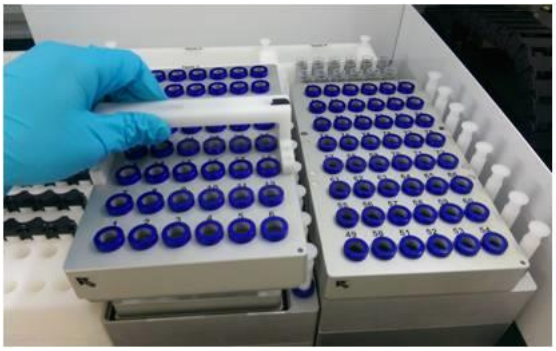
4.6 HCCEB tube rack

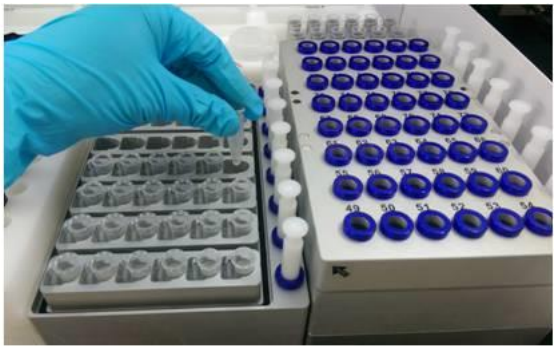
The rack is for 2.0 ml 6-strip tubes (the tube is the same as 6-strip sample tube) of hot column clean elution buffer (HCCEB) in the extraction procedure. Place two row of 6-strip tubes at this rack.



4.8 Elution vacuum manifold

This unit is for 96 product elution. Two set of elution block are located at worktable. Eight airlocks located on the right side of the elution block are used to control each elution row. A plastic handrail with magnets comes with the metal cover of the elution block for convenient handling of the cover.



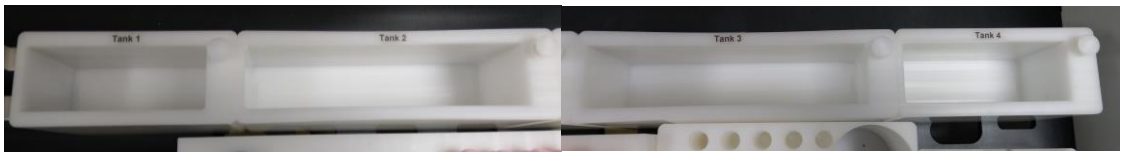


4.9 Reuse tip rack

Reusable tips for wash buffer and ethanol are placed on the tip-reuse rack.

4.10 Buffer tank

Four buffer tanks are for lysis buffer, EtOH, washing buffer, and elution buffer (CCEB). All buffer tanks are connected to automatic reagent feeders and therefore no need manual input of buffers



4.11 Proteinase K tube rack and PCR component rack

The rack is for 6 ml screw-capped tube of enzyme proteinase K、buffer LTL and PCR mastermix。

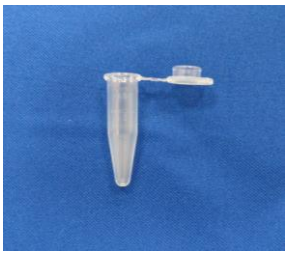
4.12 Tip disposal vent

The tip disposal channel is for disposal of tips and consumables.

ACCEEORIES

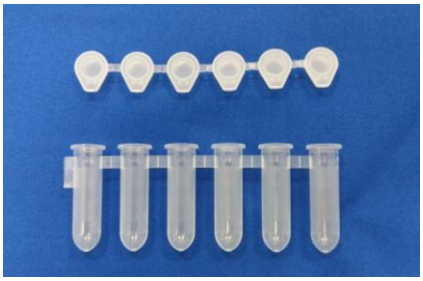
5.1 Elution tube

1.5 ml Eppendorf tube with caps is placed on the **Elution vacuum manifold** for elution product collection.



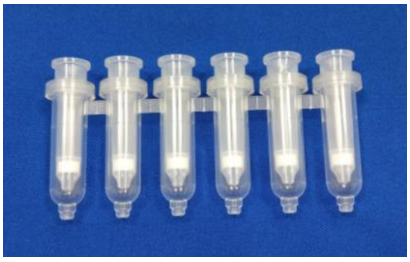
5.2 Sample tube

6-strip sample tubes (2.0 ml) are placed on the **48-well Sample lysis thermoblock**. The 6-strip caps can be used for sample preservation in the 6-strip tubes.



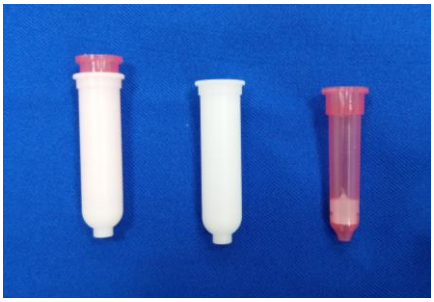
5.3 Column set

The column set consists of spin columns and 6-strip spin column adapters, which is placed on the **Binding-washing vacuum manifold** for genomic DNA/RNA and viral DNA/RNA extractions.



5.4 Plug tube combination

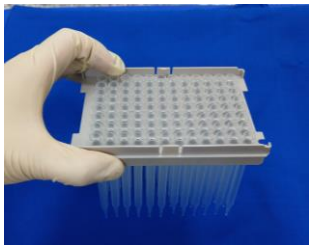
Six orange plug tubes are analogical to the column set and are mounted on the **Binding-washing vacuum manifold** to secure vacuum pressure during vacuum application. They are used only for the last row of **CPU,**



where sample extraction takes place. The machine will setup the plug tube combination automatically during the extraction.

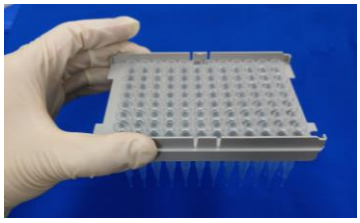
5.5 96-well tips(1100ul)

1100ul 96-well tips is used for sampling/extraction and placed at 96-well tips rack.




5.5 96-well tips(300ul)

300ul 96-well tips is used for PCR setup and placed at 96-well tips rack.

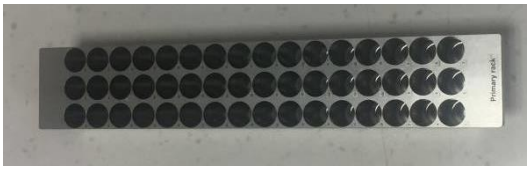



5.6 Proteinase K buffer

100ml Proteinase K buffer bottle is placed at Proteinase K buffer rack. It is used for sample lysis during nucleic acid extraction.

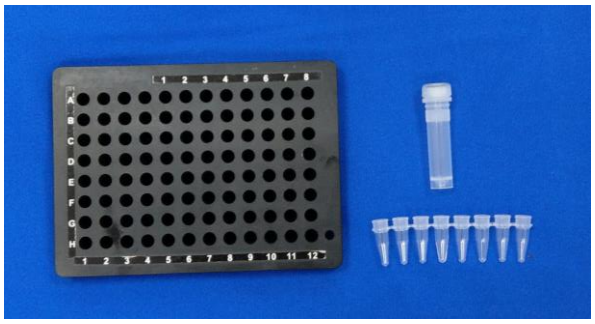
5.7 Primary tube rack

This rack is for different kinds of primary tube. Sample will be transfered from this rack to 6-strip sample tube.



5.8 PCR setup plate adaptor

For PCR setup function, put PCR tubes or plate on the plate adaptor and apply them to 96-well tips rack. It can accommodate 8-stripped tub



SOFTWARE INTERFACE AND OPERATION

Main menu

After machine startup, click the LabTurbo 96 compact system software. The main menu includes the options of all LabTurbo functions. Users can easily select the desired function to start the operation.

Barcode: for reagent barcode tracking and documentation.

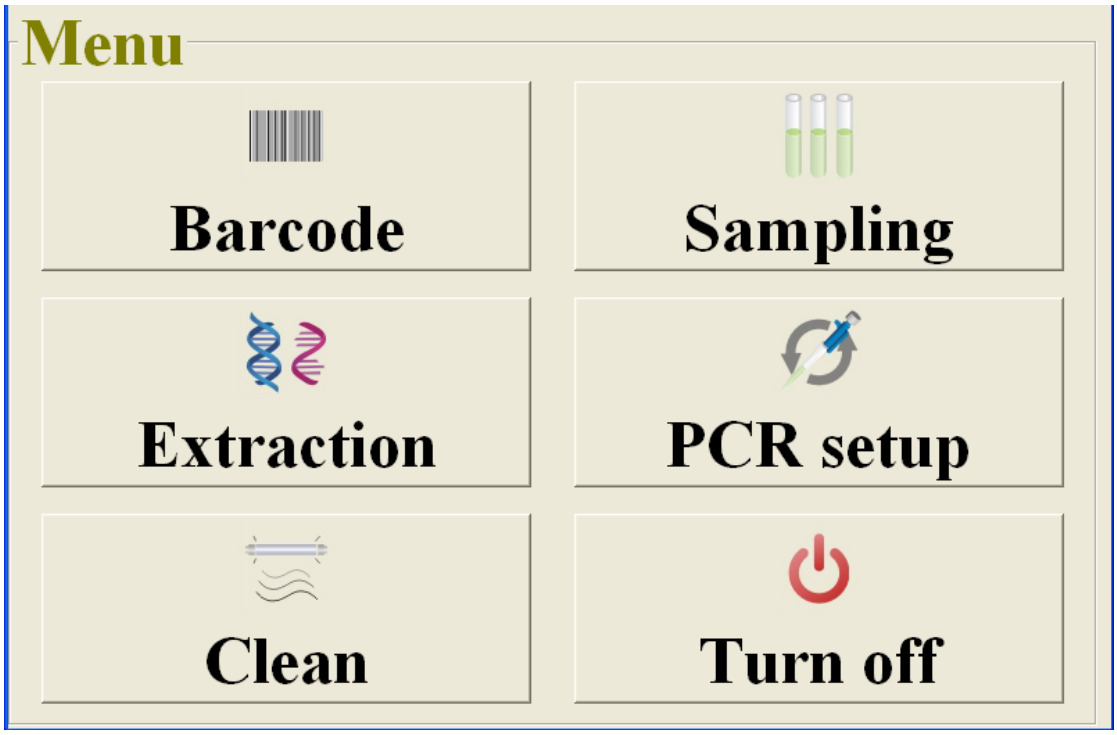
Sampling: for transferring sample from primary tubes to 6-strip sample tubes.

Extraction: for nucleic acid extraction procedure.

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

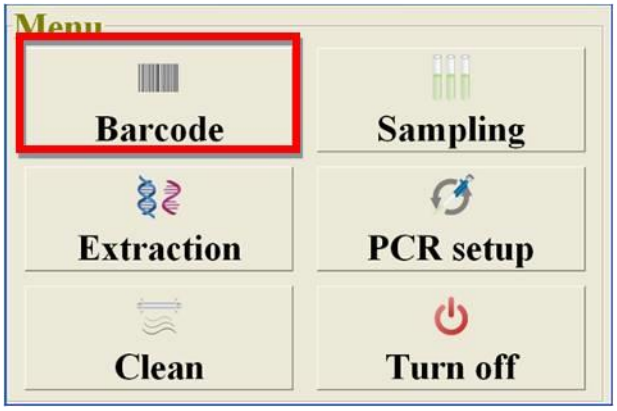
Clean: for machine maintenance and UV sterilization. ◦

Turn off: for turning off the machine.

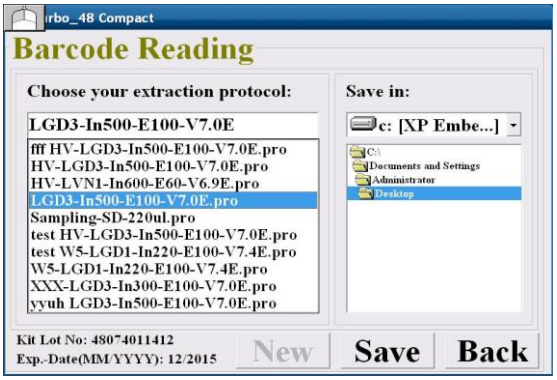


6.1 Barcode

1. For reagent barcode recording, select Barcode.

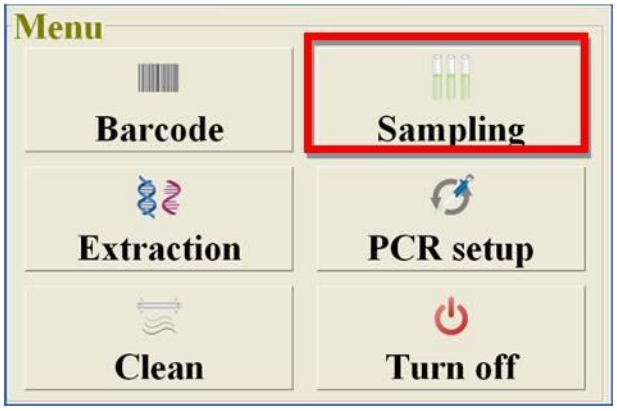


2. Scan the barcode on **reagent bottle first** and then scan the barcode on the associated buffer reservoir. Once they are matched, the screen will display the color and position to help users recognize the correct reagent reservoir. It also records the **refilling date**, **reagent lot number, kit lot number** and **extraction kit expiration date**. Repeat the steps to refill all buffers for extraction.
3. The reagent barcode information is automatically saved in the system. To obtain an independent reagent barcode documentation file, please select **Save** to export the data. The saved data format is **txt file**.



6.2 Sampling

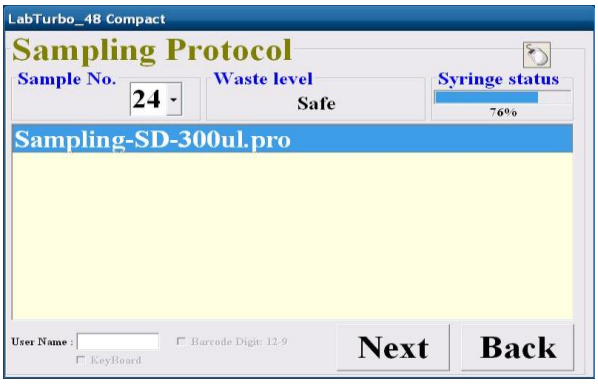
1. For sampling from primary tubes or 2.0 ml screw tubes, select Sampling



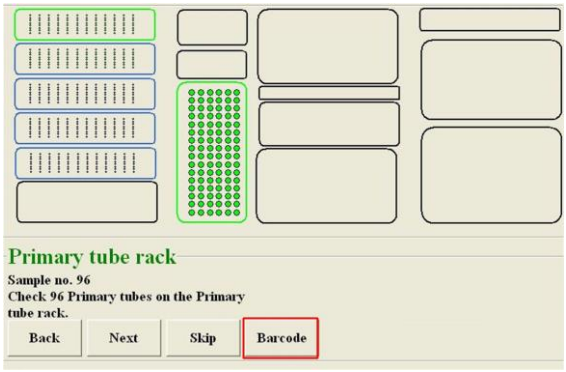
2. Sensor Detection：for using ultrasonic to detect the liquid level of blood primary tubes (customization) and aspirate the sample with top-down motions.

   Equal Level：for using tip senor to detect the bottom of 2 ml screw tubes and aspirate the sample from the bottom of each tube.

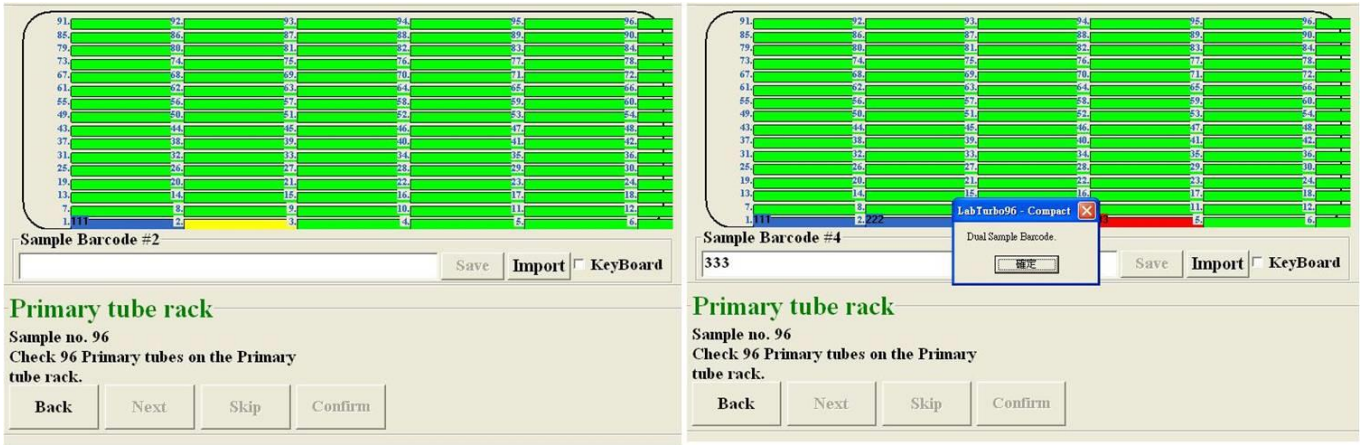
3. Put primary tube rack with sample tubes in the machine and select the input sample number and protocol, then tap Next.



4. A Loading check window will pop up. Follow the instruction on the window to set up the worktable. For sample barcode documentation function, tap “Barcode”.



5. Use the barcode reader to scan the barcode on each primary tube. The barcode will be automatically entered and show on the screen. Follow the highlight in **yellow** to scan the barcode on the associated primary tube. Once barcode is entered, it will be marked in **blue**. If a duplicated barcode is keyed in, it will be marked in **red.** To modify the barcode data, select the barcode to be modified and key in the correct barcode.



6. Once all barcodes are keyed in, select **save** to export a txt documentation file of the barcode, then select **confirm** to continue to the next step. (To redo the barcode input step, select **New** to refresh the barcode input sheet and key in all barcodes again). Check the box in front of **keyboard** to manually key in sample barcode.

7. Close the safety door. Press 

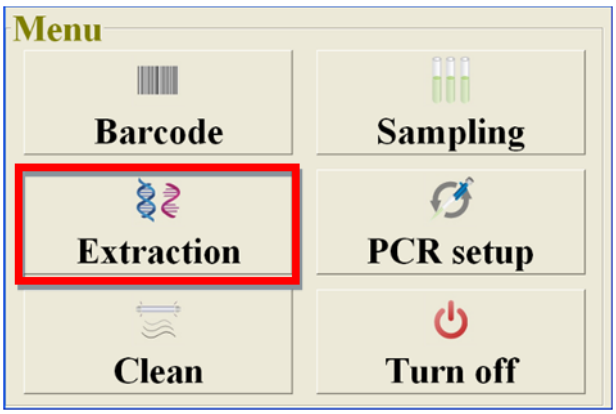
to start the protocol. ◦

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

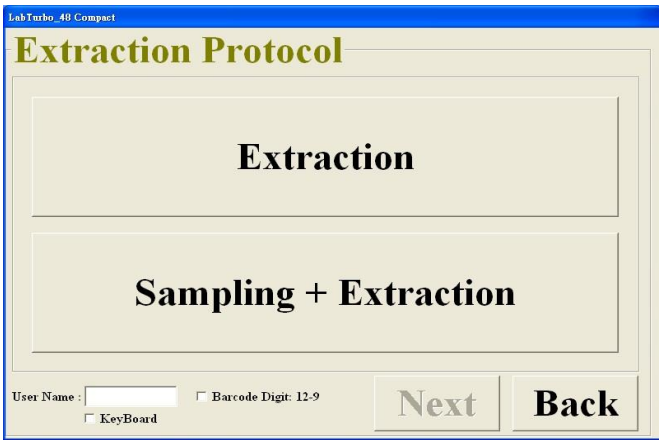
6.3 Extraction

- 6.3.1 Extraction

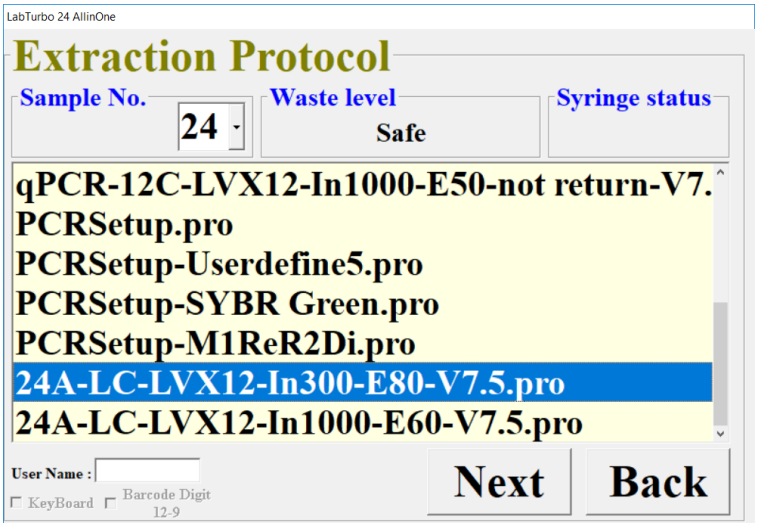
1. For DNA/RNA purification, select "**Extraction"**.



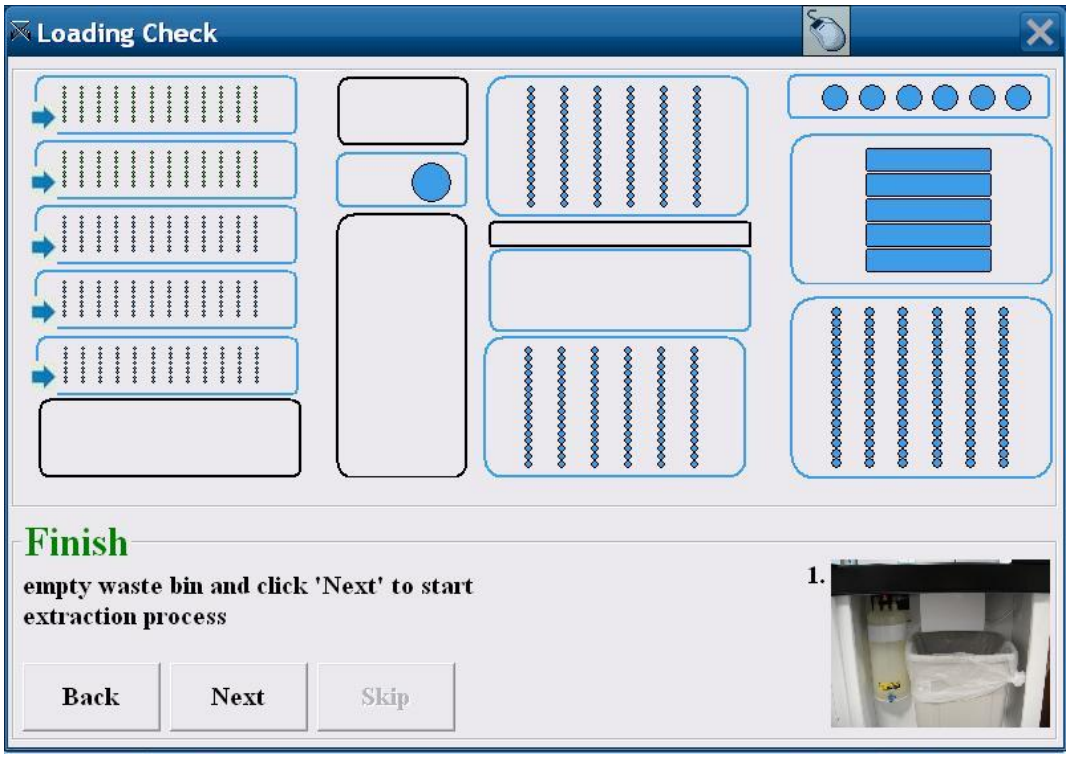
2. "**Sampling + Extraction"** For extraction starting from 6-strip sample tubes, select "**Extraction**".For extraction starting from primary tubes with automatic sampling function, select "**Sampling + Extraction".**



3. Select the sample numbers and the protocol (e.g. HV-LGD3-In300-E100-V7.0E), click "**Next"**. (LGD means the kit for extraction; In300 means the sample input volume is 300 ul; E100 means the elution volume is 100 ul)

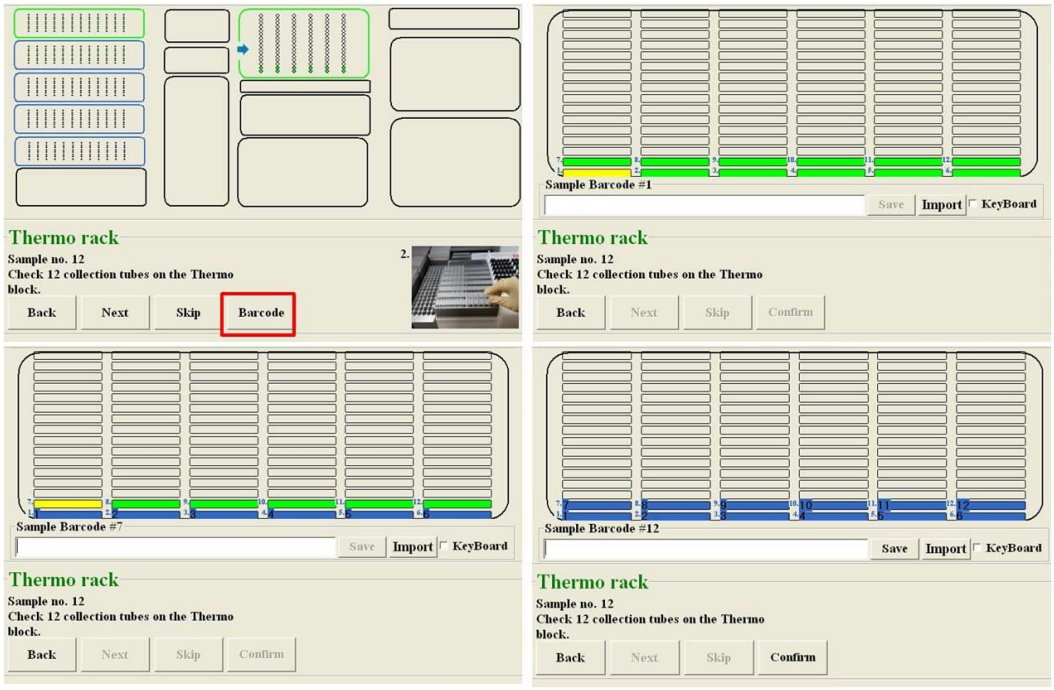


4. Follow the loading check to setup the worktable：a. Put five rack of 1100uL tips；b. Put 6-strip sample tube；c. Put Column set；d. Put 1.5 mL eppendorf；e. check five plug tubes；f. Put two row of 6-strip sample tube；g. Put Proteinase K /LTL and open the cap；check reagent level；check waste bottle and trash can.

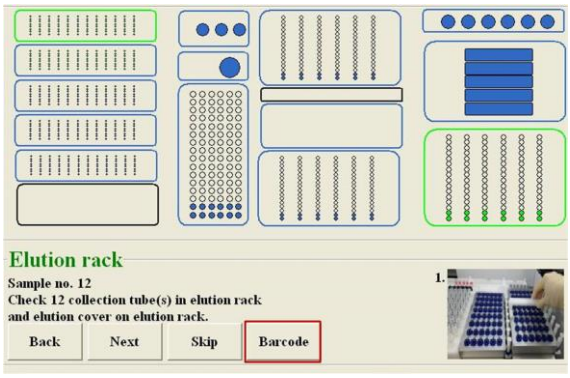


- 4-1 Sample barcode recording：select “barcode” before tapping the sample tube section on the screen. The barcode input sheet will display. Follow the highlight in **yellow** to scan the associated barcode on each sample tube. Once a barcode is keyed in, it will be marked in **blue**. If a duplicated barcode is keyed in, it will be

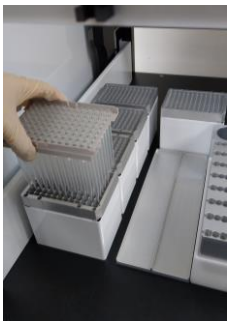
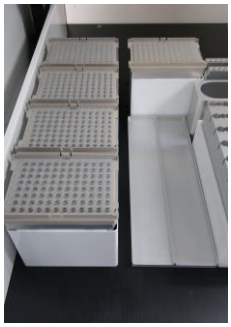
marked in **red.** Once all barcodes are keyed in, select **save** to export a txt documentation file of the barcode, then select **confirm** to continue to the next step.



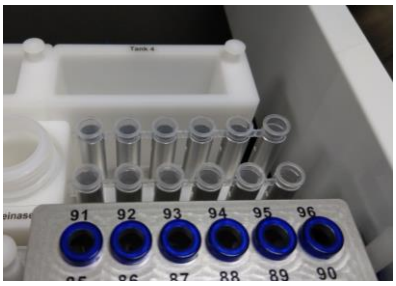
- For elution tube barcode recording, please select “barcode” before tapping the elution tube section on the screen. The barcode input sheet will display. Follow the highlight in the **yellow** to scan the associated barcode on each elution tube. Once a barcode is keyed in and matched, it will be marked in **blue**. To modify the barcode, select the barcode to be modified and key in the correct barcode. Once all barcodes are keyed in, select **save** to export a txt documentation file of the barcode, then select **confirm** to continue to the next step.



4. Remove all tips left from the last run. Put five new full 96-well tips (**1100 µl**) on **Tip rack 1~5.**

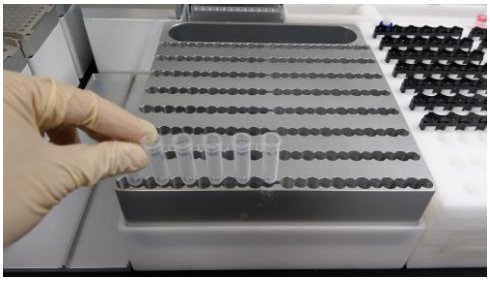




5. Place two row of 6-strip sample tubes on HCCEB tube rack。

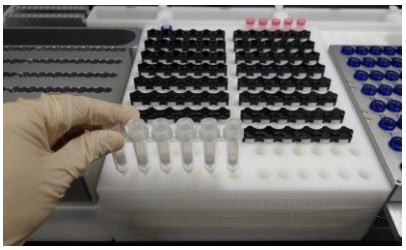
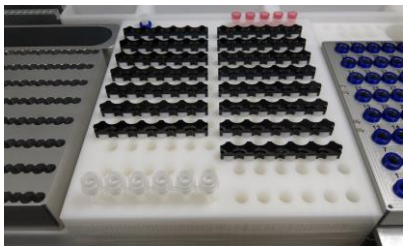


6. Open the cap of Proteinase K and put into Proteinase K rack

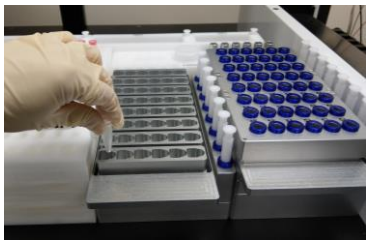
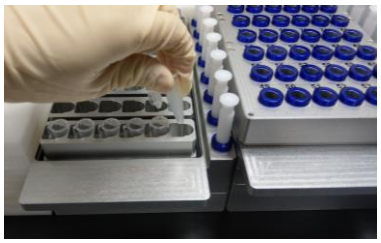
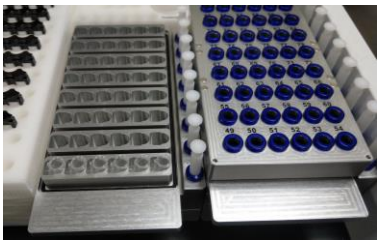
7. Carefully place 6-strip 2.0 ml sample tubes (with samples) on the Sample lysis thermoblock one by one. (For Sampling + Extraction function, please refer to section 6.2 to put the primary tube rack into the machine and then put the same number of empty 6-strip sample tubes to Sample lysis thermoblock.)



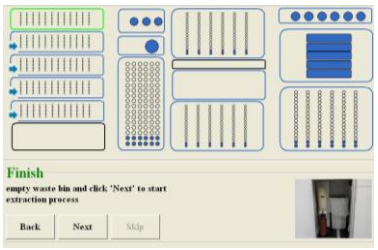

8. Put new column set into **Binding-washing vacuum manifold**.

9. Put Elution tube into **Elution vacuum manifold**.

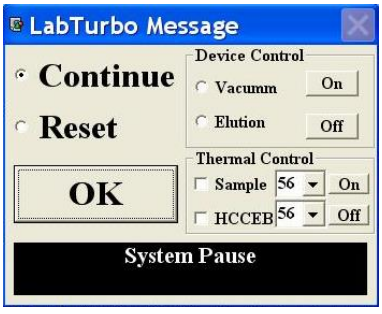
10. Once every worktable unit is checked and confirmed, ensure sufficient amount of reagents in reagent reservoirs and empty the trash can, then click Next.

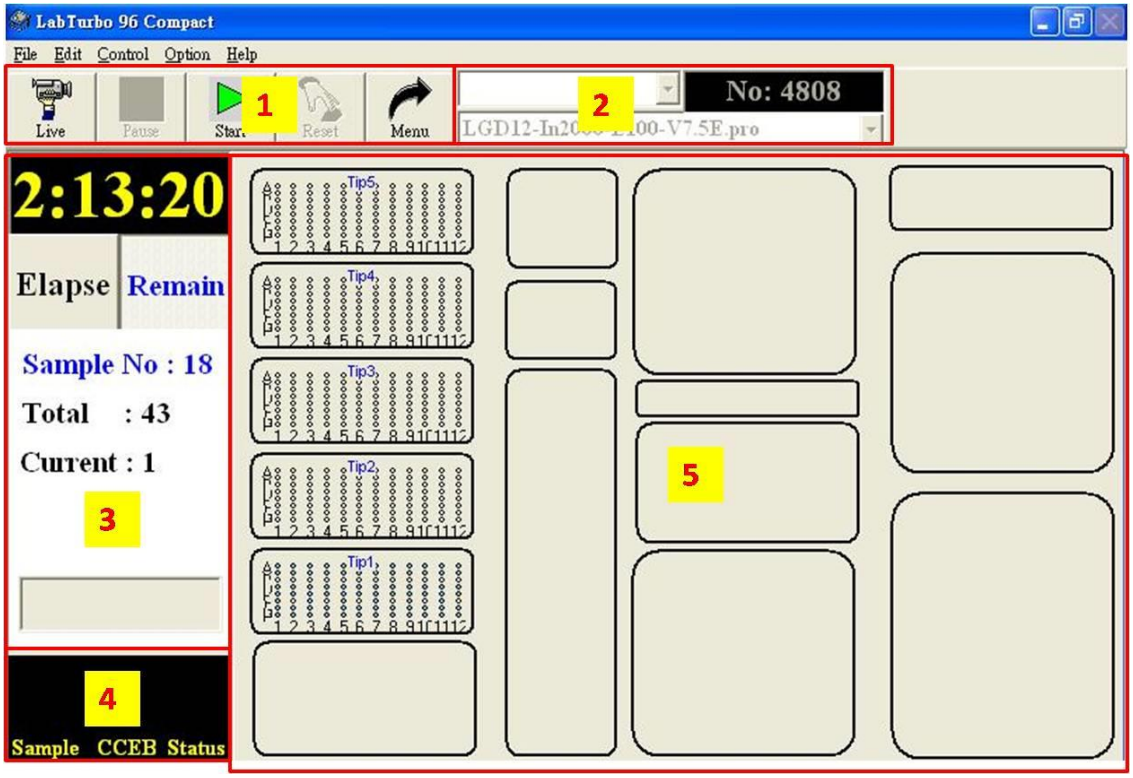


11. Close the safety door. Press  to start the protocol.

12. When the extraction completes, the System Message will pop up. Open the safety door and take the elution tube out from the Elution vacuum manifold.

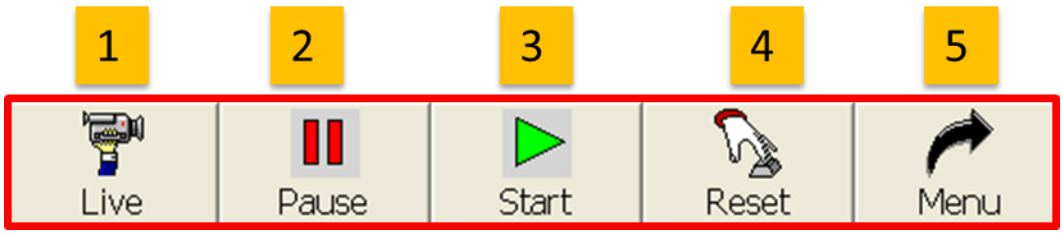
13. During the run, users can click Pause or open the safety door to stop the extraction procedure temporarily. Click Continue to continue the procedure or click Reset to terminate the procedure.





The following is the general control panel of LabTurbo 96 Compact program:

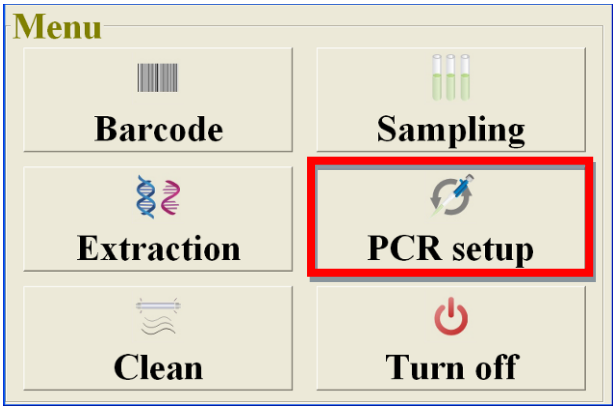
1. The **Main Toolbar** contains several shortcut buttons for convenient operation of the machine.
2. The **Protocol Window** indicates the selected protocol for the procedure.
3. The **Timer** shows elapsed time or remaining time (count-down). It also indicates the total and current steps of the protocol.
4. The **Monitor** indicates the current heater temperature and vacuum pressure of the machine.
5. The **Platform Configuration** mirrors the worktable to the machine. The green icons indicate the operating units at the current step.



1. **Live**: Click this button to initiate the camera to show the real-time view of the worktable.
2. **Pause**: Click this button to pause the machine (same as opening the safety door).
3. **Start**: Click this button to start the procedure.
4. **Reset**: Click this button to reset the machine and move the robotic arm to original position.
5. **Menu**: Click this button to go back to the main menu.

6.4 PCR Setup

1. 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. Only two kinds of Master Mix could be used on LabTurbo96C. Select the PCR tube format for 8 strip tubes/12 strip tubes.

4. Select sample number. Maximal number is 96.

5. Select Master Mix volume. Maximal Master Mix volume is 30ul

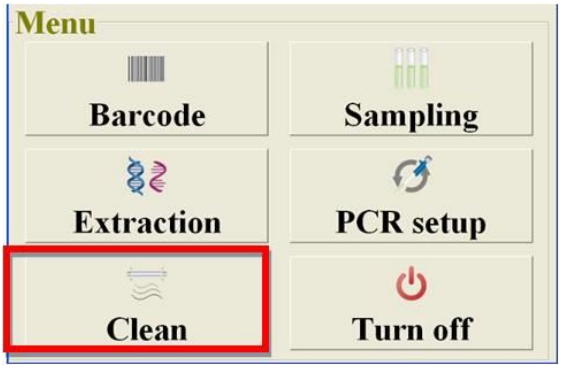
6. Select template volume. Maximal template volume is 30ul. Minimal template volume is 2ul.

7. (If needed)Select Master Mix 2 sample number、Master Mix 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 the operation completes, the System Message will pop up.

6.5 Clean

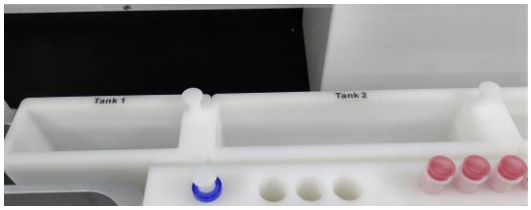
Select **“Clean”** to enter clean and maintenance page.



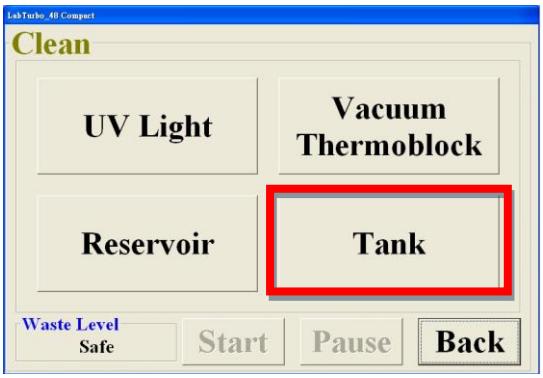
Tank Clean

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

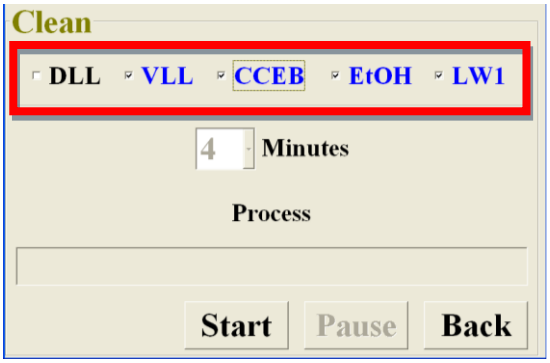

2. Add 80~90% tank volume of ddH_2O to tanks intended to be cleaned.



3. Select “Tank”



4. Check the tanks intended to be cleaned.

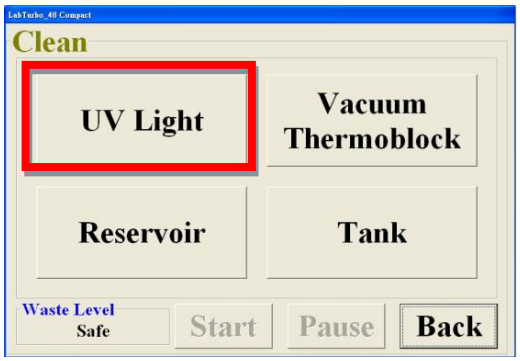


5. Close the door and press “start”. The machine will automatically drain out the ddH_2O to **Waste Bottle**.

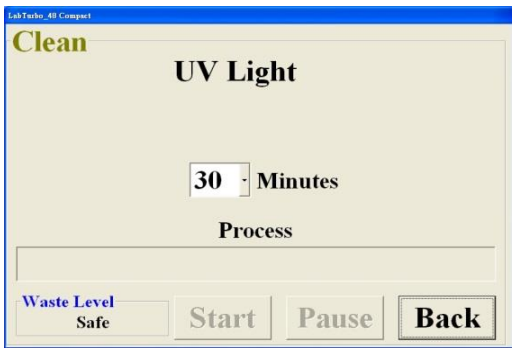
6. After finishing the procedure, please drain out all the waste in **Waste Bottle**.

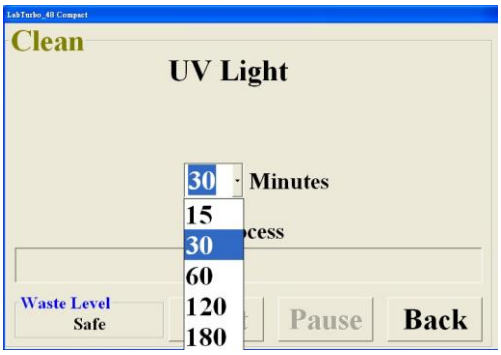
UV light

1. Select “UV light”.



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

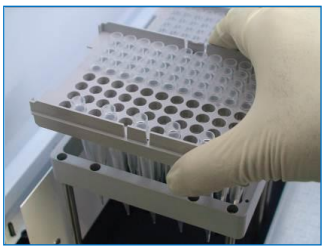




MAINTENANCE

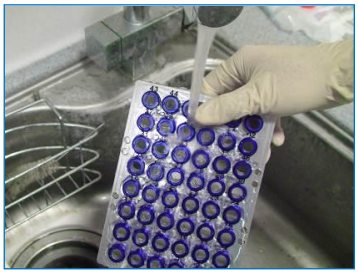
7.1 Daily clean and maintenance

1. Collect all the tips left on the **Tip racks** for the next run.



2. Take out the **Proteinase K** or other reagent bottle.

3. Wash the **Elution Cover** with tap water and air dry or wipe and dry with tissue paper. (**Do not** put in “Oven” or “autoclave” to dry)

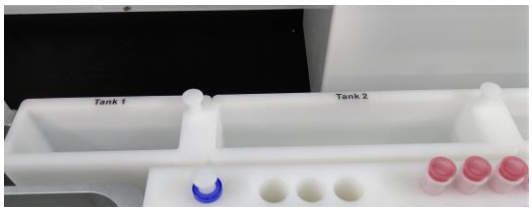


4. Check the level of the trash can.

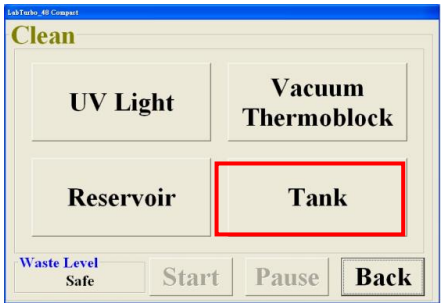
5. Check the waste level in the **Waste Bottle** and drain out the waste.

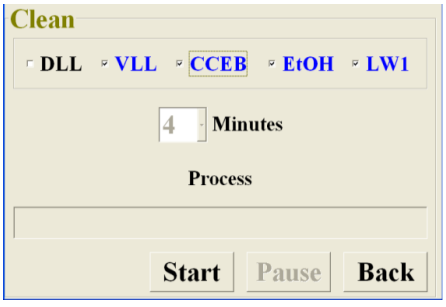
7.2 Weekly clean and maintenance

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

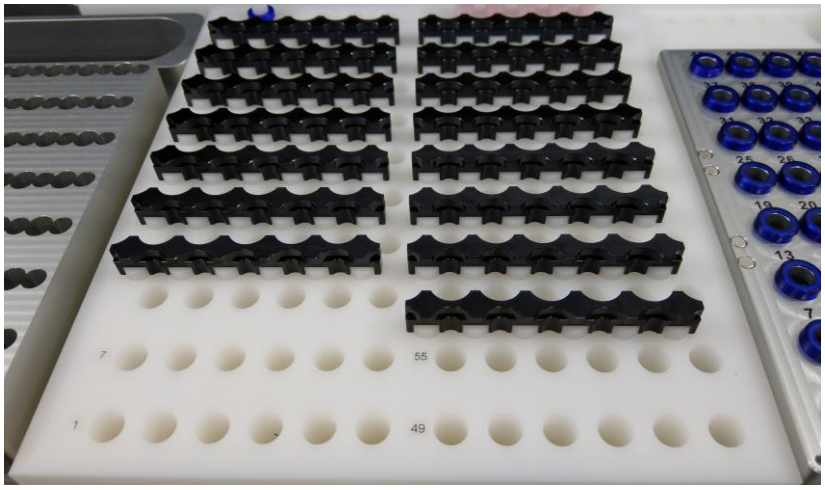
1. Clean each side of machine by using hand towel.

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

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

4. (**Optional)** Wash **Vacuum plug sets** with tap water and air dry or wipe and dry with Tissue paper. Make sure to put fifteen **Vacuum plug set** back to the original positions.

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



TROUBLE SHOOTING

“DAQ connection error, software run the Demo Version”

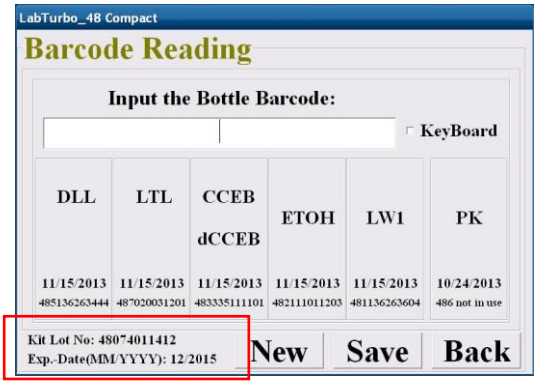
This message indicates that the controller fails to connect to computer. Please turn off the LabTurbo 96 Compact software and the machine. After system is turned off, switch the main power off and on once, and then turn on the machine. If this message remains, please contact our customer service.

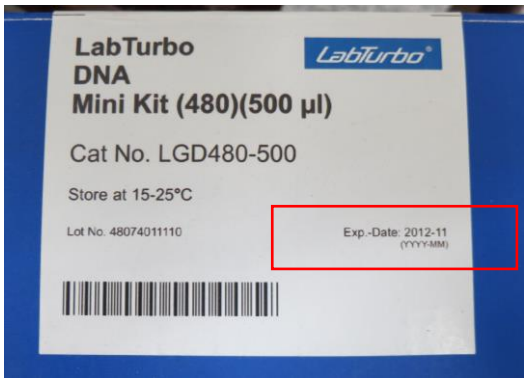
“XY/ZW/T/Heater1/Heater2 connect error, checking the RS232USB connection”

This message indicates that the controller does not connect to computer. Please turn off the LabTurbo 48 Compact software and the machine. After system is 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.

“Kit has been stored over one year”

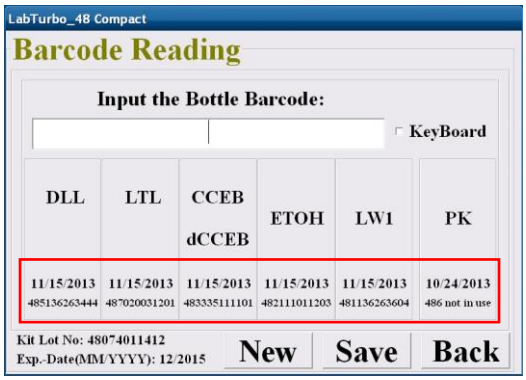
This message could show up during the startup of the LabTurbo program if the current extraction kit is expired. The extraction kit can be stored for one year and expiration date is shown on the top of extraction kit. Please replace the kit with a new one, and scan the barcode on the new extraction kit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





"XXX buffer has been stored over three months"

This message could show up during the startup of the LabTurbo program if one or more buffer in the **Reservoirs** is stored over three months. Select **OK** to continue. Please refer to section 6.1 to replace the expired buffer with a new one. XXX represents LW1, CCEB, DLL, Proteinase K, etc.



"Close the door"

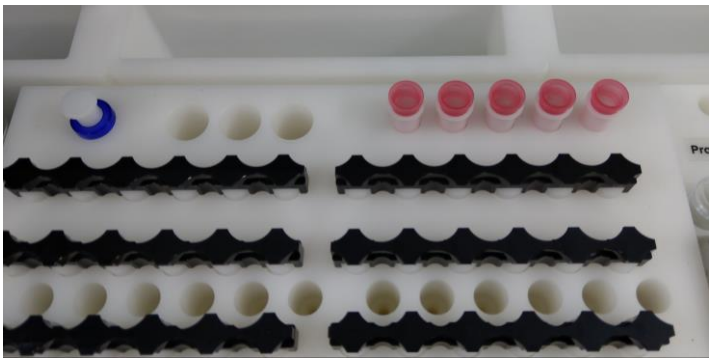
This message indicates that the door is opened. Check the sensor on the right side of the door and make sure the door is closed. Please close the door and start the procedure again. If this message remains, turn off the computer, switch the main power off and on, and then restart the computer.

"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.

“Wrong plug tube setup”

This message may show at the beginning of the extraction. Check if the five plug tube combinations are at the original positions. If the plug tube combinations are set up correctly, click **Cancel** and the machine will continue the extraction procedure.



“Please fill Tip 1/2/3/4/5 Rack and install it correctly”

This message indicates that there are missing tips in one or more tip racks. Please open the door and fill up the tip racks. After refill, close the door and select “OK”. Remember to install all five tip racks for each run of extraction.

“Open the cap of proteinase K”

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

“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”.

“Missing elution cover, put it on elution manifold correctly”

This message indicates that the elution cover is missing. Put the elution cover back correctly then click “OK” to resume the procedure.

“Take off carrier of Elution cover”

This message indicates that the handrail for elution cover was not removed. Remove the carrier from elution cover then click “OK” to resume the procedure.

“Elution cover on wrong direction, put it on elution manifold correctly ”

This message indicates that the Elution cover is placed in the opposite direction. The “Front” label should be placed toward the user.

“Remove the excessive column/SC-adaptor or Plugset at sample#”

This message indicates that the worktable setup at **Vacuum manifold** is incorrect. Take the worktable setup of 6 samples as an example：an additional column set is misplaced at position 7(left picture). Only 6 column sets should be placed at **Vacuum manifold (**right picture**)**. “**#**” represents the sample position at **Vacuum manifold**, or 7 in the aforementioned example.

This message also indicates the **Plugset** is at the incorrect position. For example, six plugsets are set at the incorrect positions on the left picture. Please refer to the **Monthly clean and maintenance** section (section 7.3) for the plugset setup instruction.

“Removing the excessive SC-adaptor on the vacuum manifold”

This message indicates that worktable setup at **Vacuum manifold** is incorrect. Take the worktable setup of 6 samples as an example：an additional SC-adaptor is misplaced at position 7 (left picture). Only 6 column sets should be placed on **Vacuum manifold** (right picture). “**#**” represents the sample position at **Vacuum manifold**, or 7 in the aforementioned example.

“Add absent Column on the vacuum manifold”

This message indicates that worktable setup at **Vacuum manifold** is incorrect. Take the worktable setup for 6 samples as an example：a column is missing at position 6 (left picture). 6 column sets should be placed on **Vacuum manifold** (right picture).
“**#**” represents the sample position at **Vacuum manifold**, or 6 in the aforementioned example.

“Add absent Column/SC-adaptor on the vacuum manifold”

This message indicates that worktable setup at **Vacuum manifold** is incorrect. Take the worktable setup of 6 samples as an example：a column set is missing at position 6 (left picture). 6 column sets should be placed on **Vacuum manifold** (right picture).

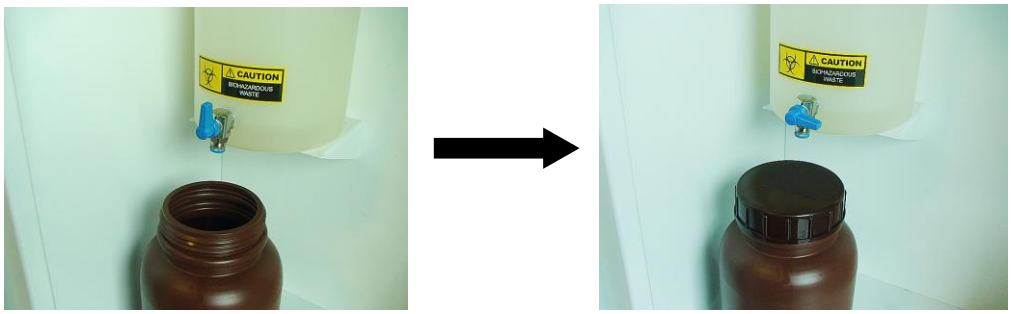
"#" represents the sample position at **Vacuum manifold**, or 6 in the aforementioned example.

"Plug set miss, install plug set at wash-vacuum block correctly"

This message indicates that the Plugset is not at correct position (left picture). Put the plug set at correct position on vacuum manifold. Please refer to the **Monthly clean and maintenance** section (section 7.3) for the plugset setup instruction.

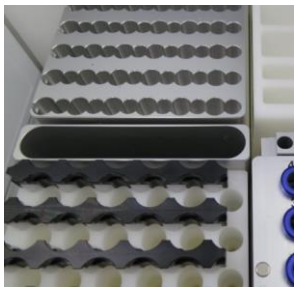
"Low vacuum pressure, switch off the waste bottle and try again"

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



"Clean the waste bin"

Check and clean the **Tip disposal** vent at worktable and the **Trash can**.



"Low elu-vacuum, check all air plug in correct position"

1. Check the air plugs of the elution manifold. Press down the air plugs to the correct position.
2. Close the door and click **Yes**.
3. If this message remains, please click **No**.
4. Another message will show up：**"Spin down all column instead of vacuum"**.

   Open the door, take out all the columns, and use a centrifuge for elution.
5. Close the door and click **OK** to finish the extraction procedure.

“Low elu-vacuum, try again”

1. Open the door and make sure there are no missing columns on the Elution cover.
2. Close the door and click **Yes** to continue.
3. If this message remains, please click **No**.
4. Another message will show up：**“Take row No:X columns out and used spin down to elution”**. “X” represents the row numbers of elution cover. The row number could be No：1~8. Open the door, take out the columns, and use a centrifuge for elution.
5. Close the door and click **OK** to continue.

“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 the original status as the following steps:

1. Clean all remaining 6-strip sample tube, column set, and elution tube on the worktable.
2. Replace a new 6-strip tube on HCCEB rack.
3. Restore all the **Plug sets** and put them back to the original positions.
4. Put **Plug tubes** back to the **Plug tube rack**.
5. Recover the worktable as shown in the picture below.

“X or Z or Y-Axis position error”

Please contact our customer service for more information and support.

“Abnormal extraction reslut”

Several reasons could cause low yield of extraction or not well downstream applications

- Sample overloading：too much starting material cause column overloading
- Buffer prepare incorrectly：forgot to add ethanol to buffer LW1 before use or add wrong buffer into reservoir.
- Tissue insufficient lysis：animal or plant tissue need to homogenize before loading to machine
- Expired extraction kit：buffer or column are already over expiration date.

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