

# Lung Sound Auscultation Trainer "LSAT" ver.2

● Product Supervision  
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## Instruction Manual

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### ■ Before use

MW28 Lung Sound Auscultation Simulator "LSAT" is designed for medical education training. Please do not use the product for other purposes. Any other use not in accordance with the instructions on this manual as well as on the help menu in the system is strongly discouraged. The manufacturer holds no responsibility for any accidents or damages resulting from such use.

For questions regarding this simulator, please contact our distributor in your area or Kyoto Kagaku. Our contact information can be found on the back cover of this manual.

### ■ Features

- Sounds are recorded from actual patients and are reproduced by using a high quality sound system.
- An actual stethoscope can be used.
- 36 lung sound cases : posterior and anterior, with and without heart sounds.
- Up to five simulators can be controlled by one wireless tablet.
- The error indicator system facilitates maintenance of the system to keep "LSAT" in its best condition.

Supply voltage: AC100-240V 50/60Hz 450VA

Altitude: 2.000meters above sea-level

Environmental conditions: 5 degrees C.to 40degrees C.

Relative humidity: Less than 80 per cent(no condensation)

Overvoltage Category: 2

Pollution Degree: 2

Power cord supply: Do not use power supply cords other than the one included in the original set.

Clean-up: Clean the simulator with water or mild detergent. Clean the manikin with water or mild detergent and coat with baby powder. Be careful not to apply water or detergent on the internal machinery.

## DOs and DON'Ts

### DOs

#### ● Operate the system under the designated circumstances

Power input: AC100V~230V plus or minus 10%, 50Hz/60Hz

Temperature range: between 0 degrees C and 40 degrees C (no congelation)

Relative humidity: between 0% to 80% (no condensation)

\*Connecting to power source outside of the designated range may lead to fire.

#### ● Safe disposition

To avoid short circuit, do not run the simulator set above a power receptacle.

#### ● Handle the power plug and cord observing following precautions

1. Clean the head of the plug periodically.
  2. Plug in the plug to the outlet firmly to the end.
  3. Always hold the plug when unplugging. Do not pull the cable.
  4. Do not force to bend, twist the cable and avoid scratching or cutting on it.
  5. Unplug the power cord when the simulator is not in use.
  6. Remove any dust that has accumulated on the power plug and insert the plug completely into the power socket.
- Failing to follow the above precautions can result in damage in the plug and the cable, constituting risk of fire or shock.

#### ● When the electric parts get warm or produce smoke, immediately turn off the power and unplug from the power source

Risk of fire. Contact your distributor or the manufacturer for repair.

#### ● Handle with care

The materials for the models are special compositions of soft resin. Please handle them with utmost care at all times.

Clean the manikin with water or mild detergent and coat with baby powder. Be careful not to apply water or detergent on the internal machinery.

Transport the simulator with caution. Hold the simulator by the handles when transporting. Do not hold the simulator by the torso manikin.

#### ● Storage

Store the simulator at room temperature, away from heat, moisture and direct sunlight.

Storage under the temperature above 50 degrees C may reduce the performance quality of the simulator.

#### ● Use the simulator in a quiet environment

#### ● Follow the instructed shutting down procedures

Shut down the computer first. Do not turn off the power or unplug the power cord without shutting down the program. Misuse may lead to damages.

### DON'Ts

#### ● Do not disassemble or open electric or precision components

Do not remove or alter cable connections in the inner machinery.

Connection cables and their settings have been preset; changes to the set up may lead to malfunctions or damages to the simulator.

Also, do not open up or disassemble the housing for electric parts or precision components.

Refrain from opening up any lids, caps or covers for such area, and never run the system while any of such covers are open.

\*Never disassembling the electric components, power plug and cable as it may create a risk of fire, shock or injury. Contact your distributor or the manufacturer for repair.

#### ● Never wipe the product and components with thinner or organic solvent

#### ● Ink marks on the soft surface won't be removable

Don't mark on the product and components with pen or leave any printed materials in contact with their surface.

#### ● Do not give shocks

The electric components are precision instruments.

Strong shocks or continuous vibration may cause breakages of its internal structure.

#### ● Do not run the system continuously over 2 hours

Take at least 30 minutes shutdown, turning off the power, every 2 hours.

#### ● Do not wet the electric components

Do not pour or spill water or liquid detergent over the electric components, power cable and power plug.

Running the system while the electric components are wet may create a shock hazard or a risk of fire.

#### ● Do not handle the power plug with wet hands

Risk of shock.

#### ● No fire

Do not put the product close to fire. It may lead to discoloration or deformation of the product as well as short circuit, creating a risk of fire.

#### ● Do not install other software onto the computer It may lead to system malfunctions.

Discoloration of the surface may occur after used after a long period of time. Discoloration does not affect the function of the simulator.

### ■ Set includes

Before you first use "LSAT", ensure all components listed below are included in the unit.

A



B



A : 1 LSAT unit with respiratory torso manikin

B : 1 control PC

1 power cable for control PC

C : 1 AC adapter

D : 1 power strip

E : 3 LAN cable (1.5m x 2 and 10m x 1)

F : 1 LAN adapter

G : 1 LAN HUB / AC adapter

H : 1 external speaker

1 sound cable I :

I : 1 lung T-shirt

instruction manual

built-in help file of software operation

C



D

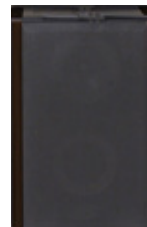


E



1.5m x2 : 10m x 1

H



I



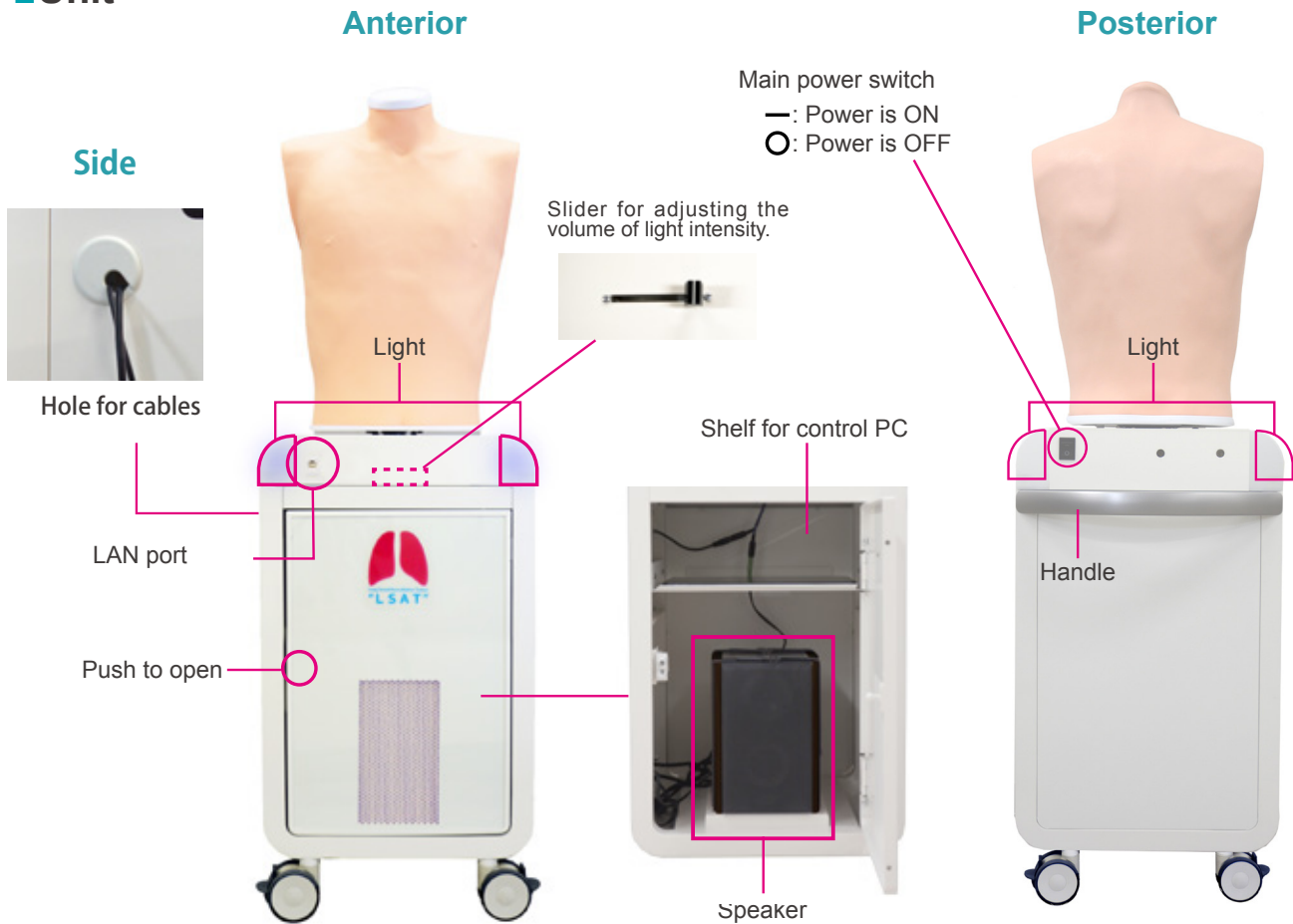
F



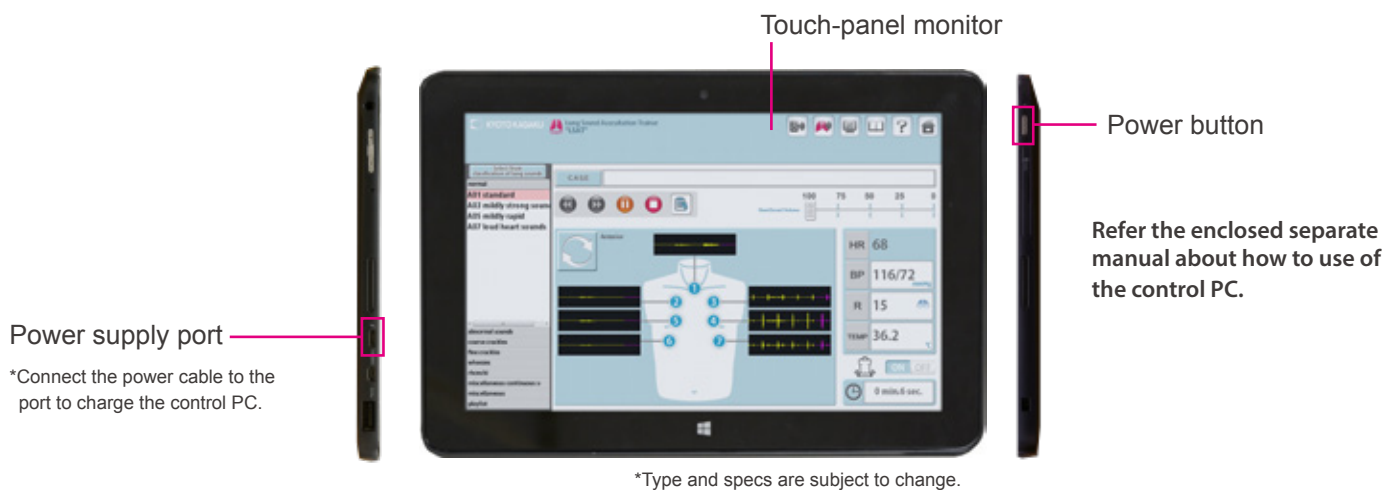
G



## ■ Unit



## ■ Control PC

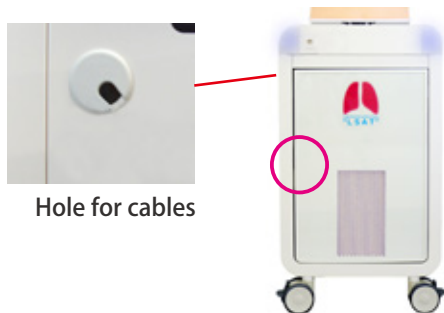


### NOTES

It is possible to play both posterior and anterior sound simultaneously at one time.

## Installation of external speaker

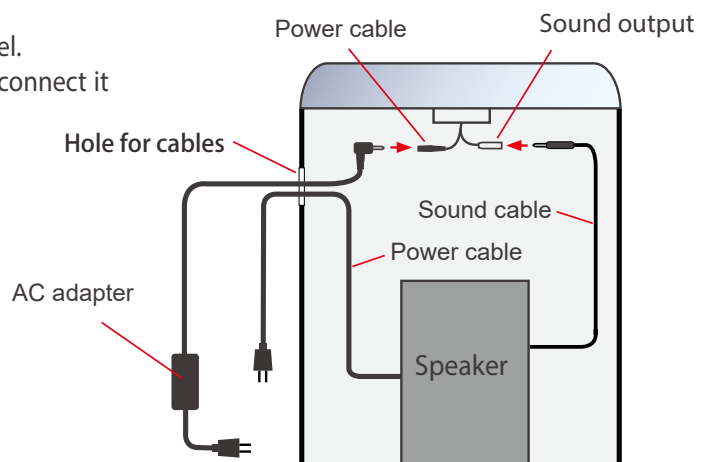
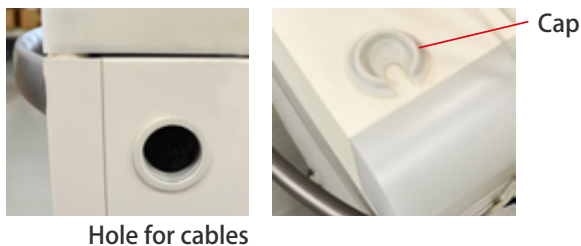
- 1 Push the red circle area to open. Find two fixing belts at the floor of the housing and unbuckle them.



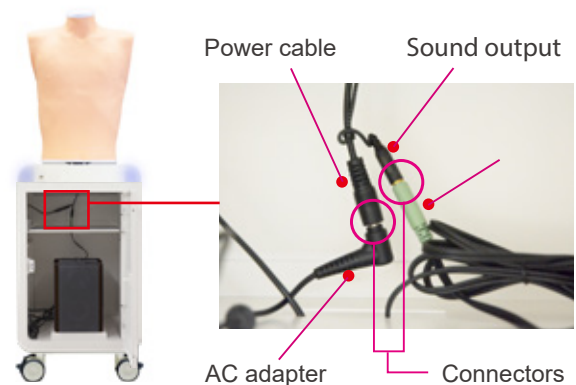
▼ Inside



- 2 Remove the cap of the hole for cables in the side panel. Pass the cable of AC adaptor through the hole then connect it to the power cable at the upper area in the housing.



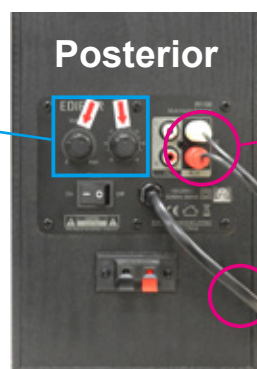
- 3 Connect the speaker and the sound output by the sound cables for the speaker. The jacks of the speaker is at its back. Pass the power cable of the speaker through the hole on the side panel and then connect it to the power strip.



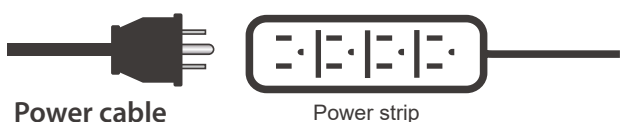
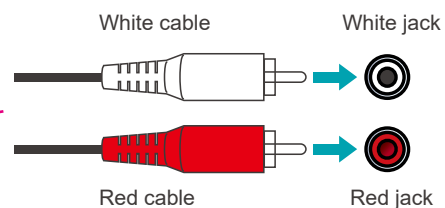
- 4 Adjust the sound volume to the position indicated by arrow marks.



\*The position of the arrow marks may vary depending on the unit.



### Sound cable



- 5 Buckle and pull the belt tightly to secure the speaker in place.



### CAUTION

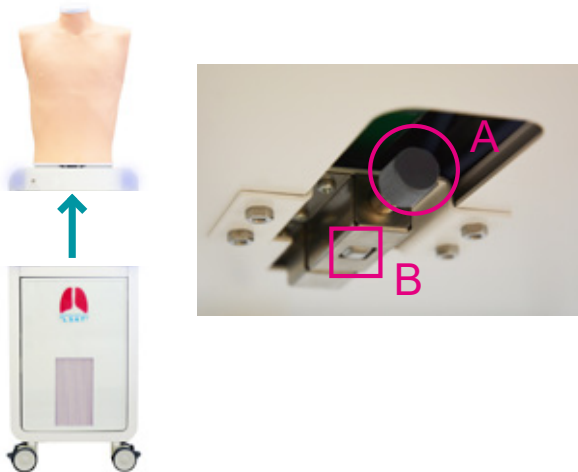
The antennas might accidentally come off when the connection is incomplete. Ensure that the antennas are connected firmly to the main unit before use.



**POINT** The torso manikin is possible to be separated.

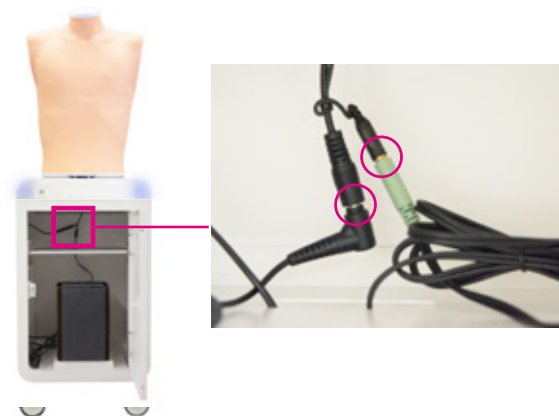
1

To separate : Push **B** button  
To attach : Push **A** knob



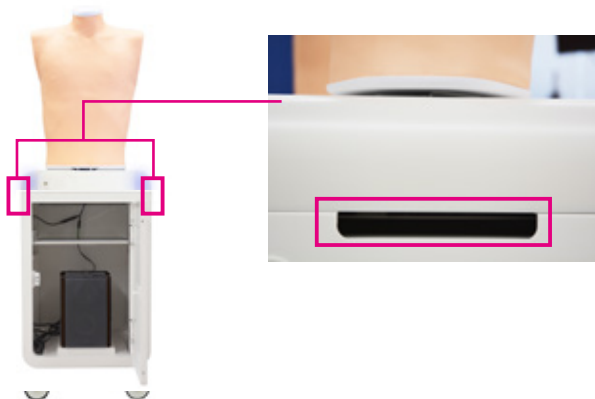
2

Detach connection cables marked with red circles.



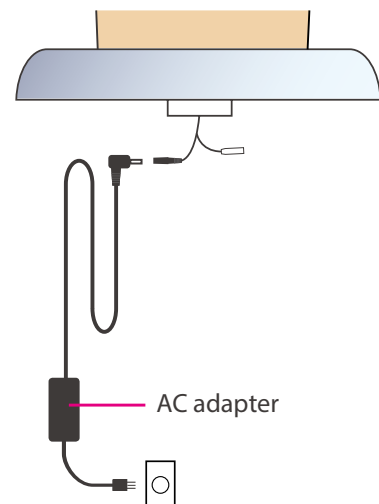
3

Hold the simulator by the handles at the both sides when separating.



4

Connect unit to an AC adapter to start using.



### NOTES

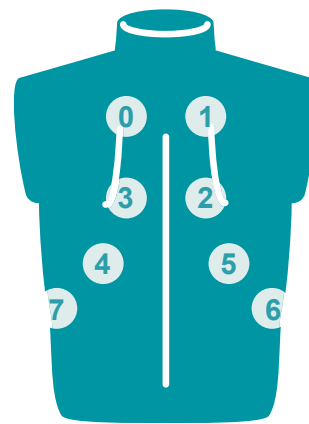
Except for when using separately, always attach unit to base.

## ■ Auscultation sites



Anterior

- 1. trachea
- 2. upper right lung field
- 3. upper left lung field
- 4. middle left lung field
- 5. middle right lung field
- 6. lower right lung field
- 7. lower left lung field



Posterior

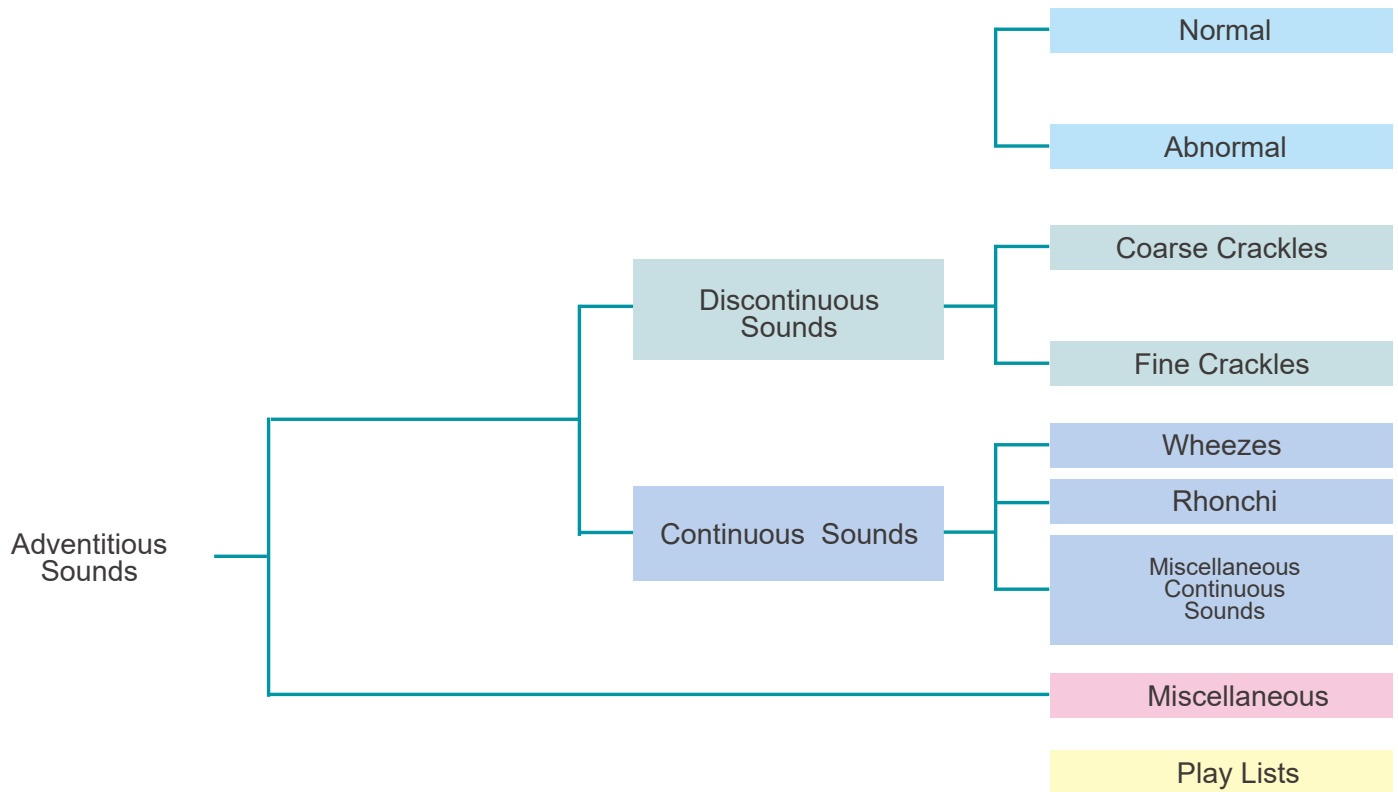
- 0. upper left lung field
- 1. upper right lung field
- 2. middle right lung field
- 3. middle left lung field
- 4. lower left lung field
- 5. lower right lung field
- 6. right costophrenic angle
- 7. left costophrenic angle

## ■ Cases

34 lung sound cases and one example of vocal fremitus are prepared.

Normal	Abnormal
A01 standard A03 mildly strong sounds A05 mildly rapid A07 loud heart sounds	B01 weak: left lower area B03 weak: left whole area(adhesion) B05 weak: left whole area(pneumothorax) B07 absent:right middle and lower areas B09 weak: right whole area B11 absent: right whole area B13 weak: whole area B15 bronchial breathing
Coarse Crackles	Fine Crackles
C01 right lower area C03 both lower area C05 right middle & upper area C07 left lower area C09 both upper area C11 whole area	D01 both lower area D03 both middle lower area D05 whole area(IPF) D07 whole area(NSIP)
Wheezes	Rhonchi
E01 upper area 600-700Hz E03 upper area 350-450Hz E05 upper area 200-1000Hz	F01 trachea and upper area 150-250Hz F03 trachea and upper area 150-450Hz (polyphonic) F05 trachea and upper area 80-120Hz F07 whole area 80-200Hz
Miscellaneous continuous sounds	Miscellaneous
G01 stridors G03 squawks	H01 pleural friction rubs: right lower and middle area H03 pleural friction rubs: left lower area H07 Hamman's sign H09 Vocal fremitus

## ■ Classification of lung sounds

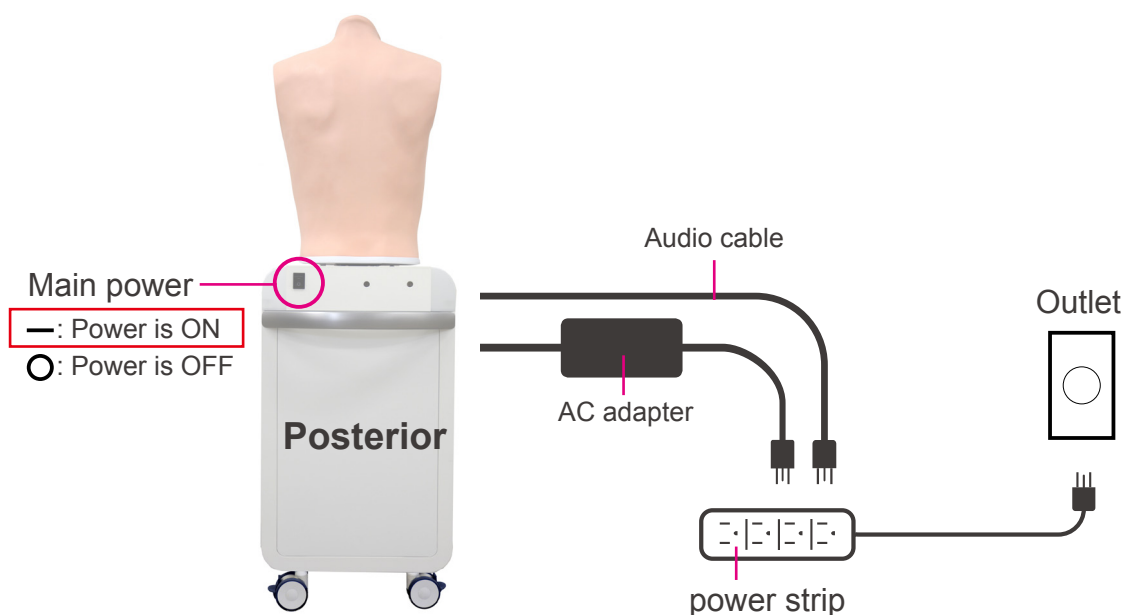


<b>Classification of lung sounds</b>	The American Thoracic Society developed a rational and clinically useful classification based on acoustic analysis of tape recordings and introduced the nomenclature. With this approach, lung sounds are categorized as continuous (wheezes, rhonchi, or stridor) or discontinuous (crackles). Crackles are further identified as fine or coarse. The terms "lung sounds" and "breath sounds" are usually used synonymously.
<b>Adventitious sounds</b>	Adventitious lung sounds are superimposed on the breath sounds in certain circumstances and usually indicate disease. They are categorized as continuous (wheezes, rhonchi, or stridor) or discontinuous (crackles). Crackles are further identified as fine or coarse.
<b>Discontinuous sounds</b>	Discontinuous adventitious lung sounds are intermittent, nonmusical, and brief (duration of less than 25ms) noises. They may be fine crackles (relatively high-pitched sounds usually heard at the end of inspiration as air enters the acinar unit) or coarse crackles (the low-pitched, bubbling sounds that result from the accumulation of secretions in larger bronchi and trachea).
<b>Continuous sounds</b>	Continuous adventitious lung sounds are usually louder than the underlying breath sounds. The word "continuous" in this context implies duration of more than 250 ms rather than meaning a sound that continues throughout the respiratory cycle. Continuous sounds may be wheezes, rhonchi, or stridor.

**IMPORTANT**

When starting up the system follow the sequence of actions instructed below so that the wireless connection works correctly.  
The unit may not work correctly when being turned on with different order.

- 1 Connect the power cable to the outlet.  
Turn on the control system's main power.



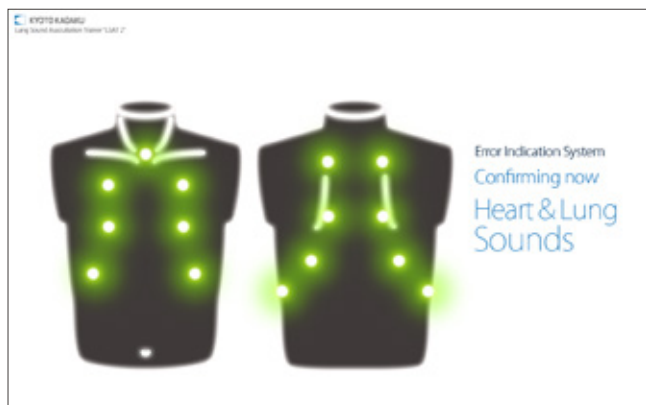
- 2 Turn on the control PC power.

**NOTES**

Before starting, be sure to charge the battery of the control PC. In case that the battery is low or empty, charge it by connecting the power cable of the control PC. The system can be used with the control PC being connected to the power.

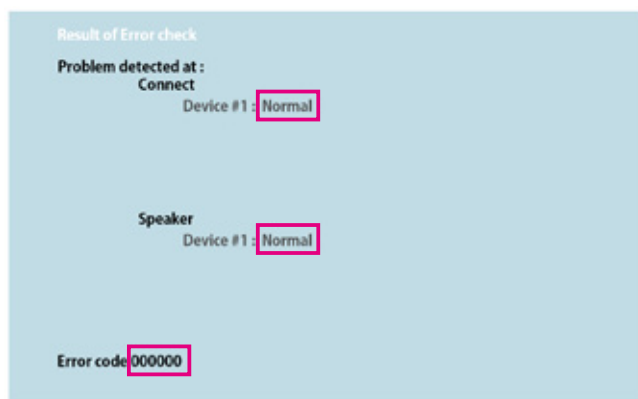
### 1 Error indicator system

When activating Simulator "LSAT 2", errors are automatically checked.



### 2 Error indication results

When errors detected, the following screen is displayed. Verify that all results are normal. When any error is detected, contact your local distributor or Kyoto Kagaku with the error code.



#### NOTES

Do not operate the control PC when the error indicator system is working.

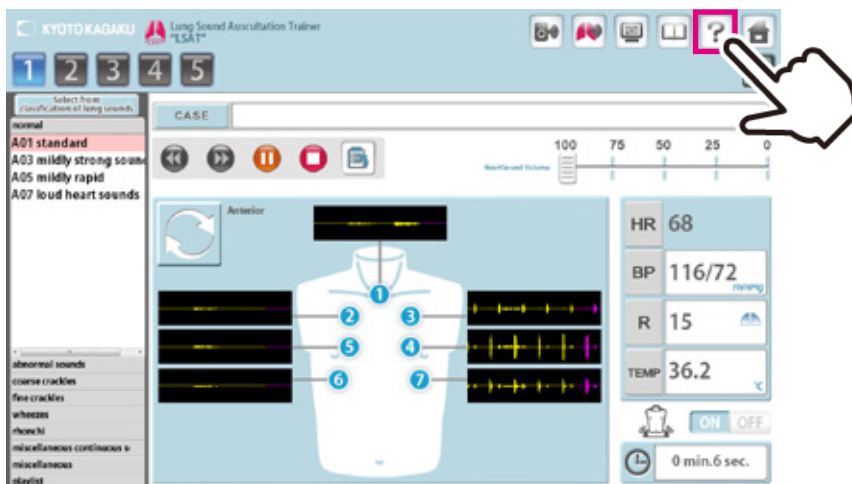
# 1 Verifying the connection of wireless systems

Verify the icon of the wireless connection. \* Default is set to **wireless**.



## NOTES

The software includes help menu for how to use the simulator. Tap the help menu for more details which are not described in this manual.



### 2 Start up simulation software

From top menu, select "LSAT2 Simulation" or "Playlist Maker".



### Softwares

#### ■ LSAT2 Simulation Software

All functions of LSAT2 are managed by this software.



#### ■ LSAT2 Playlist Maker

"Playlist" of cases can be created.

To create a playlist,

- 1) Use the Playlist Maker. Select cases, set their sequence and running time for each, then name and save the list.
- 2) Save a session as a playlist on LAST2 Simulation software. In the Playlist maker, data of recorded playlists can be edited and modified.



### 3 Select units to operate

Tap the units to operate and then tap "OK."



The button color indicate the status of each unit.



"Blue" : The units selected by this PC.



"Green" : The units already connected by another PC and not available to this PC.



"Gray" : The units unselected.



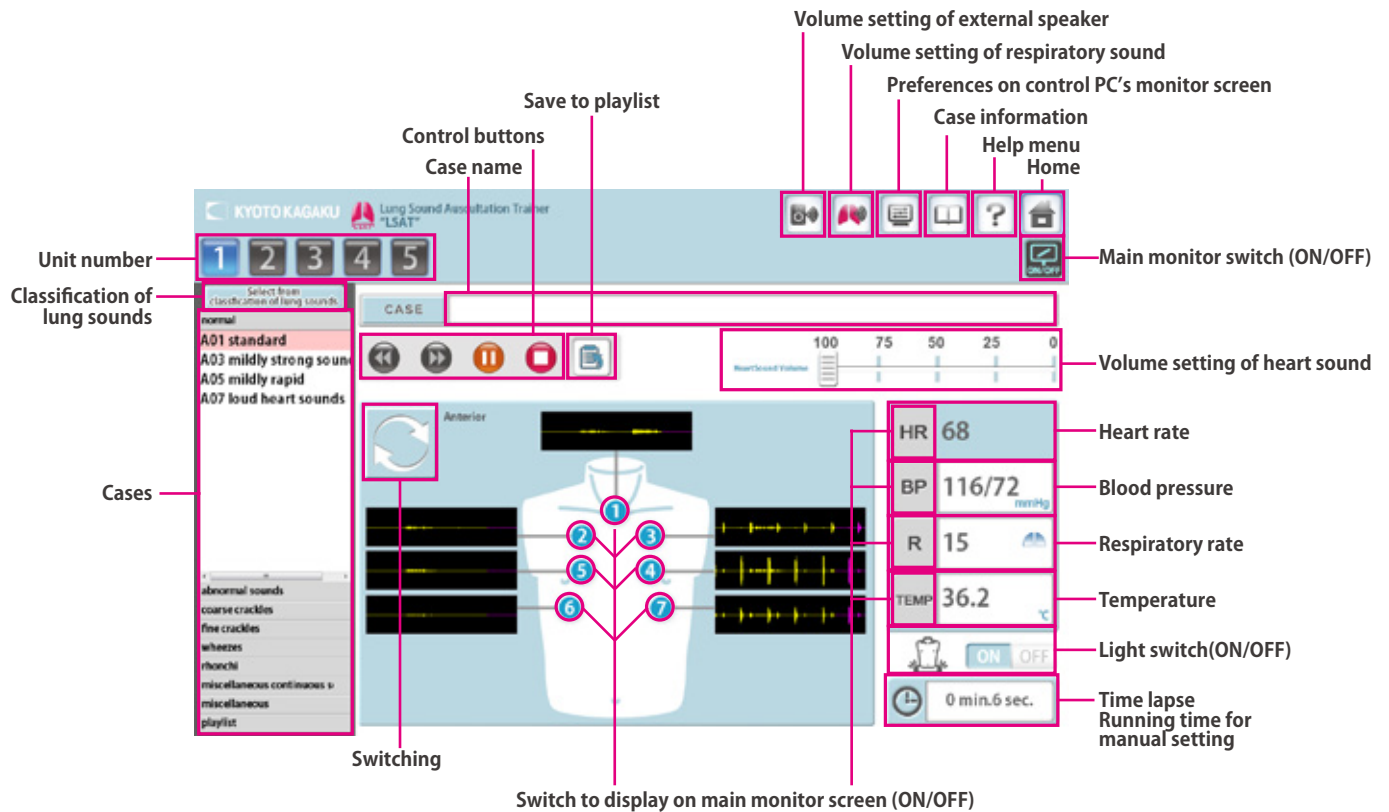
Active (Power and Wifi are on)



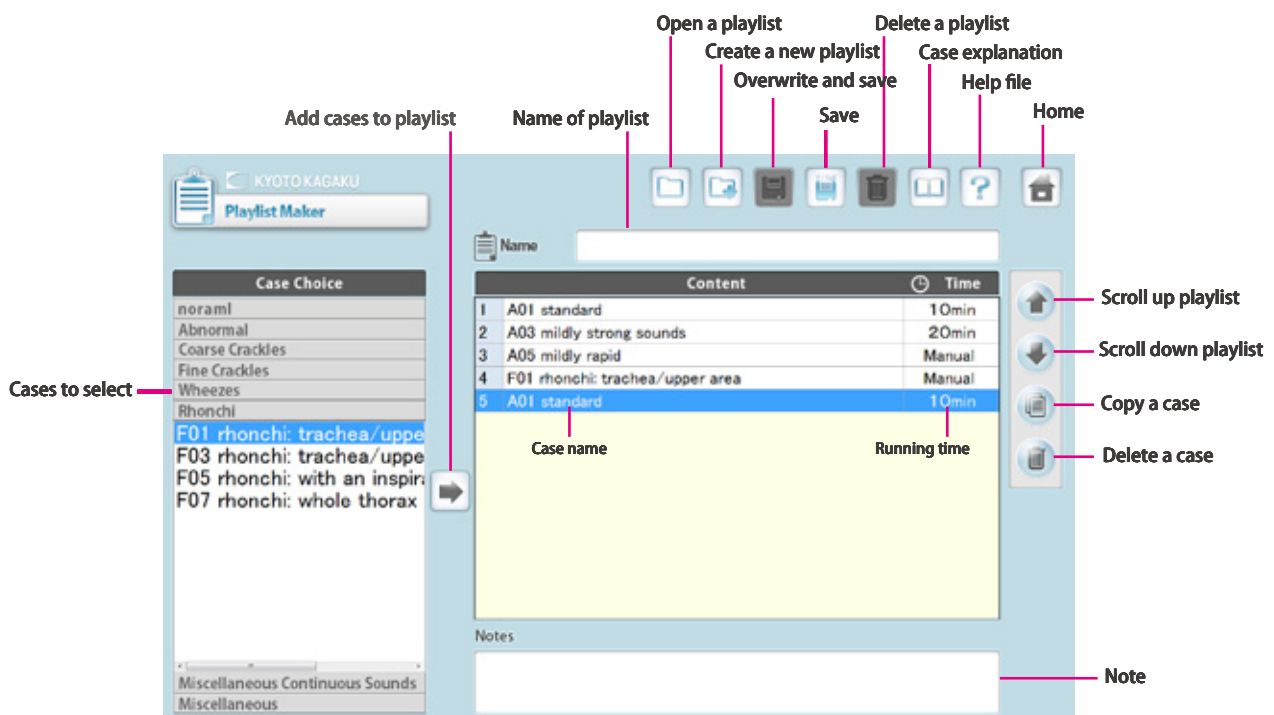
Inactive

## 1 Simulation Software

Error indication has been completed, the simulation software is ready to begin.




## 2 Playlist Maker





### Multi-unit operation

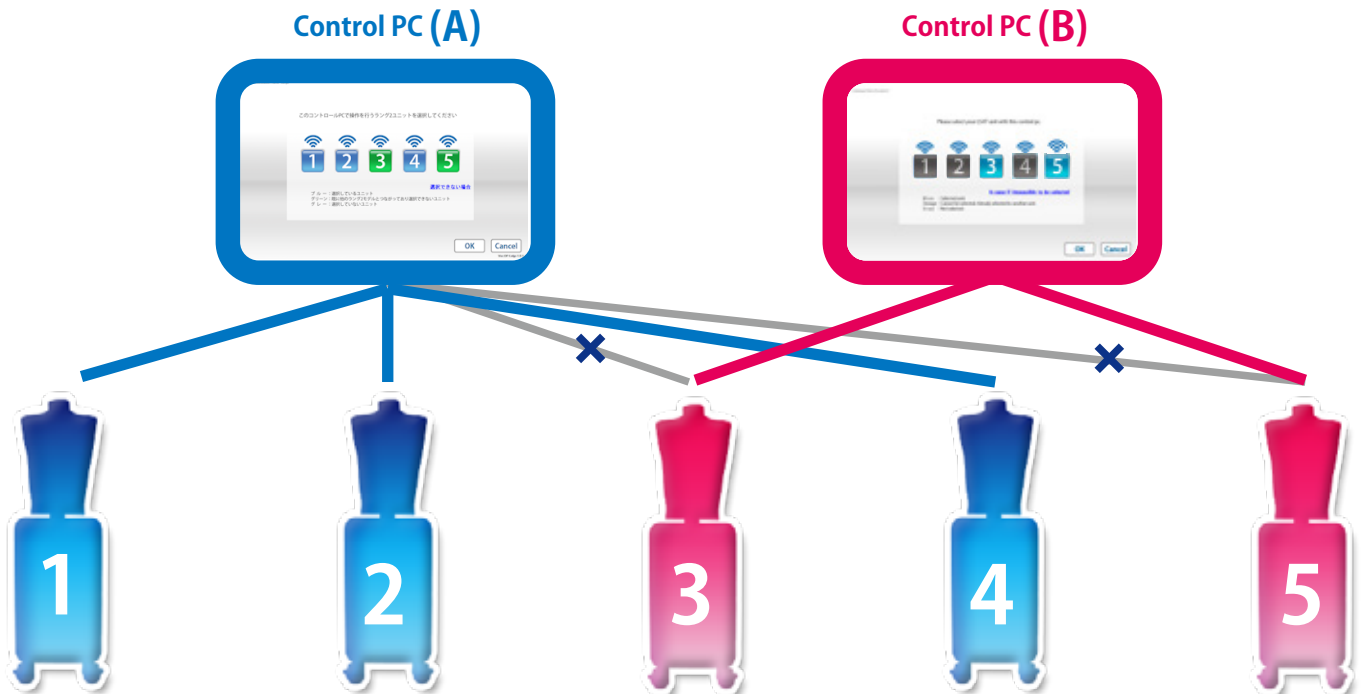
Up to 5 units can be selected by one control PC at a time.

Setting process varies between unison operations and multiple case operations. For details see incorporated HELP menu by tapping on the  mark on the top right of the screen.

#### IMPORTANT

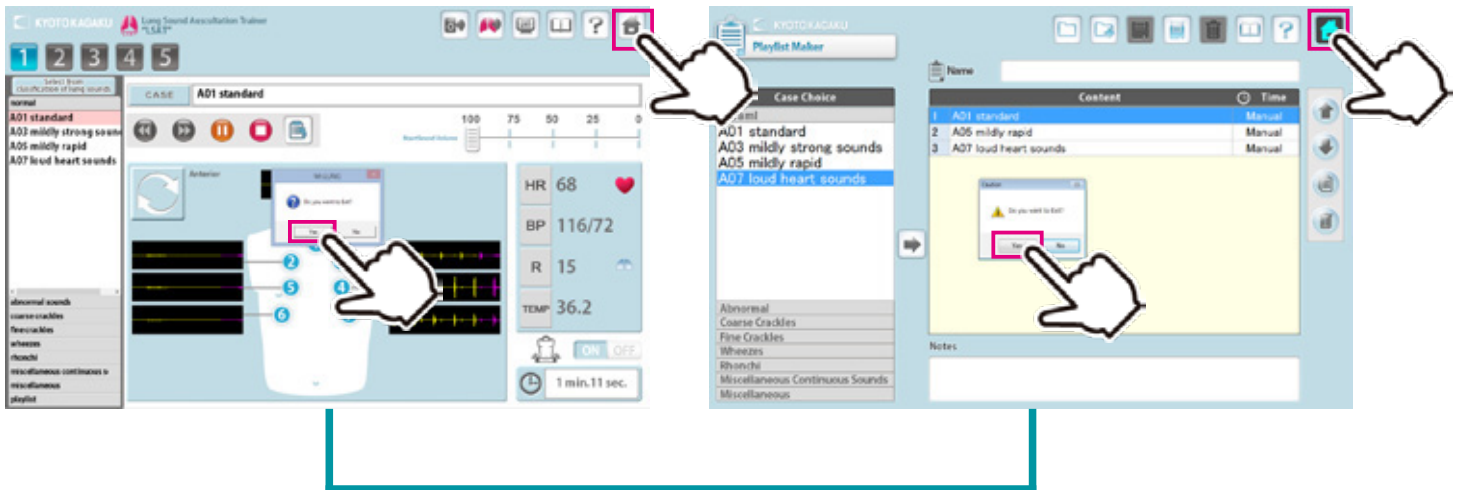
**One simulator unit (torso) can be selected by only one control PC at a time. The connections are established in the order of selecting the units.**

For example, while units #3 and #5 are selected by control **PC B**, the control **PC A** cannot select these units. To connect them to control **PC A**, these units need to be unselected by control **PC B**.



### 1 Exit software

Tap on the "Home" icon at the right top.  
"Do you want to exit?" message appears, select "Yes."



### 2 Turn off the control PC power

Tap on the "Exit" icon at the top menu.  
"Do you want to exit?" message appears, select "Yes."



### 3 Turn off the control system's main power

Turn off control system's main power on the back of unit.

Control system's main power

— : Power is ON

○ : Power is OFF



Cases	Causes	Solutions
Unable to connect with wireless or unstable connection	Network interference occurred.	→ <a href="#">Case: Unable to Boot The Main Unit</a> ( → P.19)
	There are physical obstructions for wireless connection or control PC is too far from the unit.	Clear the obstructions or close the control PC to the unit.
Unable to boot the main unit with wireless connection	Power cable of the unit is not connected.	Connect the power cable.
	The main power of the unit is off.	Turn on the main power of the unit.
	Network interference occurred.	→ <a href="#">Case: Unable to Boot The Main Unit</a> ( → P.19)
	Others	
Unable to select the units which liked to boot	The control PC does not correspond to the unit.	Use the control PC corresponding to the unit.
	The main power of the unit is off	Turn on the main power of the unit.
	Power cable of the unit is not connected.	Connect the power cable.
	Network interference occurred.	→ <a href="#">Case: Unable to Select The Units</a> ( → P.20)
	Others	
The session automatically shuts down with the message of "Connection Error", and then the connection becomes unavailable.	Network interference occurred.	→ <a href="#">Case: The Error Occurs During The Session</a> ( → P.21)
Unable to hear the respiratory sound from the manikin	Volume setting of the respiratory sound is "0"	→ <a href="#">Volume Setting of The Respiratory Sound</a>
	Speaker connection may have problems.	→ Contact Us
Unable to hear the heart sound from the manikin	Volume setting of the heart sound is "0"	→ <a href="#">Volume Setting of The Heart Sound</a>
	Speaker connection may have problems.	→ Contact Us
Unable to hear the sound from the external speaker	Volume setting of the external speaker is "0"	→ <a href="#">Volume Setting of The External Speaker's Sound</a>
	Speaker connection may have problems.	→ Contact Us

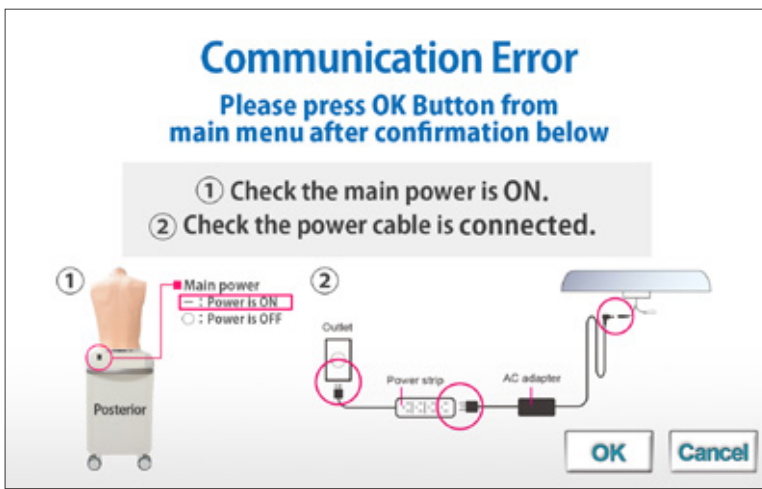
### Unable to boot the main unit

#### Attention

For the multi-unit operation, **be sure the control PC's own main unit is turned on.** The control PC is not able to operate when its own main unit is turned off.

#### ■ Case:

The screen shows the sign below repeatedly and it does not work despite several trials.

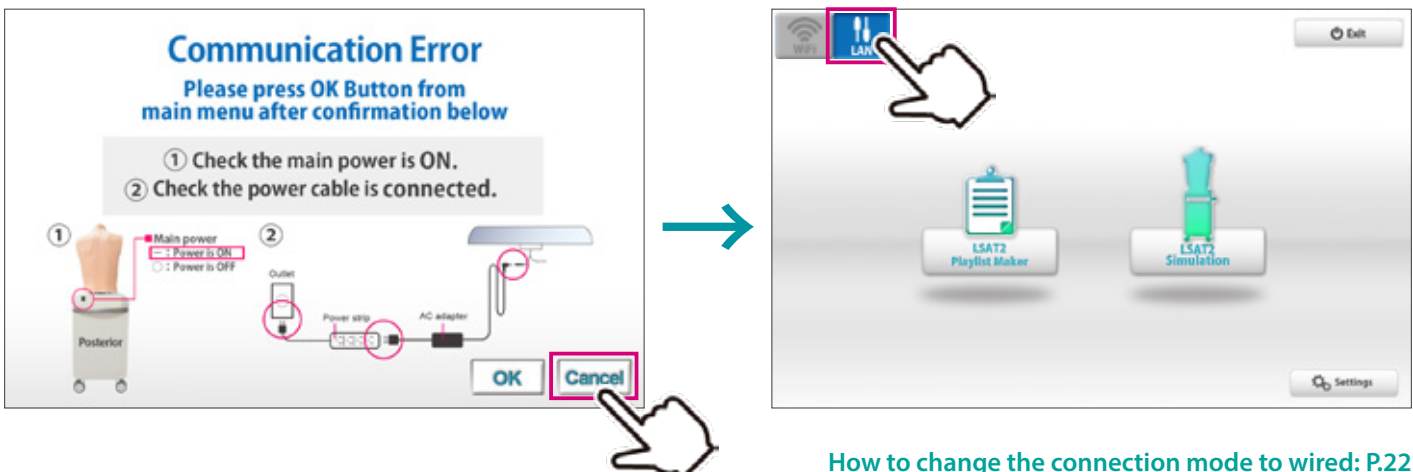


#### ■ Cause and solution:

1. The main units are not connected to power source.  
→Connect the cable to power source and turn on the main unit.
2. The main units are not turned on.  
→Turn on the main units.
3. Interference from other wireless network  
→Follow the solution 2 below.

#### ■ Solution 2:

Tap the cancel to back to the top page and try with wired connection mode.



How to change the connection mode to wired: P.22

### Unable to select the units

#### Attention

For the multi-unit operation, **be sure the control PC's own main unit is turned on.** The control PC is not able to operate when its own main unit is turned off.

#### ■ Case:

Units are not available to be selected.



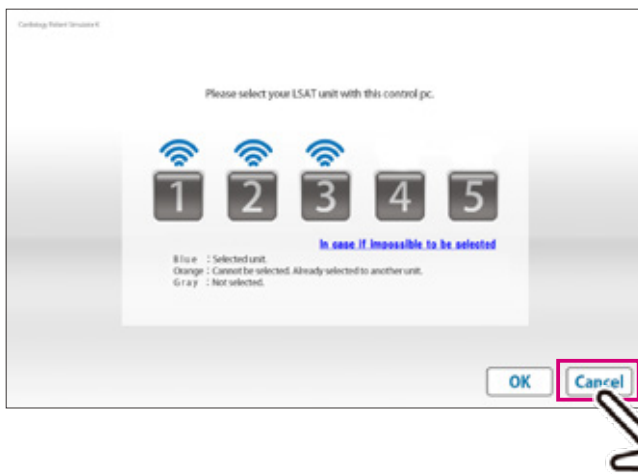
The connection indicator is gray on the unit which are wanted to be used.

#### ■ Cause and solution:

1. The main units are not connected to power source.  
→Connect the cable to power source and turn on the main unit.
2. The main units are not turned on.  
→Turn on the main units.
3. Interference from other wireless network  
→Follow the solution 2 below.

#### ■ Solution 2:

Tap the cancel to back to the top page and try with wired connection mode.



How to change the connection mode to wired: P.22

### An error occurs during the session

#### ■ Case:

The software closed with showing the error display below.

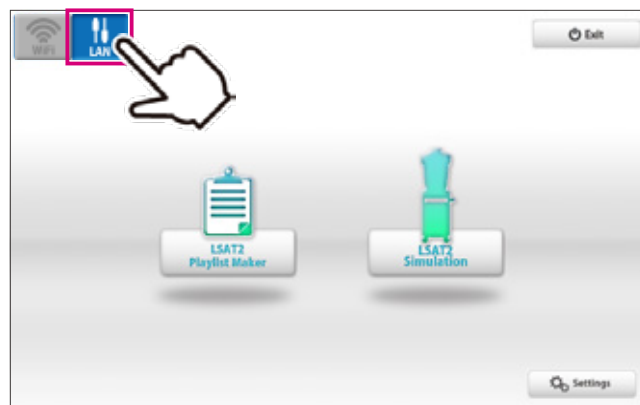
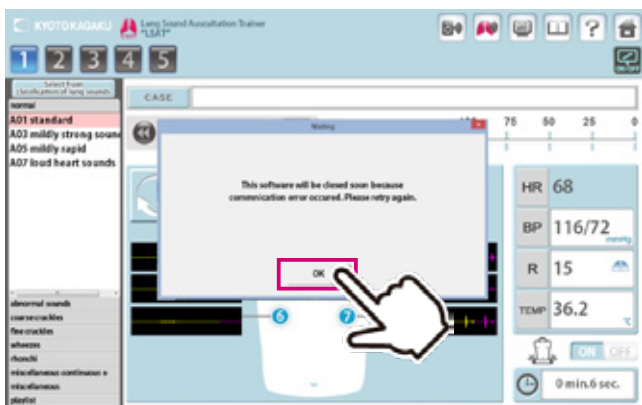


#### ■ Cause:

Wireless network confusion may be happened around the models.

#### ■ Solution:

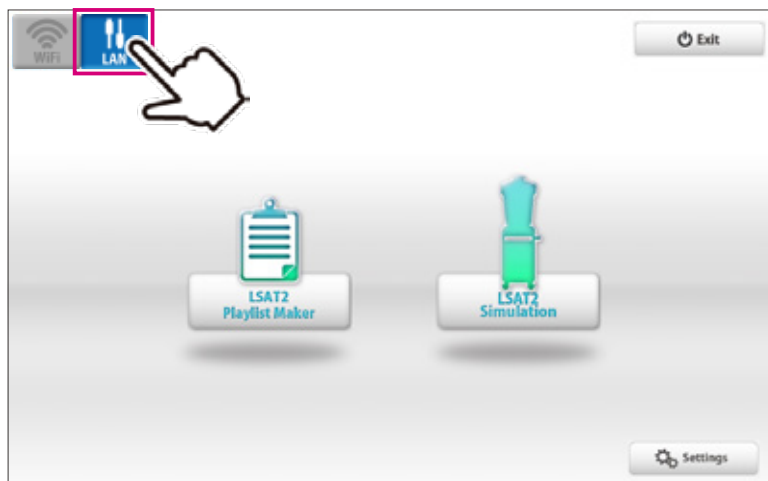
Try with wired connection mode.



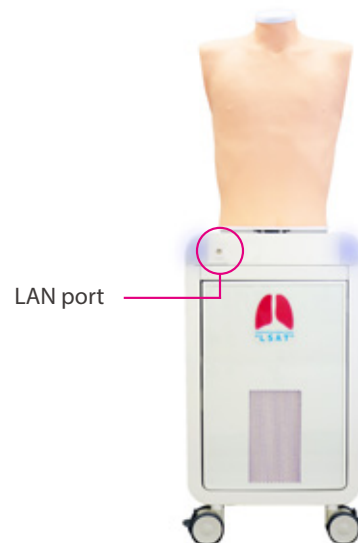
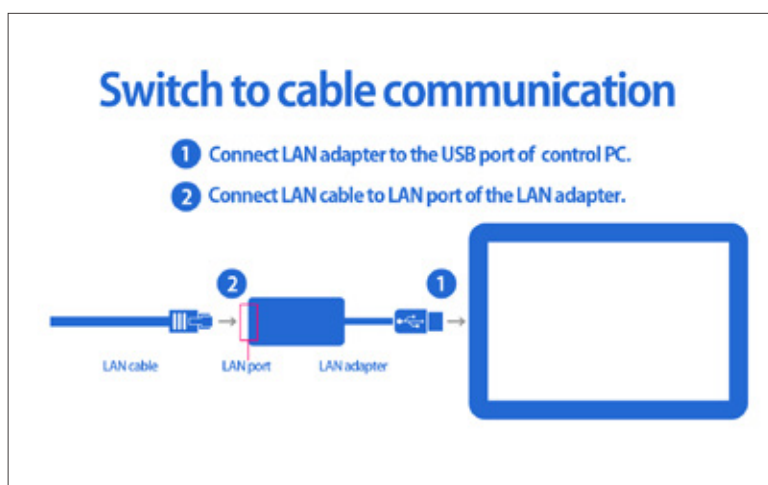
How to change the connection mode to wired: P.20

### The error occurs during the session

- 1 Tap the connection switch on left upper display to change the connection mode.



- 2 Connect the control PC to the LAN cable from the main unit .



### Attention

In regard to multi-unit operation with the wired connection mode, unit. please refer to the attachment paper.

**Caution** | Do not mark on the model and its components with a pen or leave printed materials in contact with the model surface. Ink marks on the model are not removable.

## **KYOTO KAGAKU co.,LTD**

URL: <http://www.kyotokagaku.com> e-mail: [rw-kyoto@kyotokagaku.co.jp](mailto:rw-kyoto@kyotokagaku.co.jp)

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3109 Lomita Boulevard, Torrance, CA 90505-5108, USA

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