

PH-48

Dynamic Heart and Lung Phantom

Instruction Manual

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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.

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.

● 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.

DON'Ts

● Do not disassemble or open electric or precision components

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

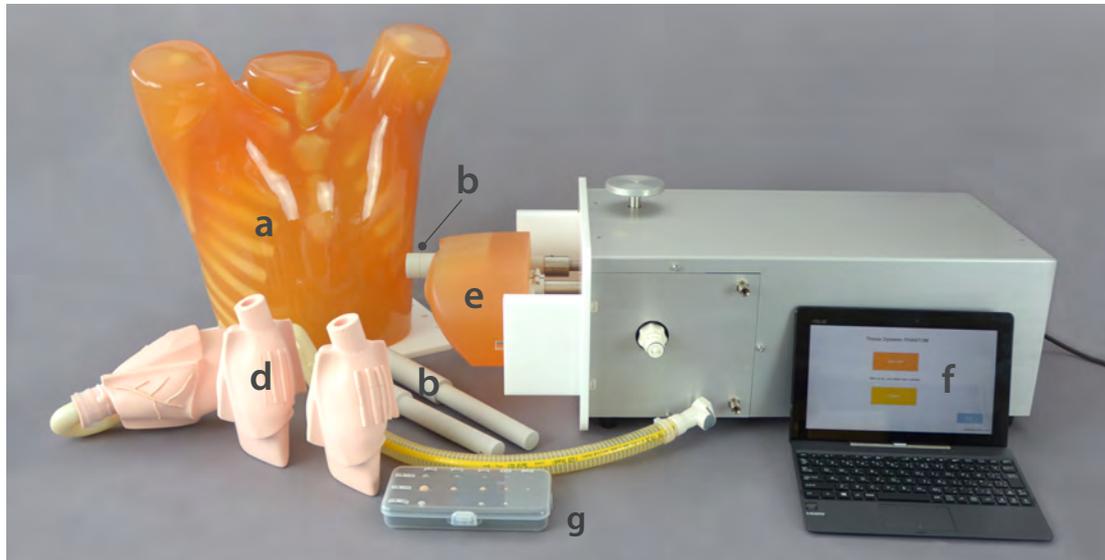
Risk of shock.

● 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.

Components

Before your first use, please ensure that you have all components listed below.



a Chest Phantom	1 unit	e Diaphragm	1 unit
b Rolling Cylinder of Simulated Tumor	3 units	f Control Tablet	1 unit
c Mechanical System	1 unit	g Simulated Tumor	1 set
d Simulated Heart	3 units		

This dynamic phantom consists of chest phantom, rolling cylinder of simulated tumor, diaphragm, simulated heart, and mechanical system.

It is controlled by tablet PC to select the heart beat and respiratory pattern, and start the motion of diaphragm and rolling cylinder of simulated tumor.

● 3 Simulated Heart Models



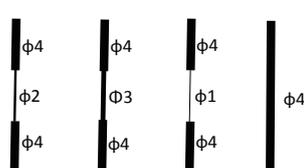
Coronary Arteries

Length: 60mm



Coronary Artery Stenosis

Length: 20+20+20mm

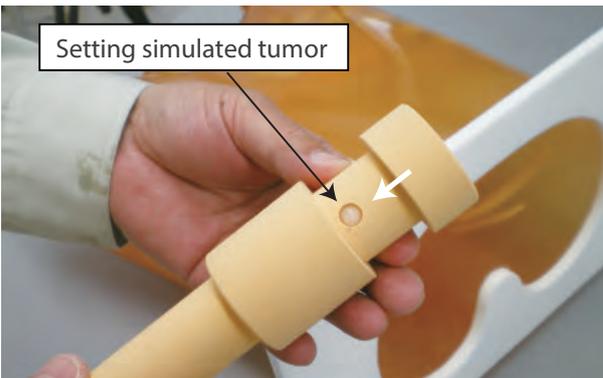
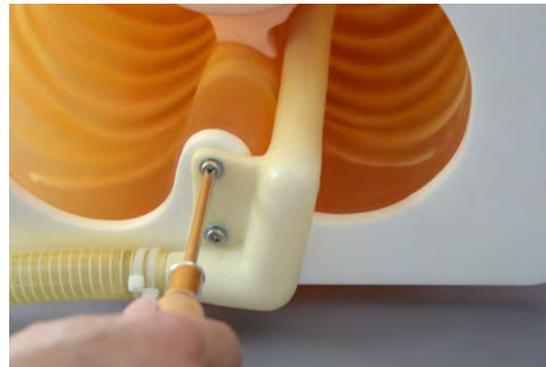
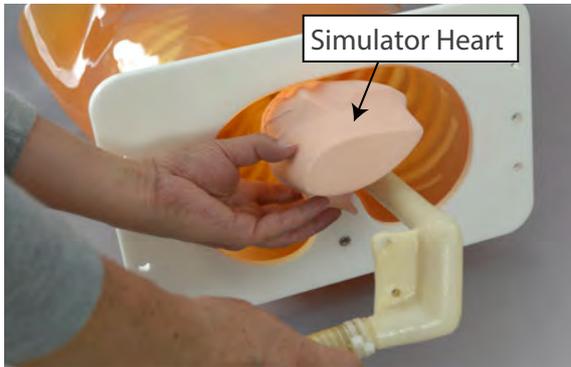


Anatomical Coronary Artery

Unit: mm

Set-up 1

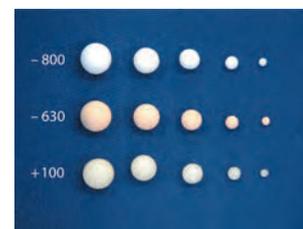
1. Fill the simulated heart with water using assistant tube and set it into the chest phantom. Fit it with screw.



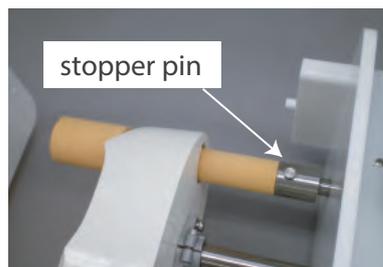
2. Put simulated tumor in the rolling cylinder, and attach it to the mechanical system.

*The rolling cylinder is made from Lung tissue equivalent material. Pull tip of cylinder and, put tumor in the cavity.

*Two types are available, one for $\phi 3 \cdot 5 \cdot 8\text{mm}$, and other for $\phi 10 \cdot 12\text{mm}$.



3. Inserting the stopper pin.



Set-up 2

4. Attach the chest phantom to the mechanical system to insert white pegs to the holes, and fix them by screws.



5. Connect power cable and turn on.

* ○: OFF |: ON.

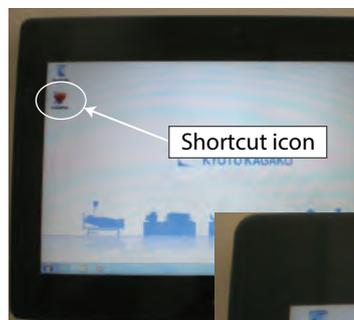
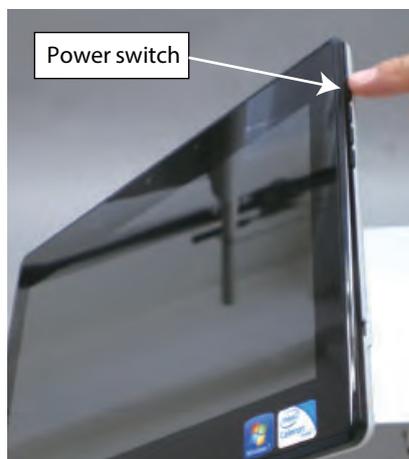
Attention; Turn on the main switch prior to turn on the tablet.



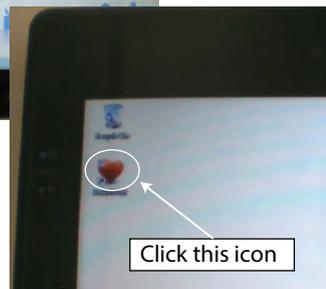
Turn on the tablet power

1. Turn on the tablet power. The switch is located on the side.

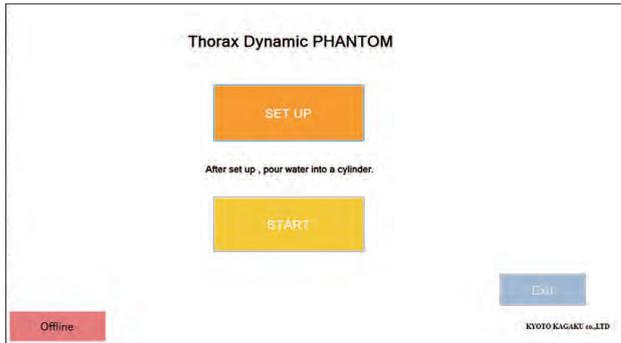
*Keep pressing the button to turn on.



2. Click the shortcut icon to start.
(Check the main power is on)



Set-up 3



1. Touch "SET UP" button to initialize.

2. Pour water in the cylinder in the main body.



Connect the transparent tubes to the connectors and pour water from bottom connector by syringe until water comes out of upper connector. (Drain the water completely after use.)



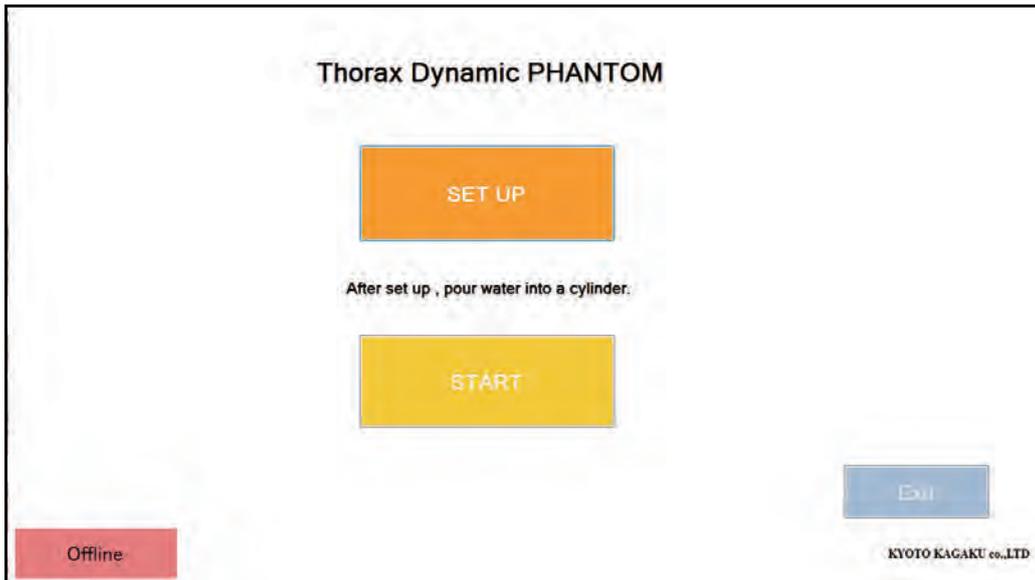
3. Connect the tube to the connector on the side of main body.

*Push the button to disconnect the tube after use.

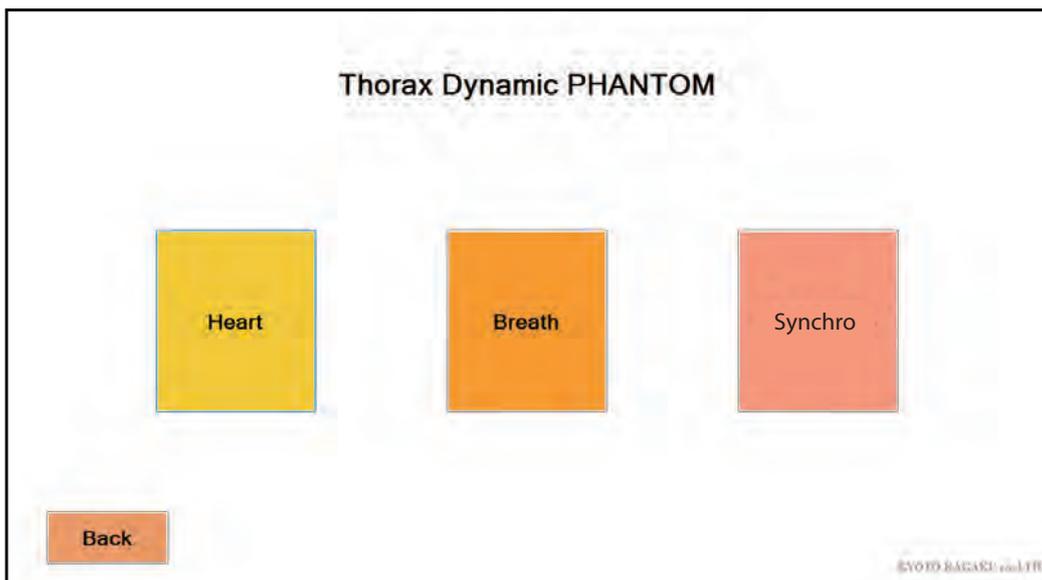


Operation

1. Touch "SET UP" button to initialize.

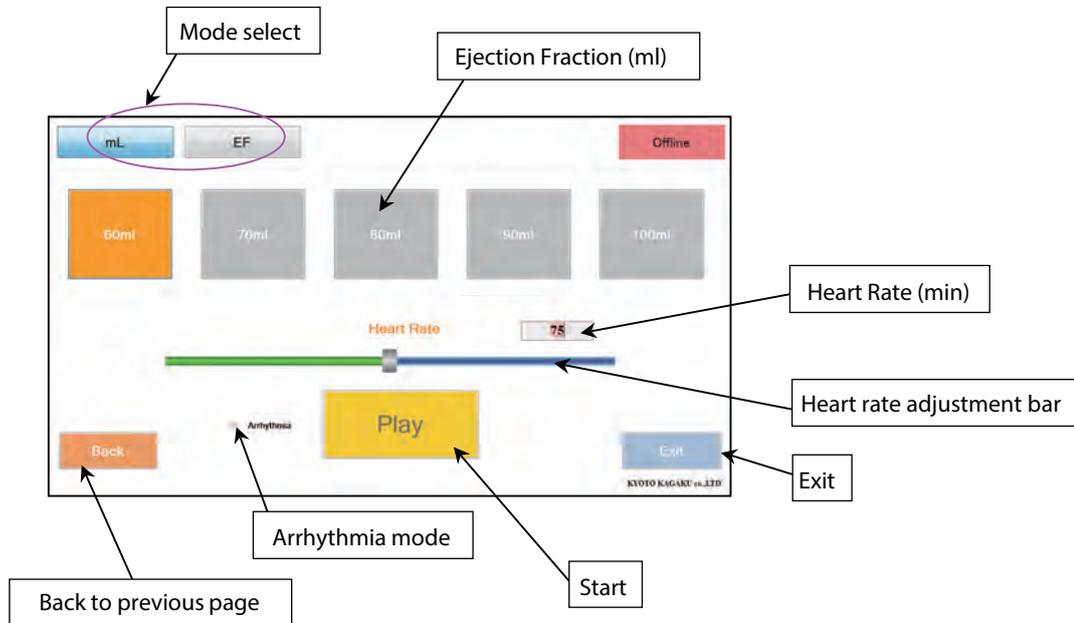


2. Select the Mode. Heart
Breath
Synchro

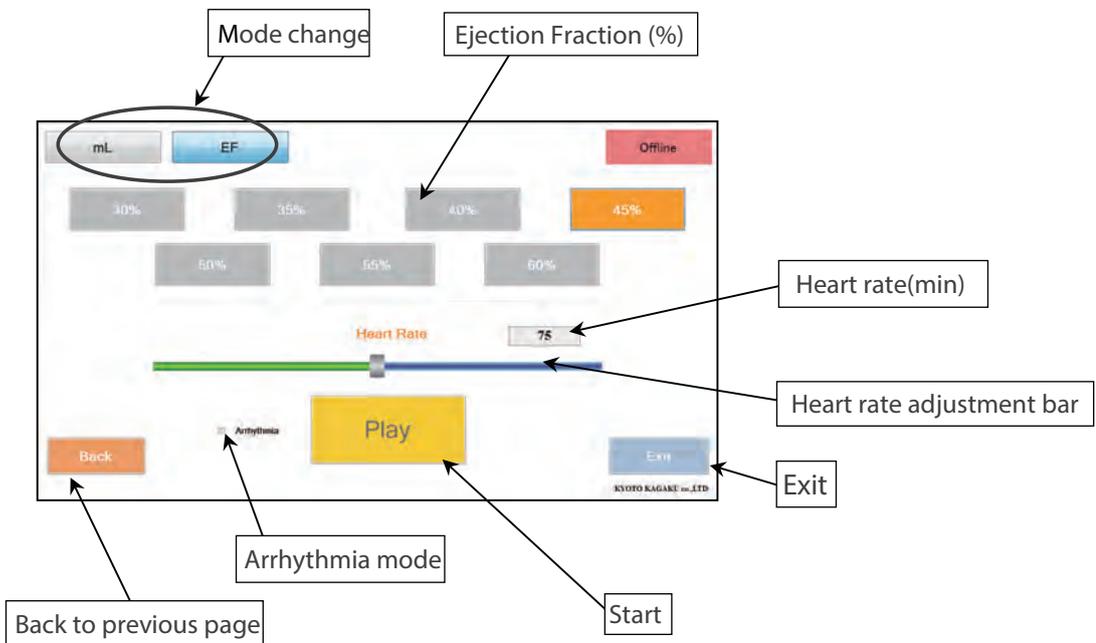


Heart

1. mL mode: Ejection Volume from LV.



2. EF mode: Ejection Fraction from LV.

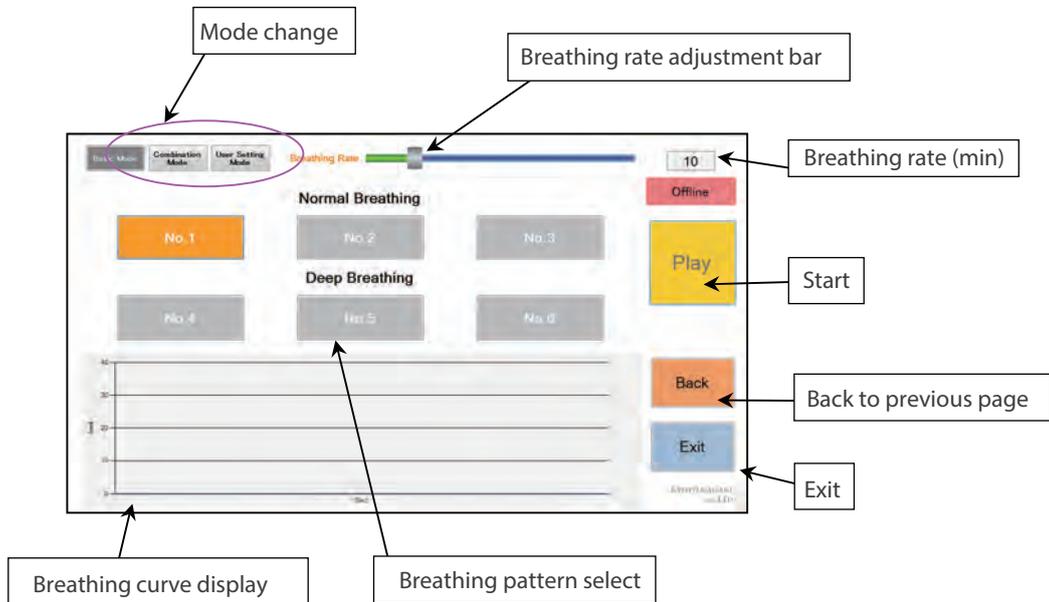


Arrhythmia mode: Adds 0.2 sec of interval time to ECG rhythm randomly with three tenths probability.

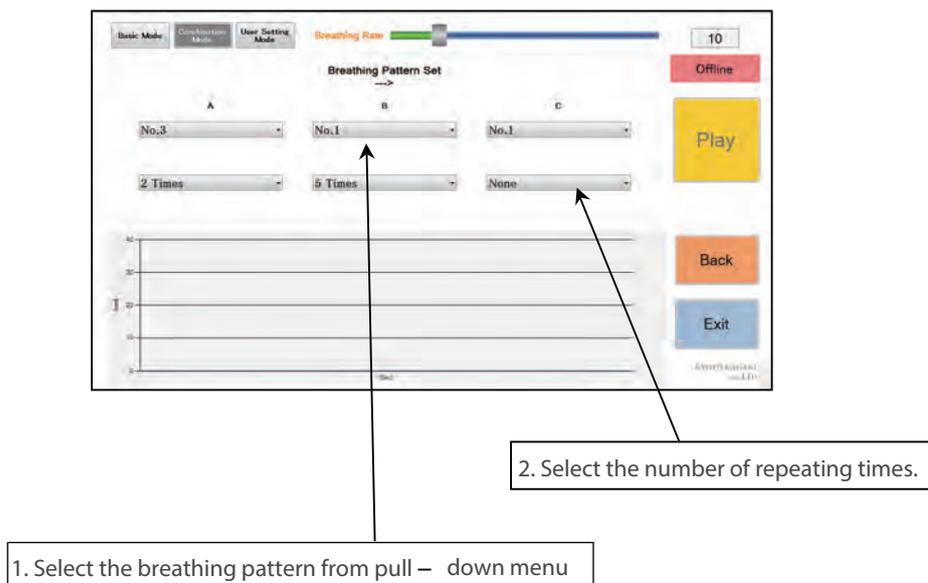
※The mode setting can not be changed while running

Breath

1. Basic Mode



2. Combination Mode



Breath

3. User Setting Mode

Make respiratory pattern based on the saved pattern data

Modify sData from keyboard.

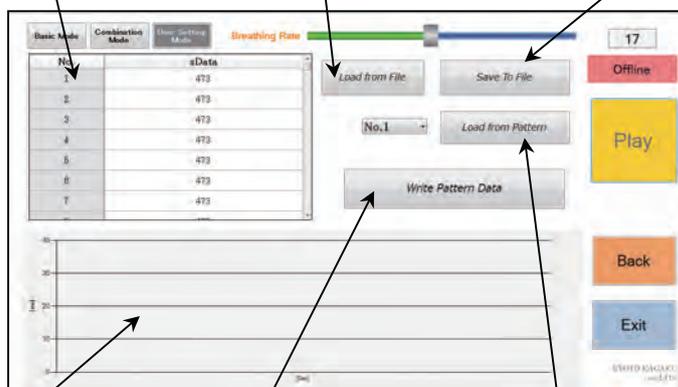
Data file is saved by Excel file and enable to be change directly.

sData represents the stroke (moving distance of the diaphragm) by mm unit.

Adjust the respiratory cycle by 0.02sec

Load the saved file

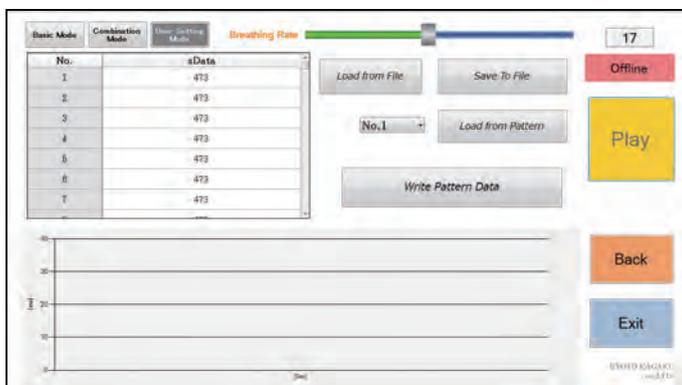
Save the data



The wave form is displayed here

Send created data to the main unit
 ※The created data can not be saved without this operation.

Load the saved breathing pattern
 ※The new respiratory pattern can be made from the saved data.



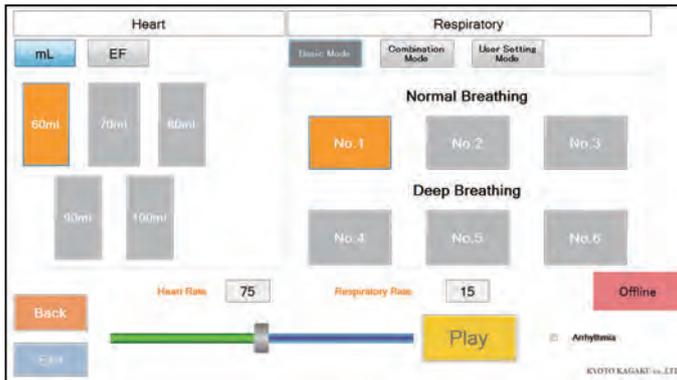
1. Load the saved pattern data
2. Change the value
3. Write Pattern Data and Push "Write Pattern Data" and save the data in the main unit
4. Play
5. Save To File

※The mode setting can not be changed while running

Synchro

Heart and Breathing motion can be replayed at the same time.
Rate, Pattern and other condition can be set individually.

Please refer to the Heart mode and Breath mode about the operation procedure

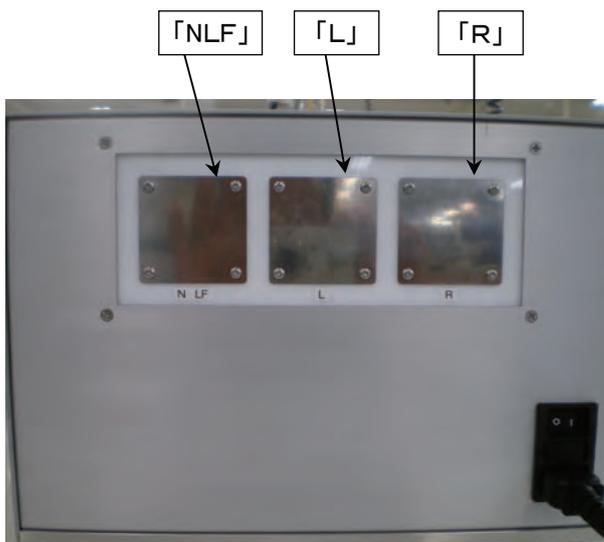


※The mode setting can not be changed while running

Output plates for ECG

Clean up the plates to put each ECG lead pad to the assigned plate.

*Since it is too small to put two ECG lead pads on N/LF plate, cut the pads by proper size to put together.



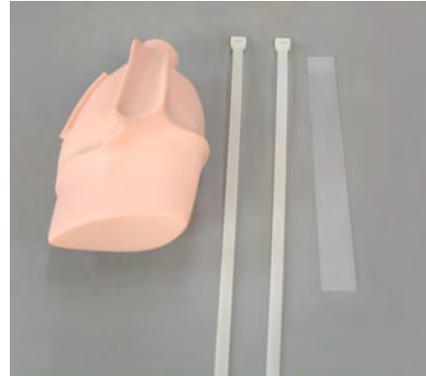
ECG plates for ECG gating

Each plate generates R-wave for ECG gating.
There are 「NLF」 「L」 「R」 ECG plates from the left

Changing of the simulated heart

1. Prepare the simulated heart, 2 pieces of bigger zip tie , and silicone tape.

Aorta tube is inserted as like the photo shows. Two dot marks are put together. Cut 2 pieces of zip tie carefully, and remove aorta tube from heart.



2. Insert aorta tube to simulated heart until putting each two dots together.



3. Wind silicone tape.



4. Wind the insertion port by 2 pieces of zip tie , and fix it firmly.



5. Cut the extra part of zip tie.





Caution

Don't mark on the phantom with pen or leave printed materials contacted on its surface. Ink marks on the phantom will be irremovable.

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