

PH-82



Caution

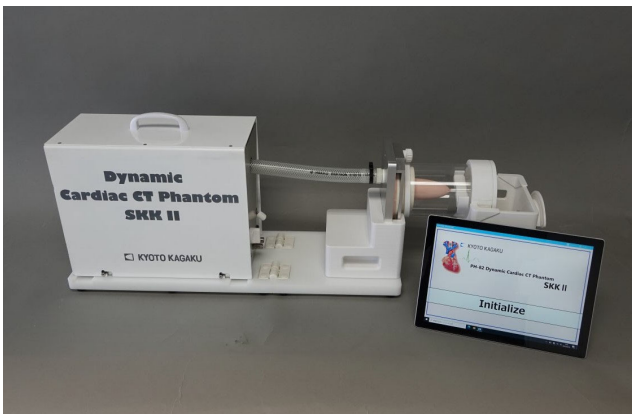
Do not mark on the model and other components with pen or leave any printed materials contacted on surface. Ink marks on the model cannot be removed.

Dynamic Cardiac CT Phantom SKK II

Instruction manual

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Introduction

Manufacturer's Note

PH-82 Dynamic Cardiac CT Phantom SKK II is a dynamic phantom for evaluation and research in ECG gated cardiac.

The product is designed for training of healthcare professionals. Usage for any other purpose or the way of use not described in this manual is strongly discouraged.

Applications

Measurement of the left ventricle volumetric change
Image quality evaluation of coronary arteries

Features

The phantom represents physical movement and volumetric change of the left ventricle
The heart phantom is made of human tissue substitute material for CT Coronary arteries' variation includes stenosis, contrast enhances and anatomical vessels
The phantom generates pulses that are synchronized with the cardiac movement for ECG gating Controllable parameters; pulse rate (30-120 bpm) and ejection volume (0-100%)
Three kinds of arrhythmic modes
Operation with the tablet PC is simple and easy

The movement of the phantom is stable and reproducible
Use the included attachment for ECG gating study

DOs and DON'Ts

- **Handle the manikin and the components with care**

Be sure not to drop or add shock to the manikin and its components, since the product uses special resins and heavy, such shock may cause damage to the products or environment.

- **Storage dark, cool and dry space will help prevent the product's colors from fading and product from deforming.**

- **The product may be cleaned with a wet cloth if necessary, using mildly soapy water or diluted detergent.**

- **Do not let ink from pens, oriented materials, this manual or other sources contact with the product's surface, as they cannot be cleaned off.**

- **Never use the organic solvent such as paint thinner to clean the skin, as this will damage the simulator.**

- **The color of the product's surface may change across the ages, this does not affect the quality of its performance.**

Introduction

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 discolor-ation or deformation of the product as well as short circuit, creating a risk of fire.

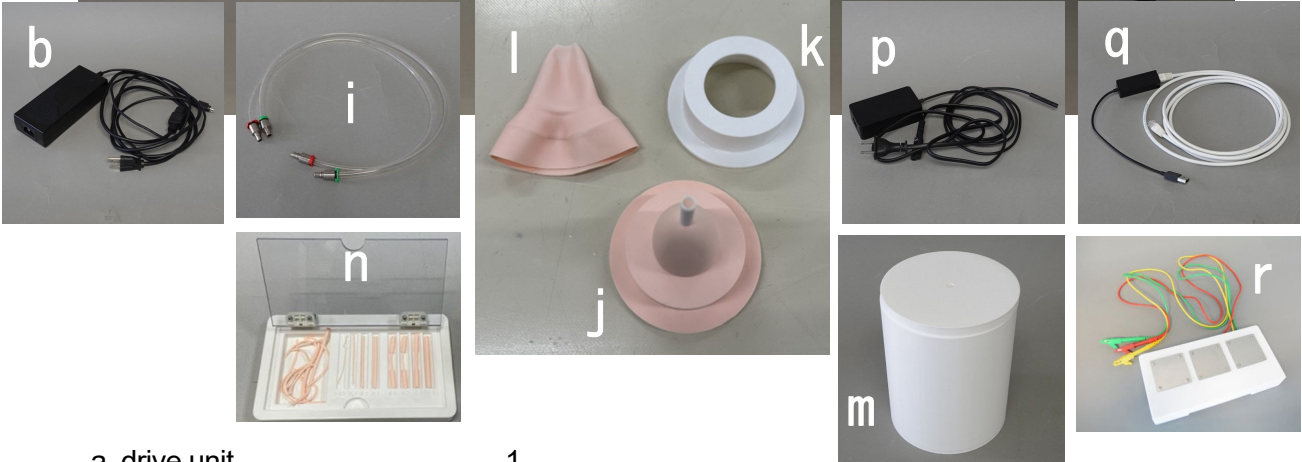
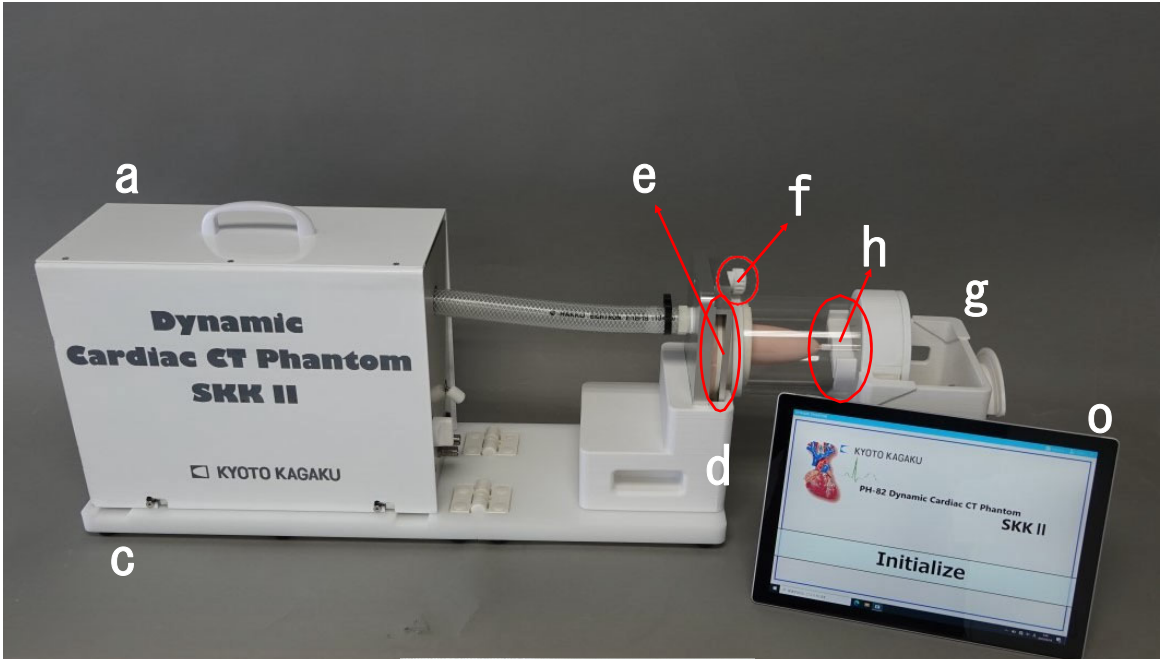
Read before use

The product is intended for use of medical and paramedical professionals only. Any other use, or any use not in accordance with the enclosed instructions, is strongly discouraged. The manufacturer cannot be held responsible for any accident or damage resulting from such use. Please use this product carefully and refrain from subjecting to any unnecessary stress or wear. Should you have any questions on this simulator, please feel free to contact our distributor in your area or KYOTO KAGAKU at any time. (Our contact address is on the back cover of this manual)

Set includes

Set includes

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



a. drive unit	1		
b. power cable	1	j. heart phantom	3
c. drive unit base	1	k. heart base cover	1
d. heart fixation unit	1	l. heart cover	3
e. heart holder	1	m. heart storage case	3
f. fixing screw	1	n. simulated coronary arteries	10types x 1 each
g. reservoir tank	1	o. tablet	1
h. cardiac tip fixture	1	p. power cable for the tablet	1
i. irrigation / drainage tube		q. LAN cable for tablet	1
	red / green each 1	r. ECG part attachment parts	1

Specifications

Specifications

*The system automatically stops after five minutes to prevent overheating.

1. Cardiac pulses

- Corresponds to changes in left ventricular volume (LW).
- One cardiac cycle, consisting of diastole (D) and systole (S), is identified based on the RR interval.
- The cycle length is adjusted during the slow-filling (SF) phase.
- Represents the four phases of ventricular motion: isovolumetric contraction, ventricular ejection, isovolumetric relaxation, and ventricular filling.

2. Volume (E/F) is shown as percentage 0-100% (no indication in actual volume)

* Calculation is different from clinical E/F (see P5)

3. Heart rate: 30-120bpm

4. Arrhythmias: three types of arrhythmia are represented:

- Extrasystole (premature ventricular contractions)
- Tachycardia
- Bradycardia

(For arrhythmia modes, the heart rate is fixed at 60 bpm.)

5. . Movement of heart can be held at its ejection 0% or 100%.

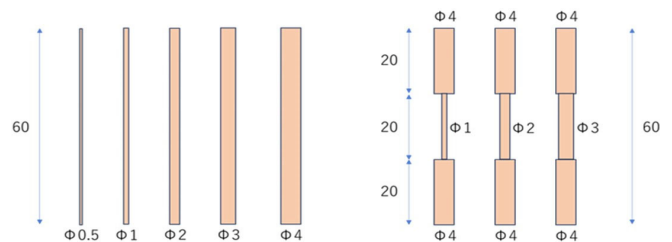
*The "true value" measurement is possible.

0% is the default position of the heart. 100% is when the internal cylinder is fully extended.

The "true value" here does not mean "measurement value in a moving state" but "measurement value in a stationary state."

6. Simulated coronary arteries

- Anatomical 2 types
- Stenosis 3 types
- Normal 5 sizes
(0.5 / 1.0 / 2.0 / 3.0/4.0 mm dia.)



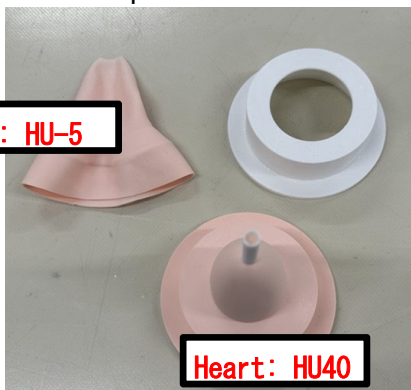
7. HU

Heart : HU40

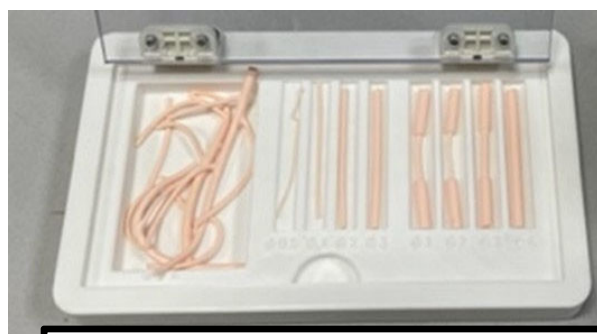
Vessels : HU350

Heart cover : HU-5 equivalent

Heart cover: HU-5



Heart: HU40

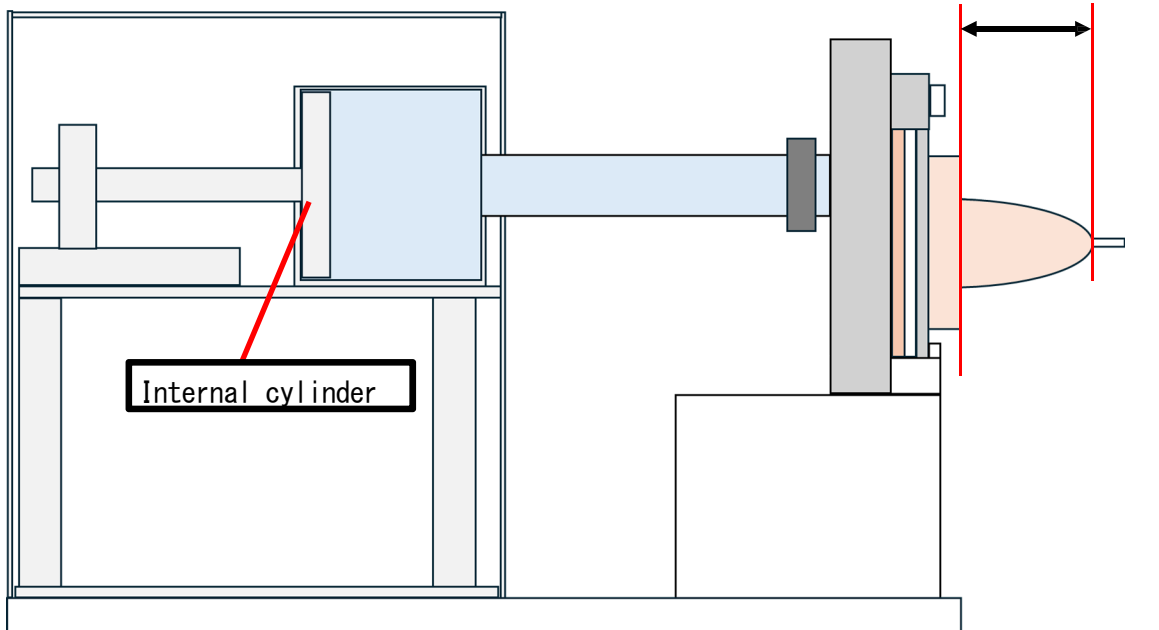


Simulated coronary arteries: HU350

Specifications

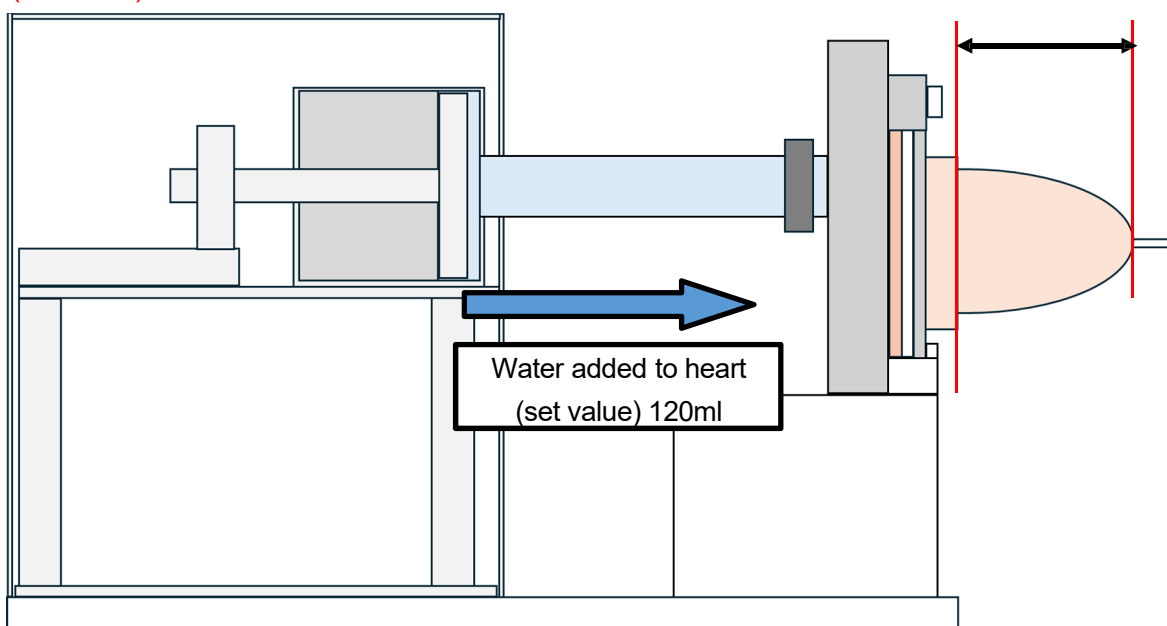
Specifications

Volume 0%: internal cylinder is at default position



Volume 100%: internal cylinder is fully pushed

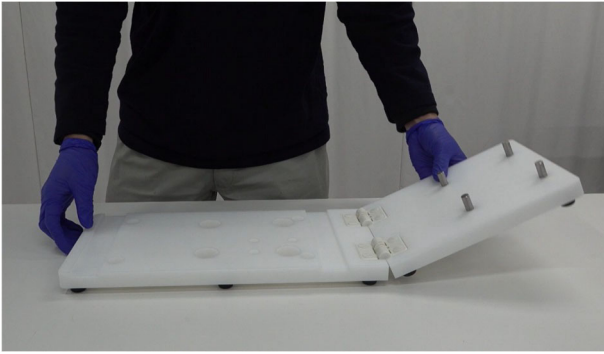
*120ml water moves into the heart making the total water volume in heart 170ml (set value)



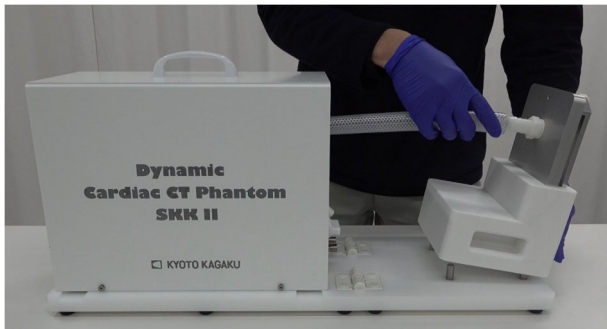
Preparation

Assembly of the Drive unit

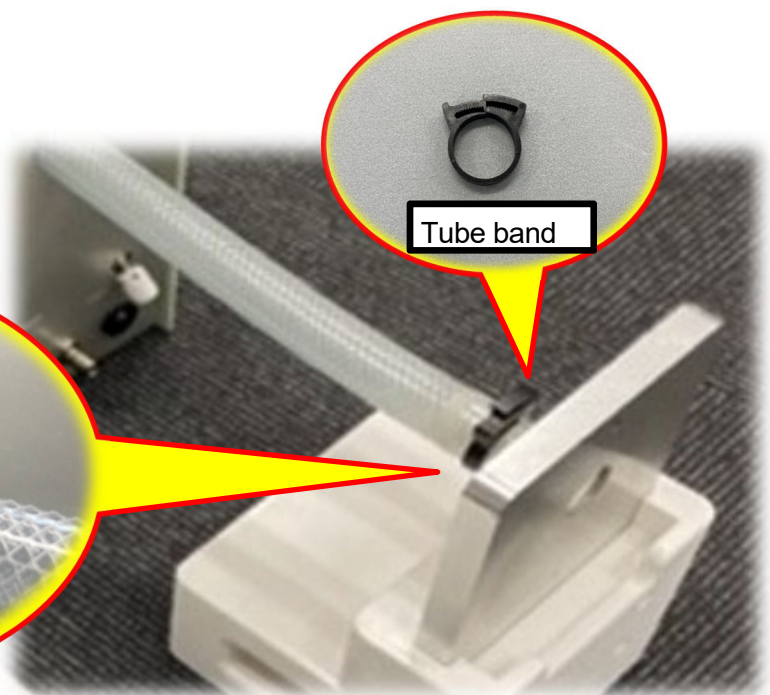
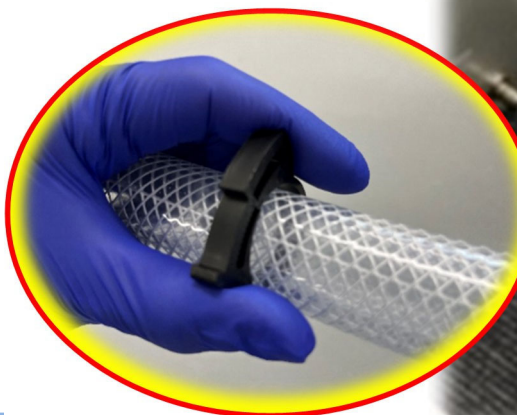
1. Open the drive unit base and put the drive unit on it.



2. Connect the tube from the drive unit to the heart fixation unit.



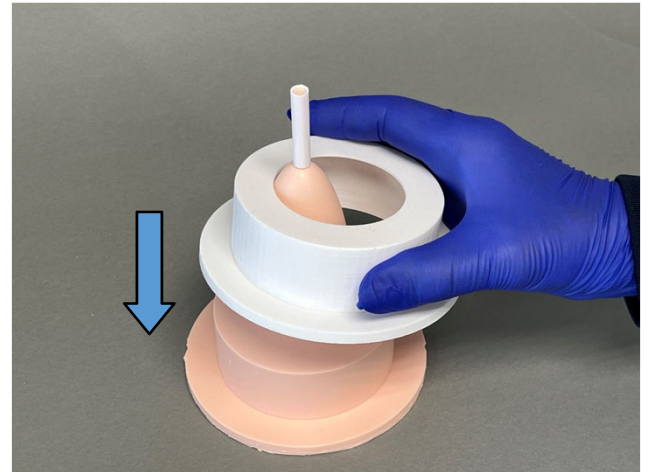
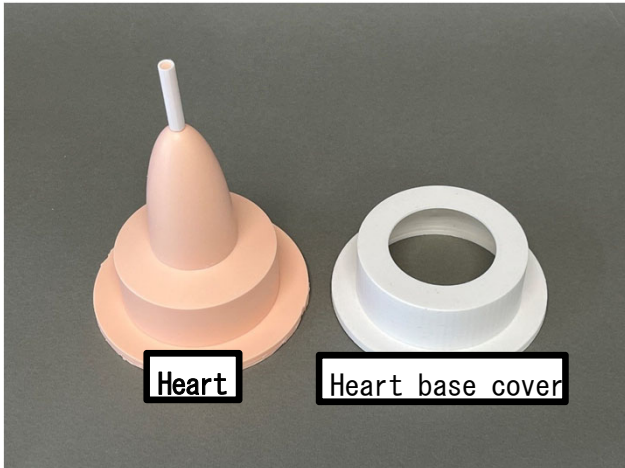
3. Tighten the tube band over the nozzle until it firmly set into place.



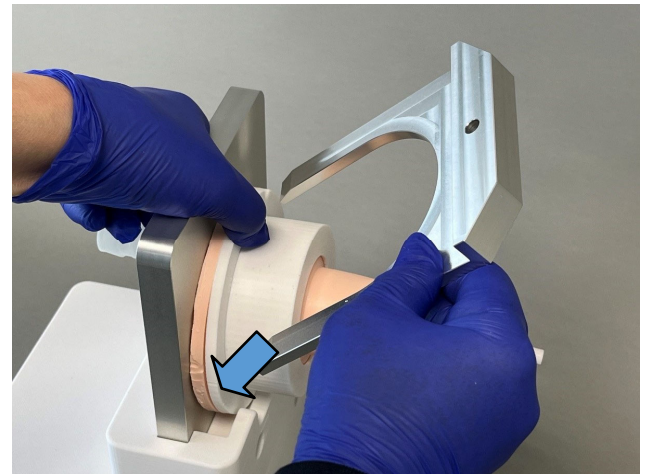
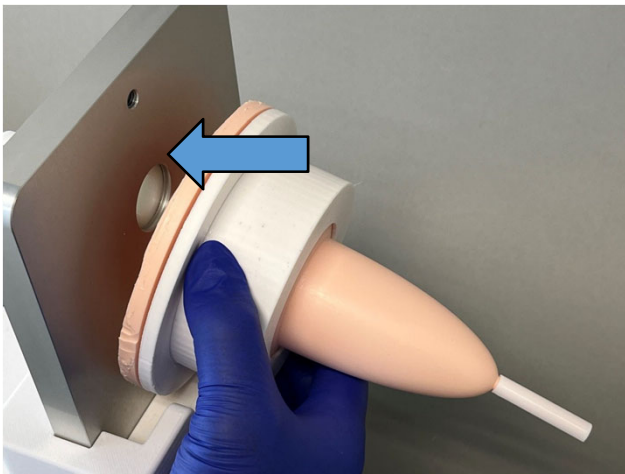
Preparation

Assembly of Heart

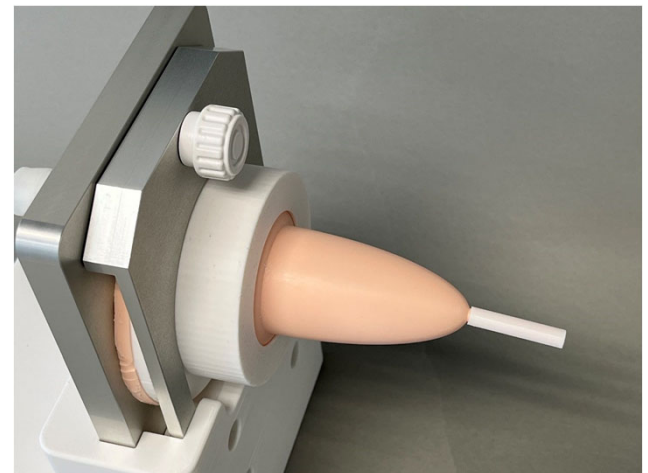
4. Place the heart base Cover over the base part.



5. Attach the assembled heart to heart fixation unit and secure it with the U-shaped heart holder.

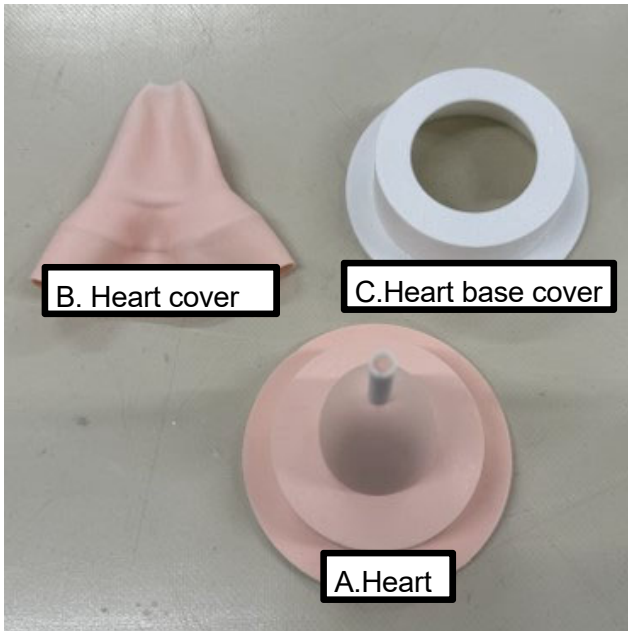


6. Secure the holder firmly with the fixing screw. Insufficient tightening may cause water leakage.



Preparation

Assembly of heart

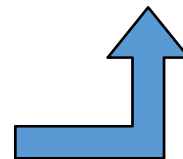
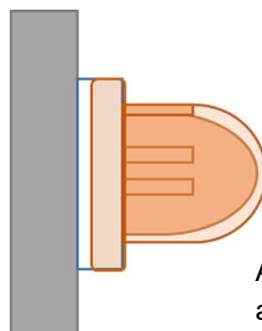
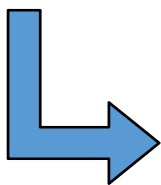
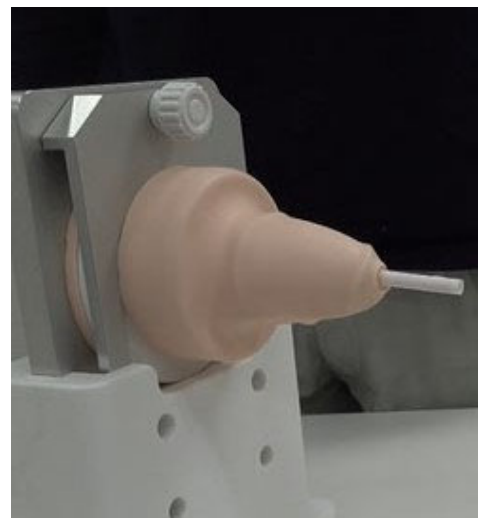
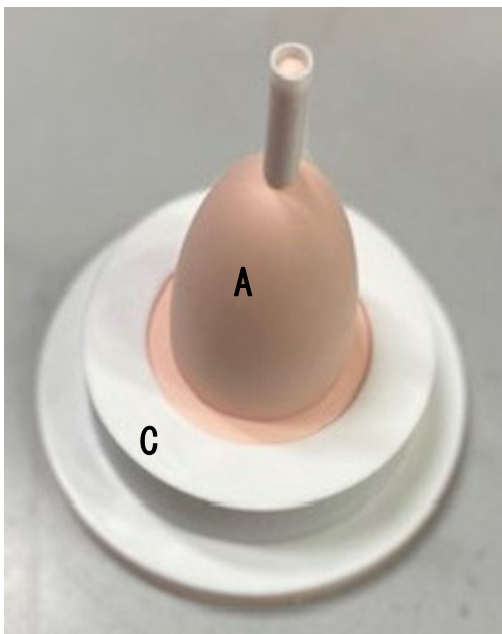


A. Heart

B. Heart cover

C. Heart base cover

This part holds the heart to the heart fixture base.



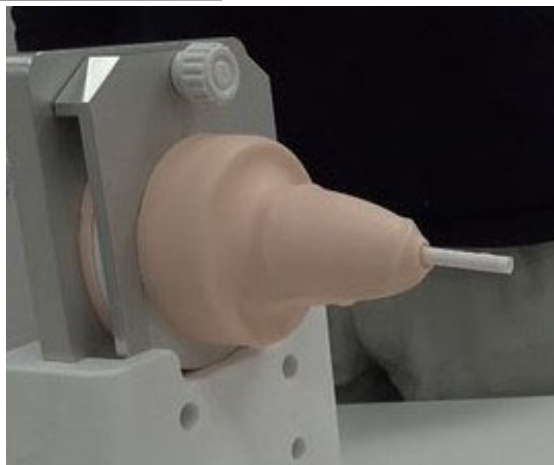
After setting the heart base cover, attach coronary arteries.

Preparation

Attaching coronary arteries



1. Turn the heart cover inside out.



2. Hold a coronal artery on the surface of the heart and cover it slowly with the heart cover from the pointed end.

Preparation

Assembled heart

Anatomical artery



Stenosis



Normal



*Adjust the position of the artery by pushing it through the heart cover.

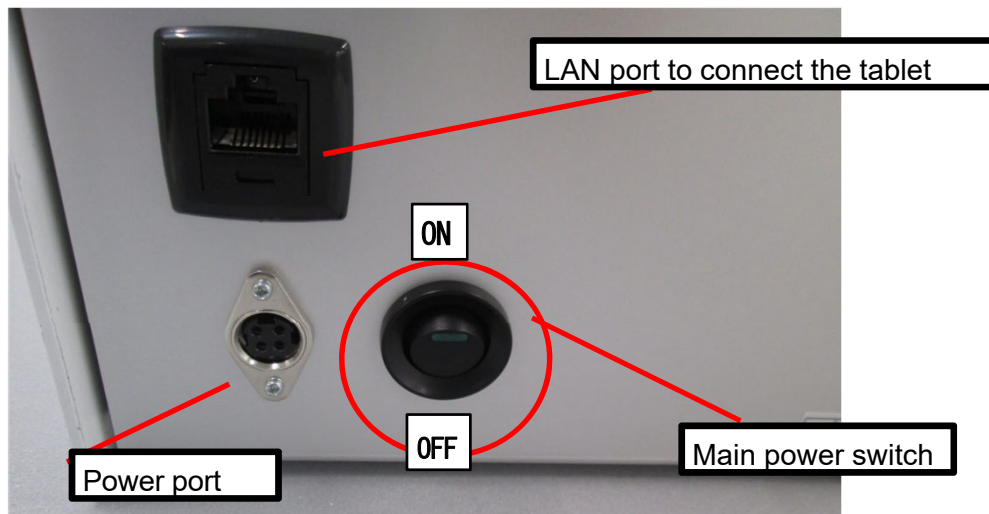
Preparation

Ports and switches

1. Turn on the power ***First ensure that the main power switch is OFF.**

Connect the power cable to the power port on the back panel of the drive unit, and plug it into a power source. Then turn on the main power switch.

Back panel of the drive unit

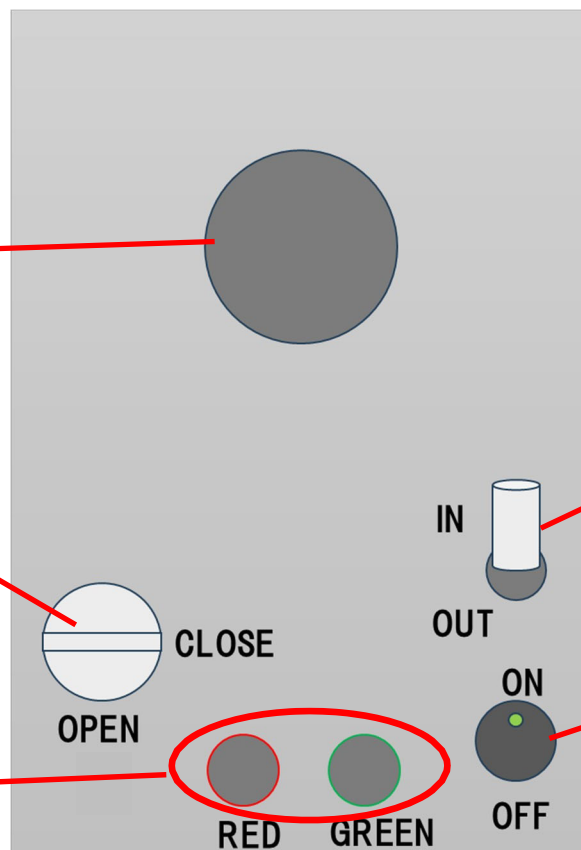


Front panel of the drive unit

Water supply/drainage dial
CLOSE it once the water is filled fully to start running the system.

A

Ports for water supply / drain



Water flow switching lever
IN→to fill OUT→to drain

B

Starting button for water supply/drainage

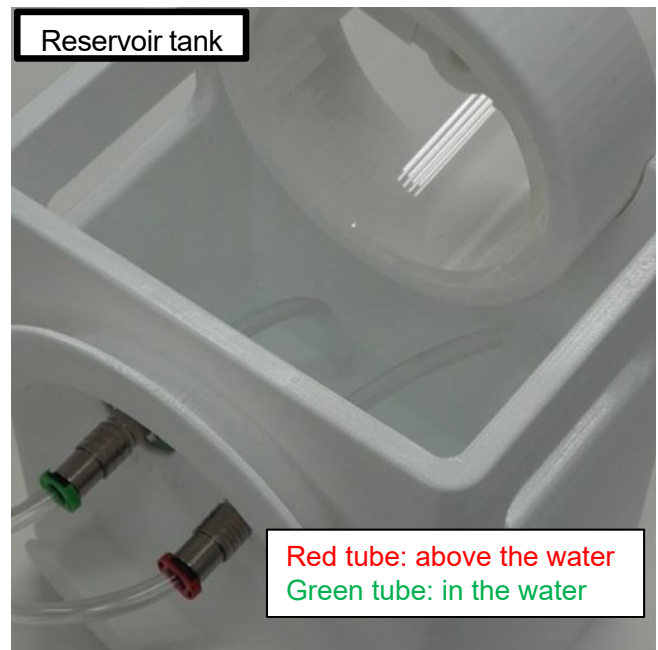
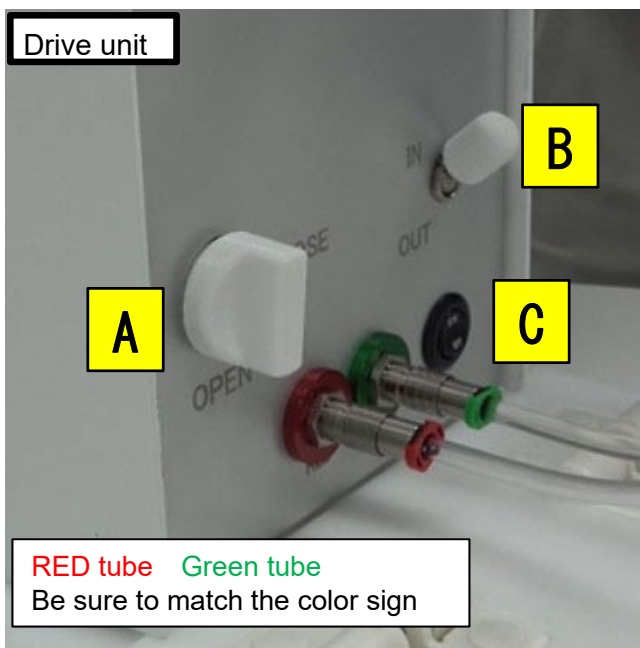
C

Preparation

Connections

- 【1】 Connect the drive unit and the reservoir tank with two tubes (marked with red and green respectively).
- 【2】 Fill the reservoir tank with water (550ml or more).
Put the tip of red tube above the water surface and the tip of the green tube in the water.
- 【3】 Turn A dial to OPEN and turn B lever to IN.
- 【4】 Turn on C switch. Then water automatically fill the cylinder in the machine unit and the simulated heart.
- 【5】 Once the system is fully filled, water flow out from the Red tube in the water reservoir.
- 【6】 Turn off the C switch and Turn A dial to CLOSE.
- 【7】 Remove the connection tubes from the machine unit.

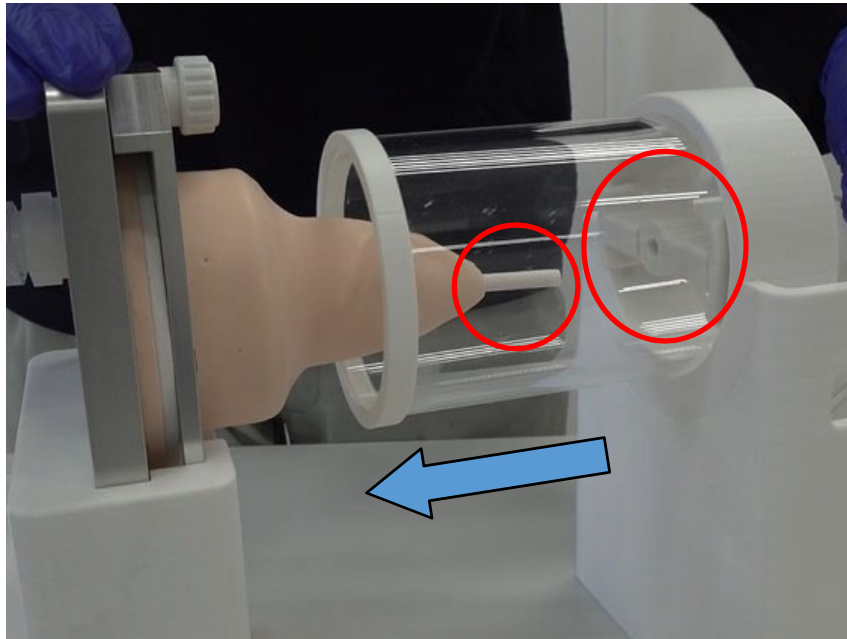
*Small amount of water may drip from the tube or the connector.



Preparation

Setting the heart

To stabilize the phantom, insert the pole on the top of the phantom into the hole at the center of the fixture in the cylindrical protection cover.



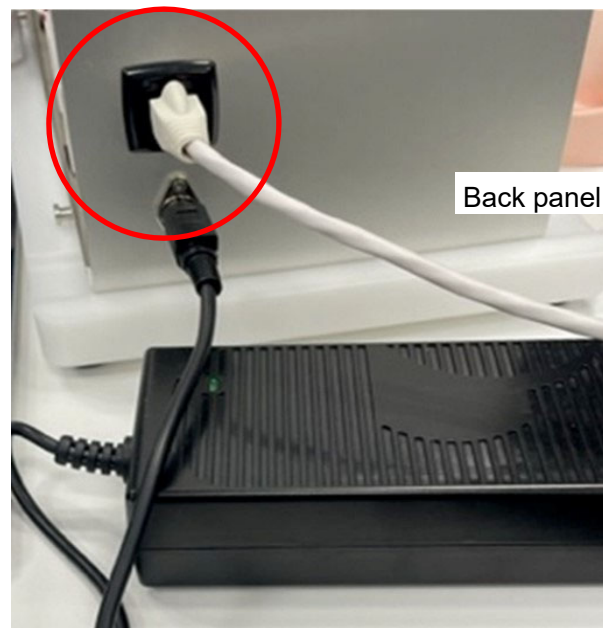
Operating the phantom

Turning on the operation software



Turning -on the APP

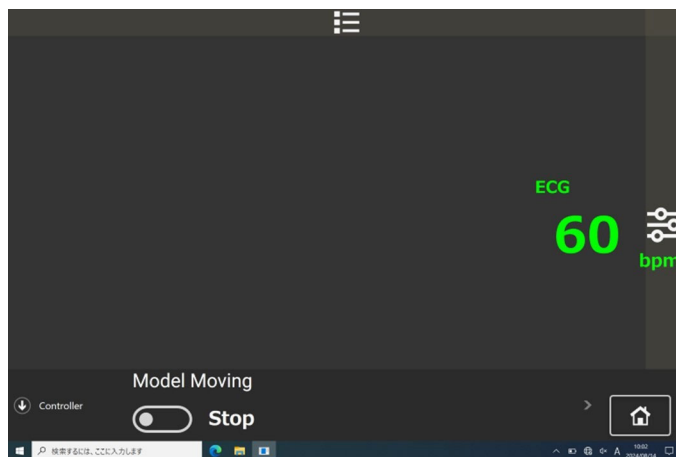
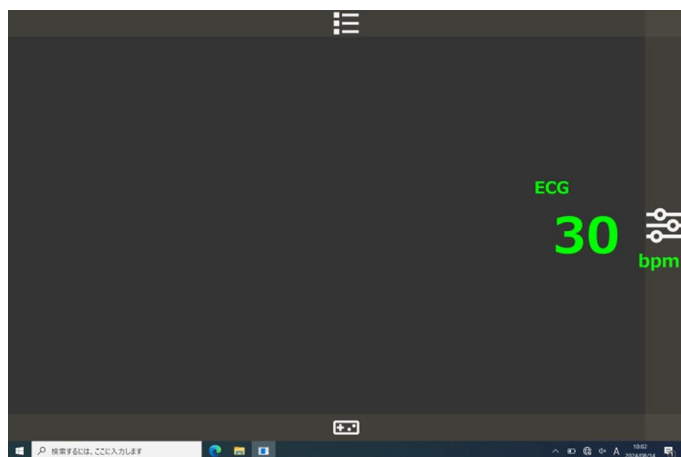
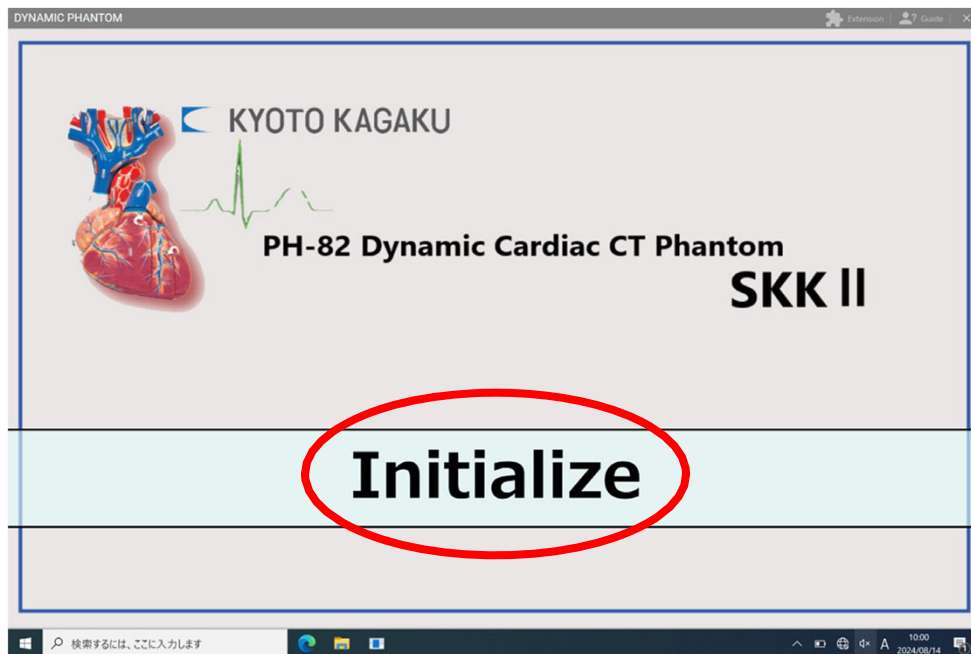
When the wireless connection is unstable, a wired connection between the drive unit and the tablet can be used with the cable.



Operating the phantom

Basic operation of software

1. Tap "Initialize".



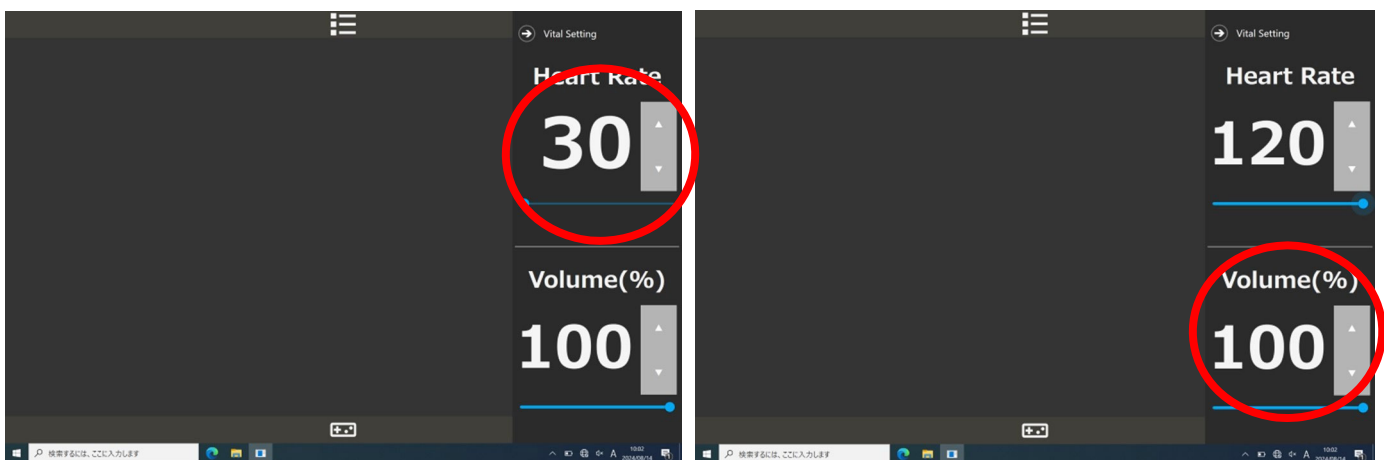
Operating the phantom

Changing the heart volume

1. Tap the right edge of the screen.



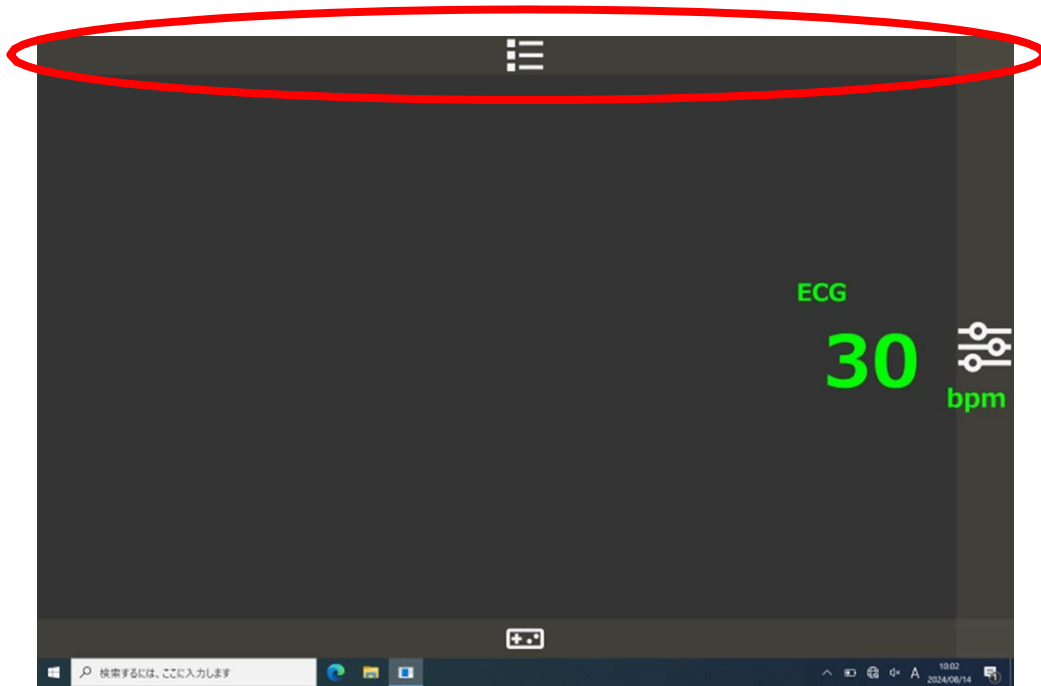
2. Adjust the volume setting with the slide bar and the + /- button.



Operating the phantom

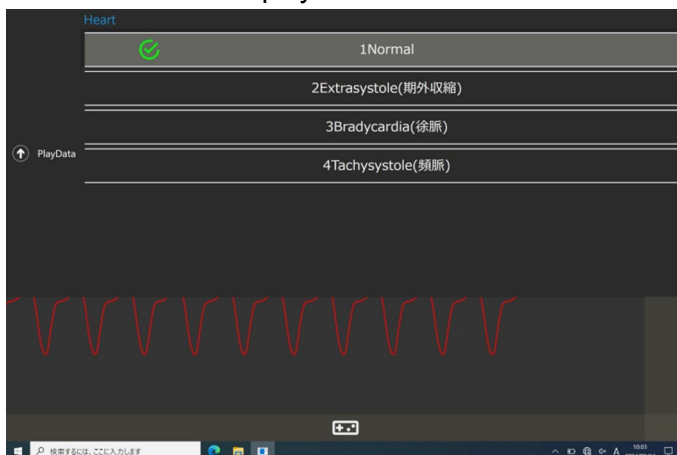
Changing cases

Tap the upper edge of the screen or slide down.



2. List of the cases appears.

Select a case to play.



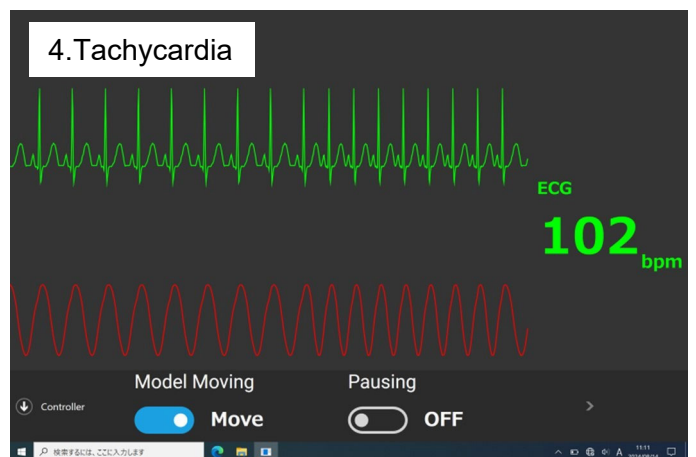
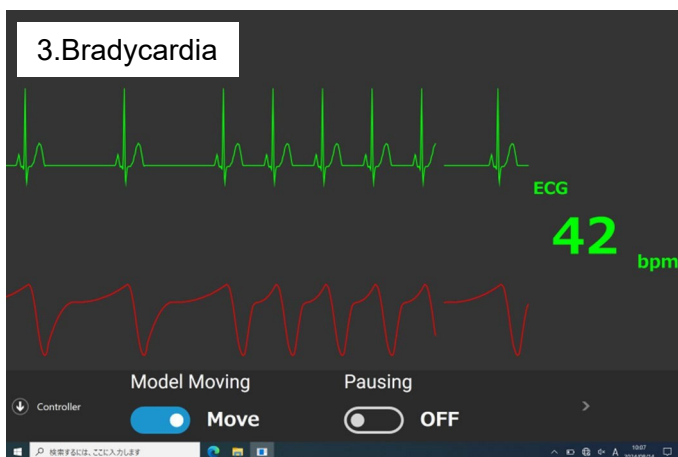
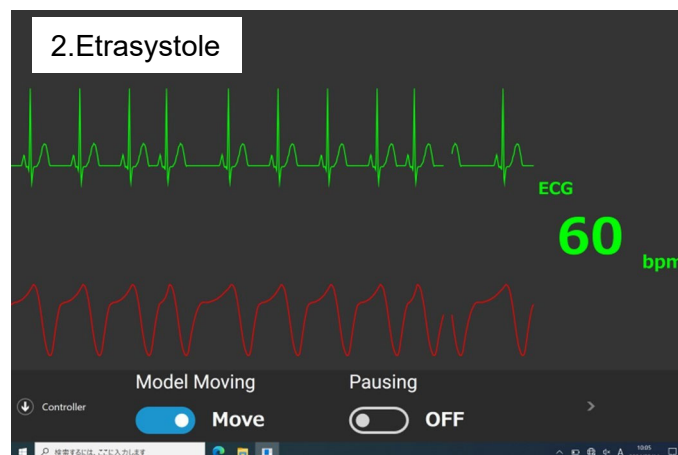
3. Turn on the model moving button.



Operating the phantom

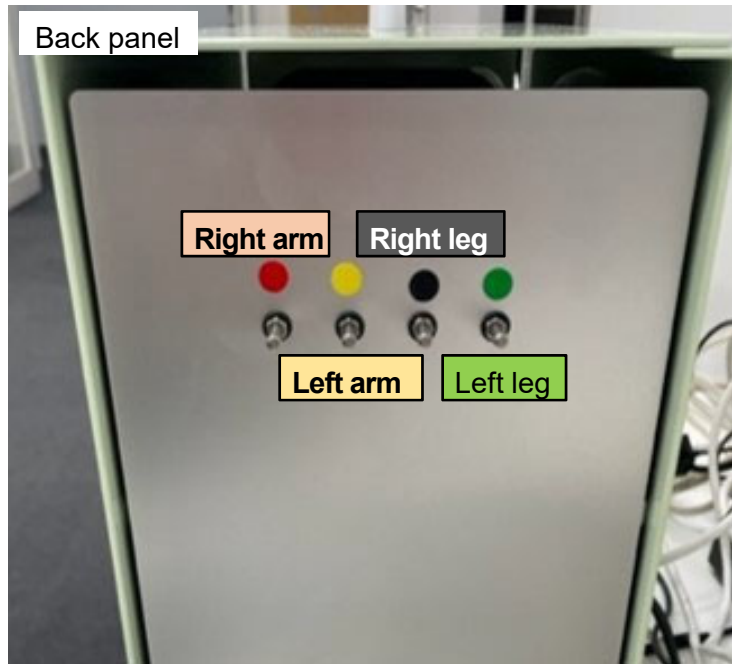
Arrhythmia Cases

Heart rate of arrhythmia cases is fixed to 60.
Heart volume is adjustable.

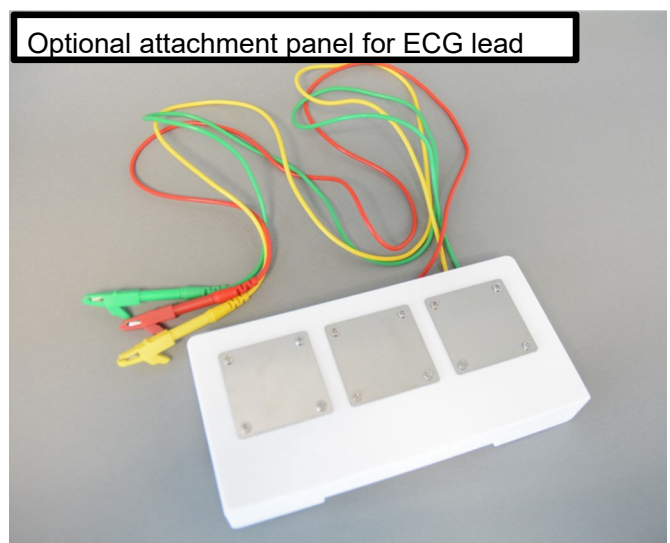


Operating the phantom

Connecting ECG leads



An optional attachment electrode panel is available for ECG electrodes that do not fit the electrode rods.

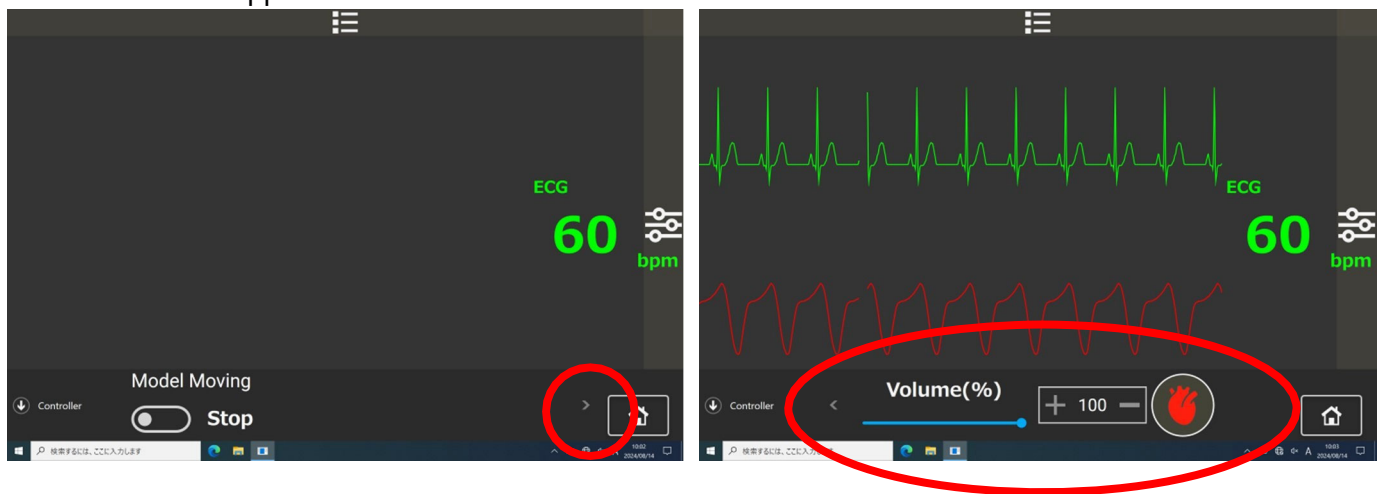


Operating the phantom

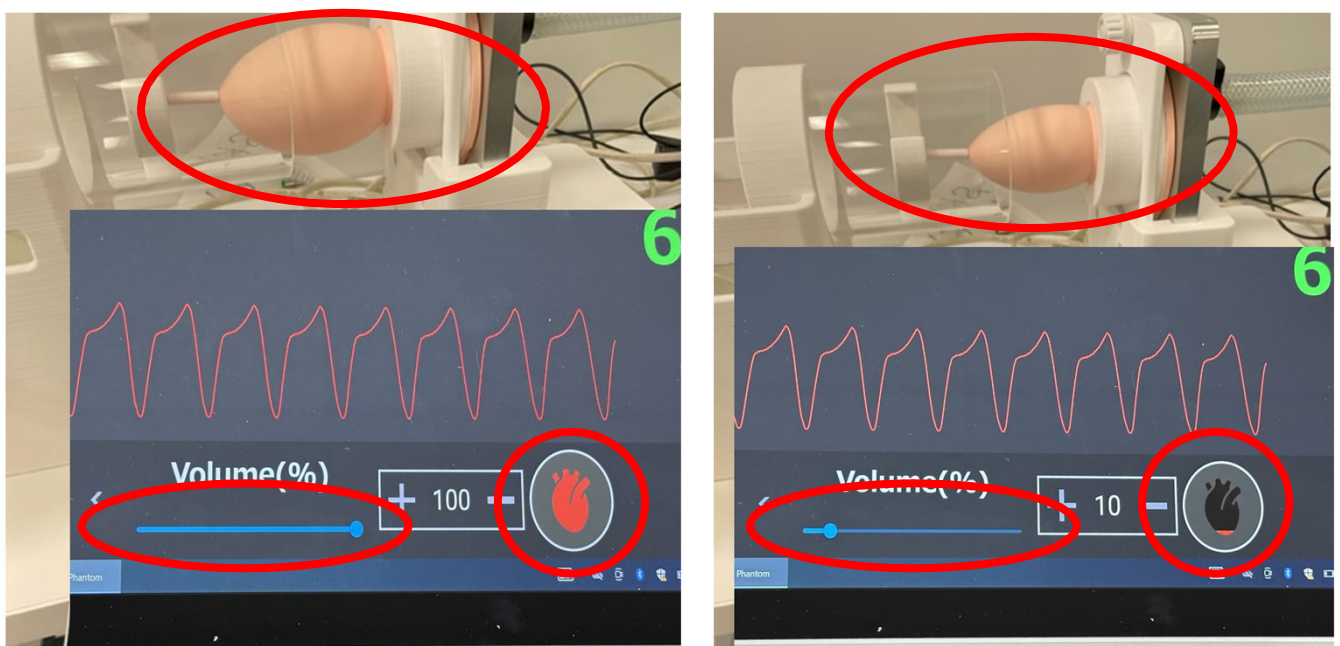
Pausing motion, comparison of images

The system can be paused at the designated heart volume to compare with still images and/or movie.

Tap the arrow mark in the lower right corner while the model moving button is shown. Then a slide bar appears.



Slide the bar and tap the +/- button to set the volume then tap the heart icon. The system pauses when the heart volume reached the designated value.



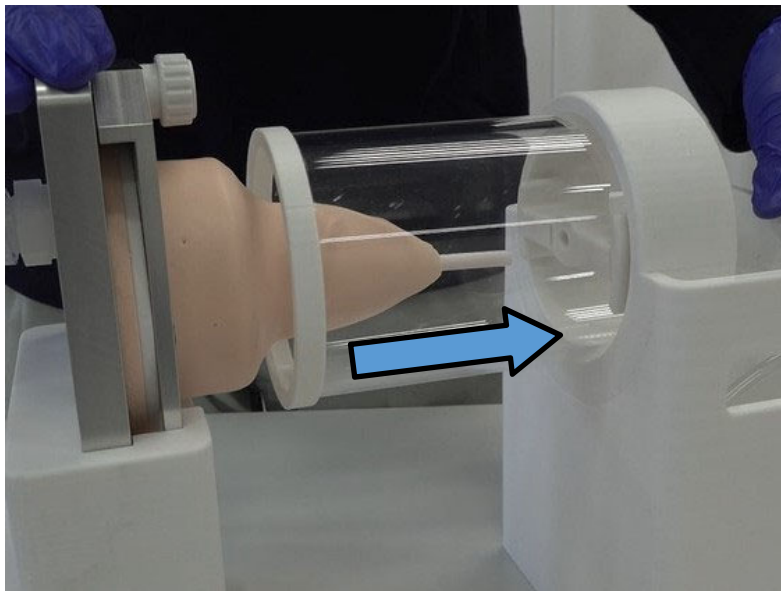
After Use

Draining water

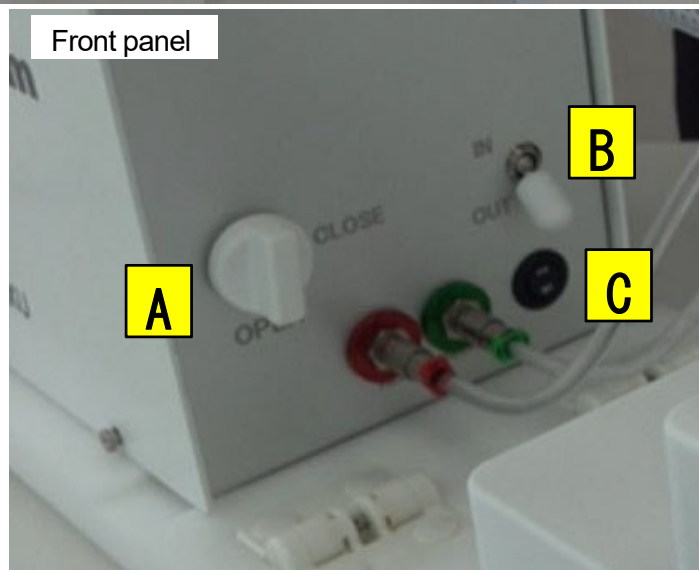
*Be sure to turn off the software before draining the water. Movement of the system during drainage may cause leakage or accidents.

*Prepare towels and perform the procedure in an area where water spills are acceptable.

- 【1】 Disengage the reservoir tank from the heart unit.
- 【2】 Connect the drive unit and the reservoir tank with RED and GREEN tubes.
- 【3】 Turn A dial to OPEN, then turn B lever to OUT.
- 【4】 Turn on the C power switch to drain water from the drive unit.



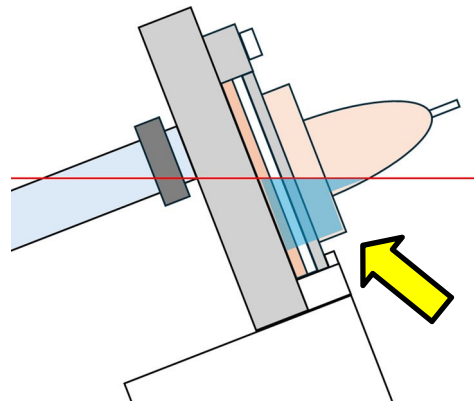
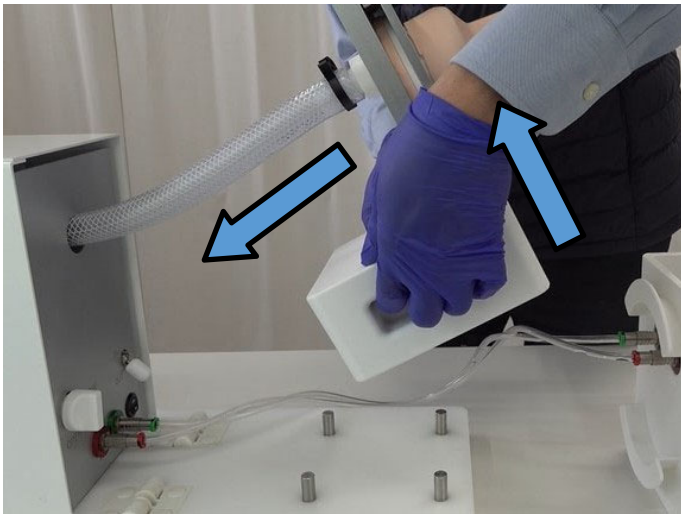
Front panel



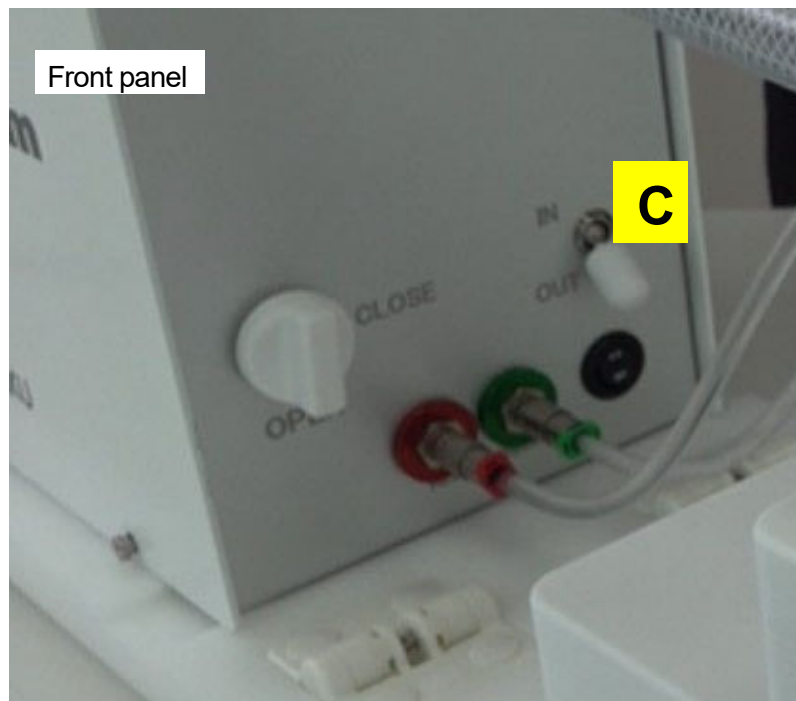
After Use

Draining water

- 【5】 Hold up the heart fixing unit so that water in the heart flow into the machine unit.
**Be sure to tilt the unit up to 90 degrees as water tend to remain in the heart due to its structure.*
- 【6】 When the drain complete, one of the tubes in the reservoir tank start producing air bubbles.
Turn off C switch.



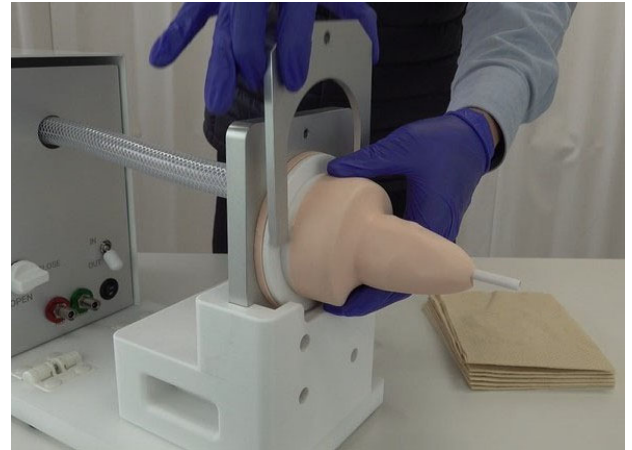
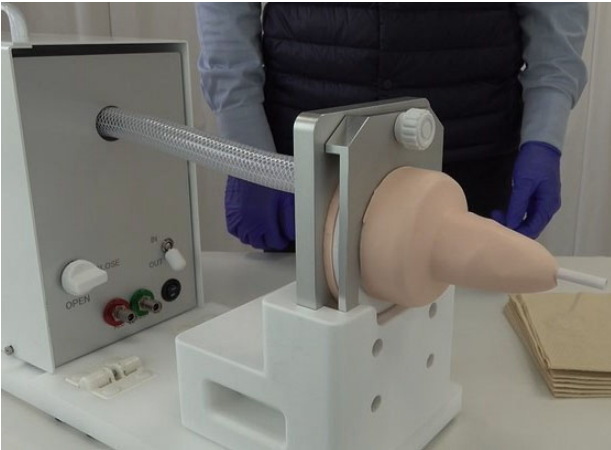
When the tilting is insufficient as shown above drawing, the water remains in the heart. Be sure to drain all the water.



After Use

Disassembly

1. Unscrew the fixing screw and remove the U-shaped heart holder.



2. Remove the heart from the heart fixture unit.



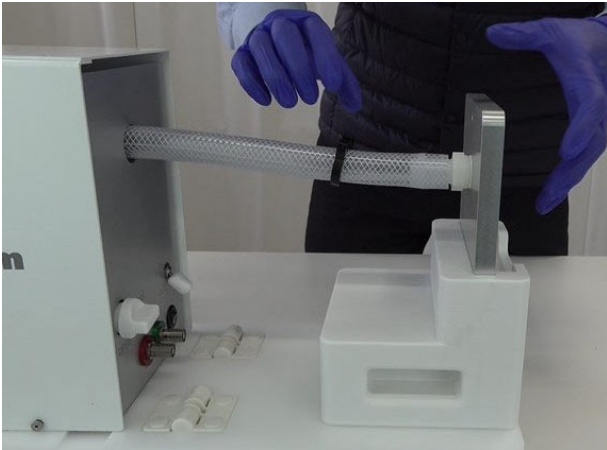
3. Drain the water from the reservoir tank and wipe off any remaining water.



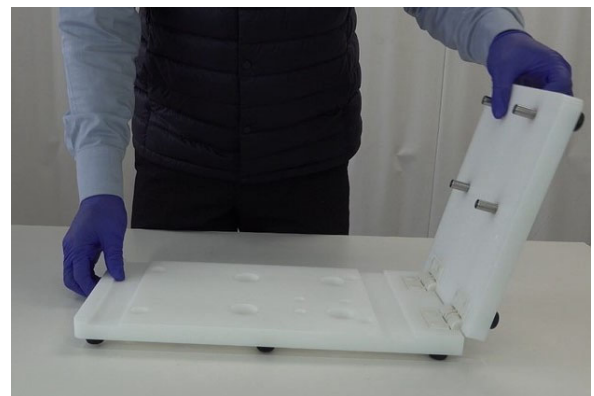
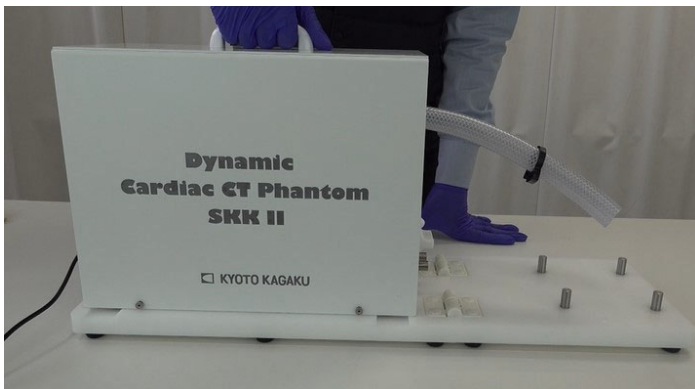
After Use

Disassembly

4. Remove the tube band and disengage the tube from the heart fixture unit.

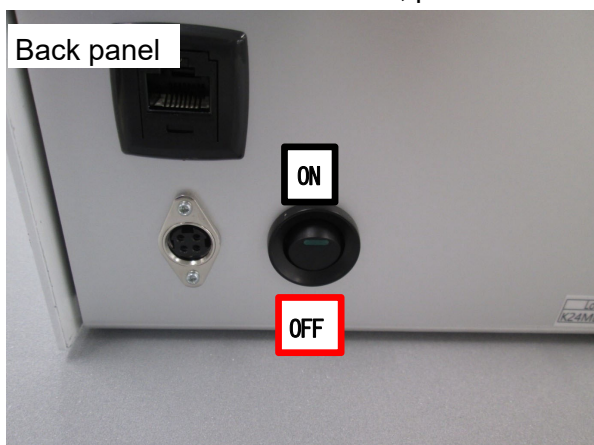


5. Remove the drive unit from the drive unit base. Then fold the drive unit base.



6. Turn off the main power switch on the back panel of the drive unit.

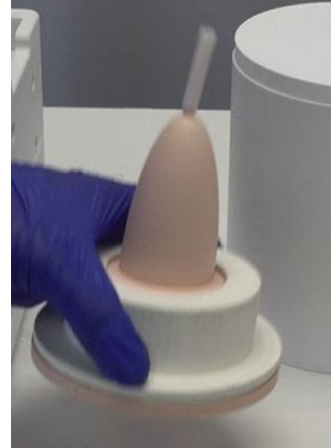
Then remove the LAN cable, power cable then turn off the tablet.



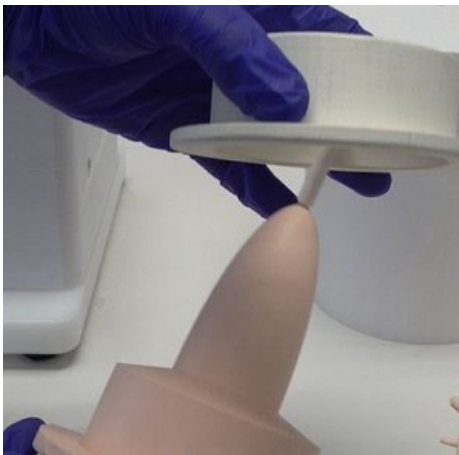
After Use

Disassembly of the heart

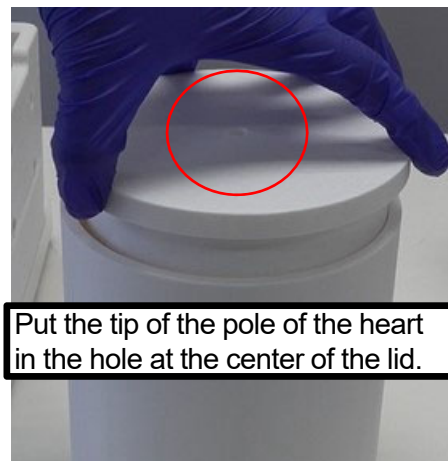
1. Remove the heart cover and the coronary artery.



2. Remove the heart base cover and put the heart cover over the heart.



3. Put the heart in the dedicated storage case.



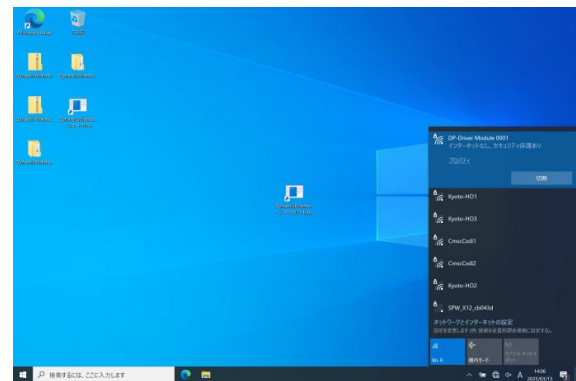
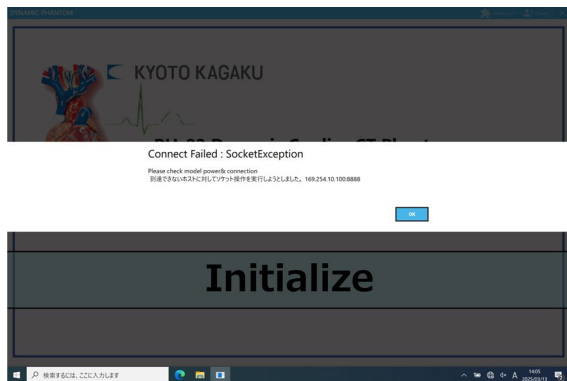
Put the tip of the pole of the heart in the hole at the center of the lid.

Trouble shooting

Trouble shooting

- **Wireless connection failure**

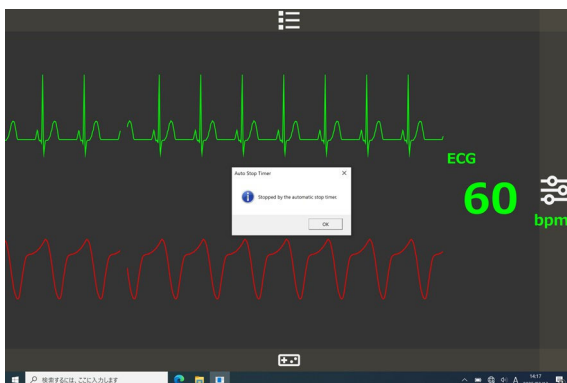
Close the app. Ensure that the main power of the drive unit is turned on. Then tap the connection icon in the lower-right corner of the screen to verify that the Wi-Fi connection is active. If necessary, reconnect to Wi-Fi and try again. If the problem persists, try using a wired connection with a LAN cable.



Driving unit stopped running

The 5-minute continuous operation limit has been exceeded.

When the system stops due to the operating time limit, a dialog window like the one shown in the image on the below left appears. To restart the system, tap OK to release the limit.



The system stopped before 5 minutes has passed.

System may have possibly stopped due to overheating of the motor.

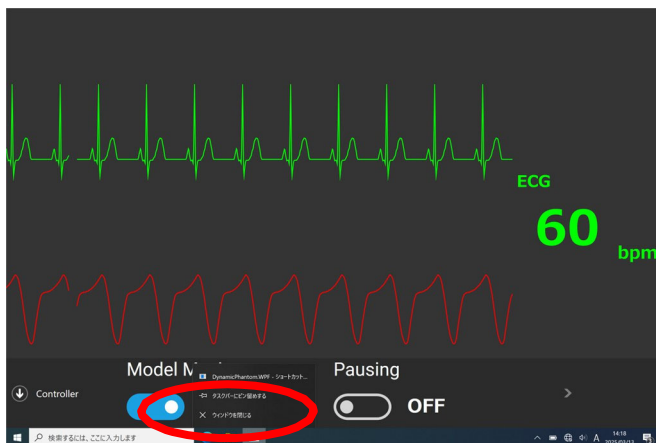
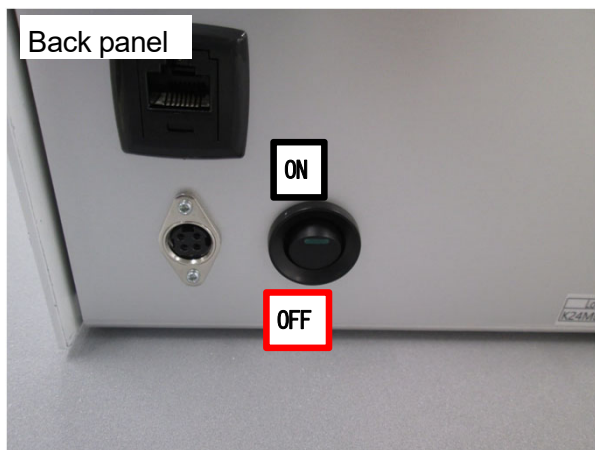
Turn off the power and cool the system for 1 to 2 hours before running it again.

Trouble shooting

Restarting stopped system

- How to restart when the system has stopped.

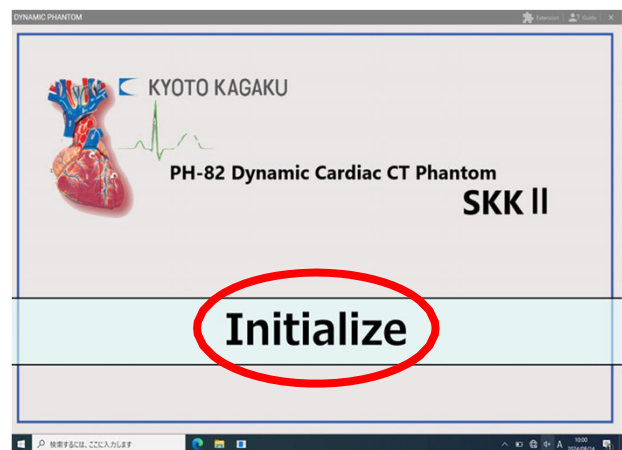
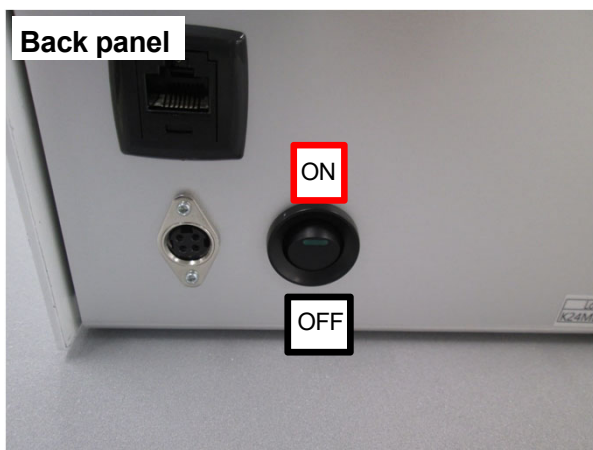
1. Turn off the main power of the drive.
2. Tap and hold the APP icon on the task bar at the lower edge of the screen.
3. Then a dialog window appears.
4. Select "Close the window" to close the operation software.



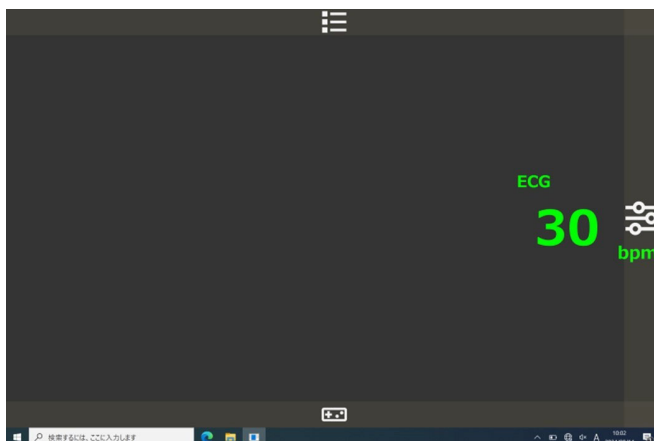
Trouble shooting

Restarting stopped system

4. Turn on the main power.
5. Open the APP and tap "Initialize"



After initialization , below screen appears to start operation.



For inquiries and service, please contact your distributor or KYOTO KAGAKU CO., LTD.



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2026/05

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