

ER-2000 SMART

User Manual

Portable Electrocardiographic
Holter Analyser

For safe and convenient use of the product, make sure to read the user manual before using it. There's also a quality assurance, so keep it safe.

* This product is a medical device.

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This user manual may contain images or contents different from the product you purchased because it is made in common. This manual can be changed depending on the company's situation.

Before use

Keep in mind for safe use

- This product is operated and used by the user himself.
 - Please make sure to use this product alone.
 - Using this product with other devices can lead to unintended consequences due to potential electromagnetic and other interference.
- Charging guide
 - This product cannot be separated from the battery.
 - Make sure that there's no moisture or moisture at the contact point between the charging cradle and the controller. (Moisture can cause corrosion of the metal in the charging part.)
 - When a charging cradle or cable is drained, stop using it and remove the charging adapter immediately.
 - Product cleaning guide
 - When cleaning the product, use a soft, dry cloth or tissue.
 - If the surface is too dirty, use a soft cloth with moisture.
 - Do not use strong chemicals such as alcohol, benzene, or thinner because they can deteriorate the surface of the product.
 - Do not use the product for any purpose different from what is stated in this manual.
 - It is impossible to change the product without the manufacturer's permission.
 - This product has a built-in SD card.

Warnings for safety



Warning: The 'Warning' indication explains what may cause serious physical damage to the user.

- Please do not allow people, including children, who cannot clearly express their intentions to use this product.
- As suffocation can occur due to external ECG cables and USB cables used with this product, caution is required during use.
- Avoid direct sunlight and do not place it near fan heaters or heaters.
- Avoid water, alcohol, flammable substances, etc. around the device.
- Do not use it in combination with a defibrillator.
- Patients equipped with heart pacemakers are not allowed to use it.
- Do not attempt self-diagnosis or self-treatment based on the measurement results and analysis. Self-diagnosis or self-treatment can worsen the user's condition.
- Do not use this device for people with sensitive or allergic skin.
- Do not use the device with your left hand.

Precautions for safety



Warning : The “warning” sign explains what the user does not cause serious physical damage but can cause minor damage to the body.

- Do not bring it to high temperatures, humidity, watery places, or public baths. It can cause failure and may not be able to be repaired.
- Do not arbitrarily disassemble the device. It can cause damage and failure.
- Do not bend or give a strong impact. It can cause damage and failure.
- Do not use it next to magnetic objects such as magnets. It can cause malfunction.
- Do not use it adjacent to or stacked with other devices. It can cause malfunction.
- Excessive body fat in the body part that touches the electrode can make it difficult to measure smoothly.
- Refrain from moving when measuring.
- This product may have a data error.
- Do not use the device for any purpose other than that indicated in the manual.

Q&A

1. How do I charge it?

Charge for 2-3 hours with the USB cable (charging and data transmission) enclosed in the product.

2. How do I check if it's charging?

When you turn on the power, there is a battery mark on the upper left. If there's lightning on the battery mark, it's charging.

3. How do you buy disposable electrocardiogram electrodes (electrode for continuous electrocardiogram measurements)?

It can be purchased at the official online store. There are 50 electrodes in a pack and you can't use it once you attach it.

4. If the external electrocardiogram cable breaks down, can it be repaired?

External ECG cables are consumable. You can buy it separately at the official online store.

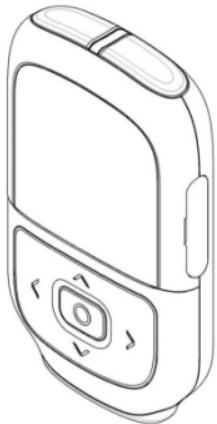
5. Can I move while measuring?

Be sure to refrain from speaking or activities when measuring. The measurement may be inaccurate.

Look into the product

Components

Main body



ECG cable



User Manual,
Quality assurance



USB cable

Look into the product

Separate components



BIOLOGICAL EVALUATION OF
MEDICAL DEVICES

► Product

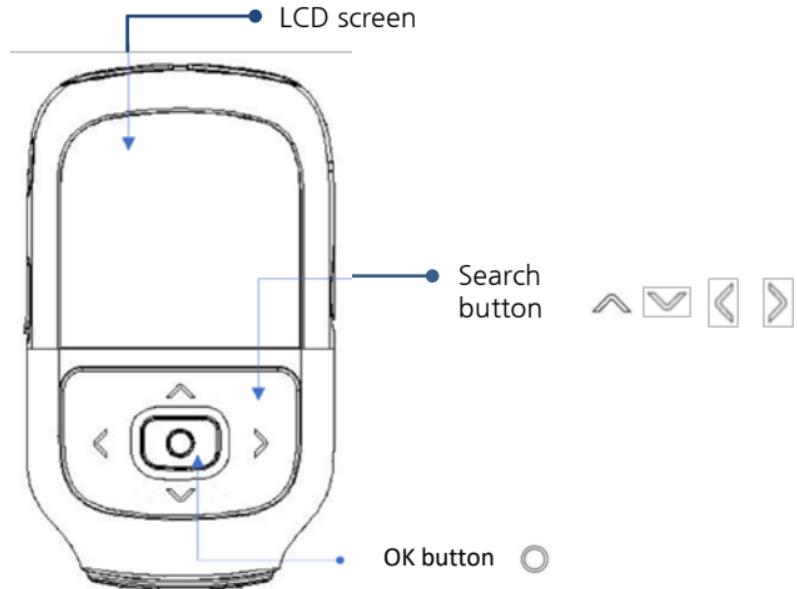
Product Name
Type Name
Packaging unit
Purpose of use

TELECTRODE
T716
50P

An instrument attached to the body surface to
measure the electrical activity of the heart

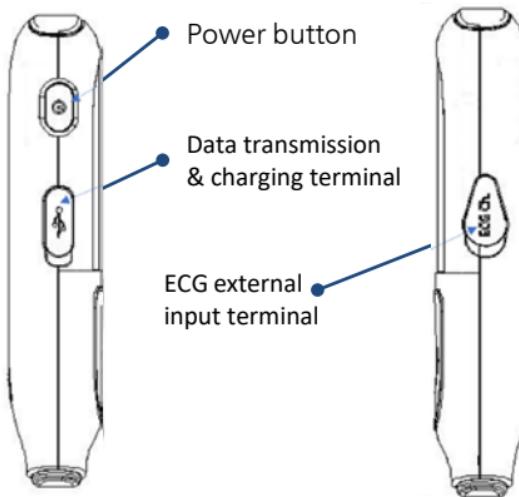
Main body

Front



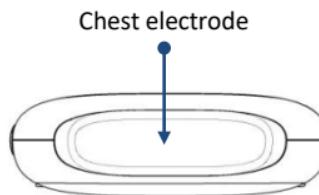
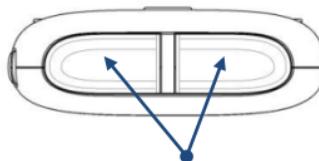
- LCD screen : Displays the menu and setting values, and represents the signal being measured and stored data.
- Search button : It's used to move for ECG measurement, menu, and setting using each display part of up, down, left, and right ($\blacktriangle/\blacktriangledown/\blacktriangleleft/\blacktriangleright$).
- OK button : It's used to select, start, or stop.

Left and right



- Power button: The button you use to turn on/off the power.
- ECG external input terminal : It is used to measure signals using an external electrocardiogram cable.
- Data transmission & charging terminal : When transmitting and charging ECG data stored in the device to the PC. (Charge for 2-3 hours when charging)

Top and bottom



- Finger electrode : When measuring an electrocardiogram signal, put your index finger in contact with both electrodes and measure the signal.
- Chest electrode : When measuring an electrocardiogram signal, touch your chest and measure the signal.

How to use

Power on/off

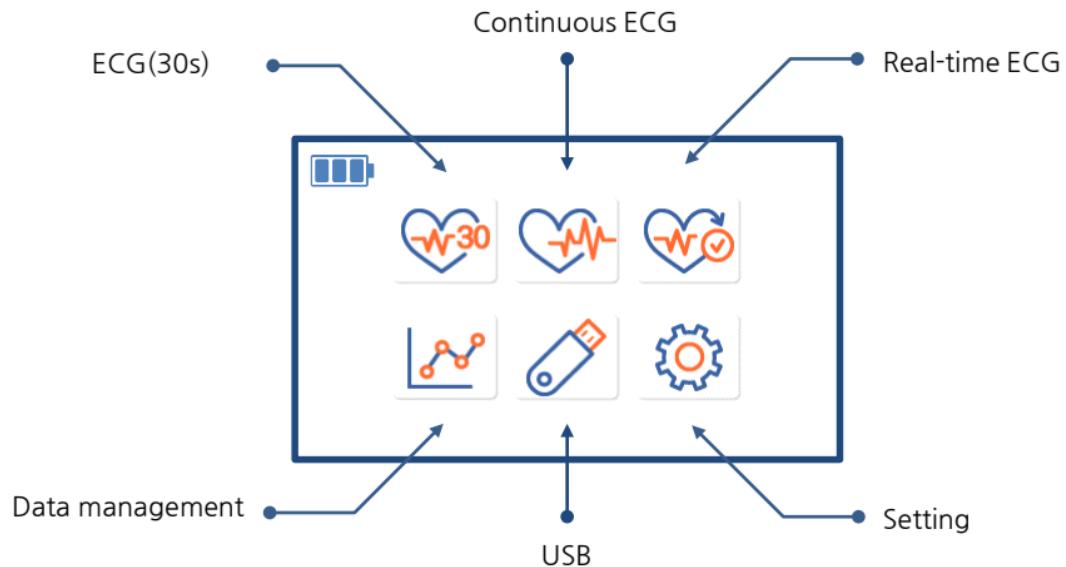


Power button

- Press the power button for more than 2 seconds, the power will turn on.
- Press the power button for more than 2 seconds during product operation, the power will be turned off.

How to use

Menu

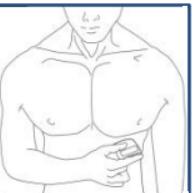
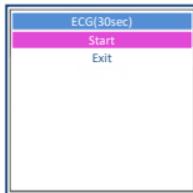


How to use

Measurement screen



ECG (30second)

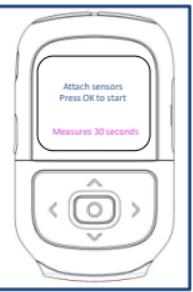
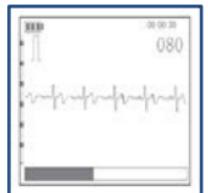
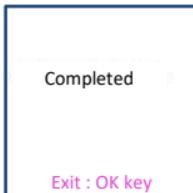
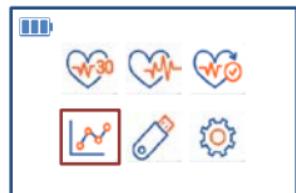


- 1 Menu →
Electrocardiogram(30s)

- 2 Start measure

- 3 Check the
holder

- 4 Check the measurement location



- 8 Data management
→ View

- 7 Finish the
measure

- 6 Start measuring



Please refrain from moving
while measuring

- 5 Press the OK button

ECG (30second)



- From the menu, select electrocardiogram (30 seconds) → Start Measurement, you will see an explanation saying, <Wear the device correctly and press the OK button.>
- Put your index finger in contact with the finger electrode, and place the chest electrode under the left chest nipple and press the OK button.



Apply some force so that the electrode can fully contact your finger and chest.



If the waveform comes out as “—”, put on moisturizing lotion.

ECG (30second)



- When you press the OK button, the electrocardiogram is measured for 30 seconds. If you press the OK button during measurement, the measurement stops and moves to the previous screen.

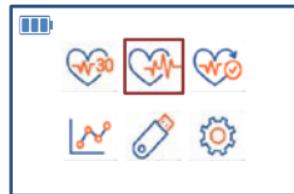


- When the measurement is completed, <measurement is completed.> The message will come out.

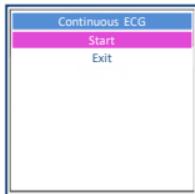


Please refrain from moving while measuring. It can affect the measured value.

Continuous ECG



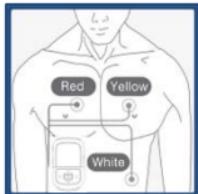
- 1 Menu
→ Continuous ECG



- 2 Press start the measure



- 3 Connect the External ECG cable



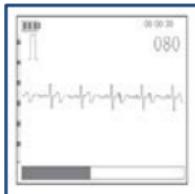
- 4 Check the measurement location



- 8 Data management
→ View



- 7 Finish the measure



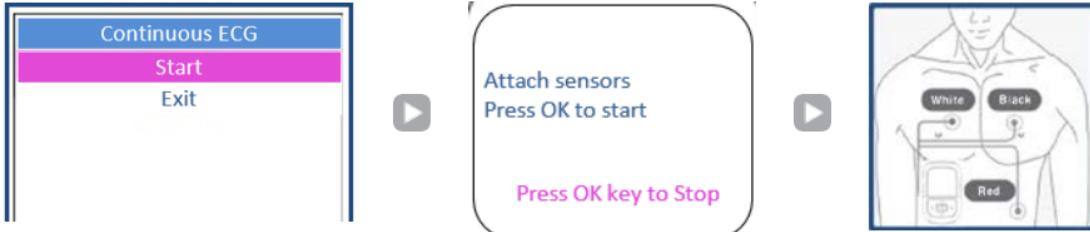
- 6 Start the measure



- Please refrain from moving while measuring

- 5 Press the OK button

Continuous ECG



- From the menu, select Continuous ECG → Start measurement, you will see an explanation saying, <Wear the device correctly and press the OK button.>
- After connecting the external ECG cable to the device, attach the disposable ECG electrodes to the left (Yellow), right (Red) chest, and left stomach (White), respectively, and press the OK button.

Continuous ECG



- Press the OK button to measure the electrocardiogram. Pressing the OK button during measurement stops the measurement and moves to the previous screen.

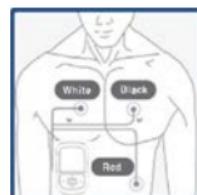
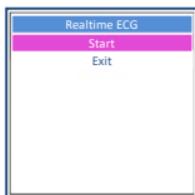
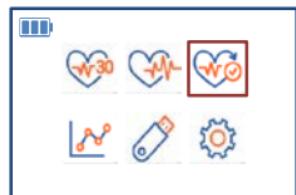


- When the measurement is completed, <measurement is completed.> message will come out.

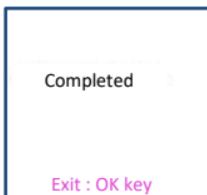


Please refrain from moving while measuring. It can affect the measured value.

Real-time ECG (using bluetooth)



- 1 Menu ➔ Continuous ECG
- 2 Press start the measure
- 3 Connect the External ECG cable
- 4 Check the measurement location



- 5 Press the OK button
- 6 Start the measure
- 7 Finish the measure



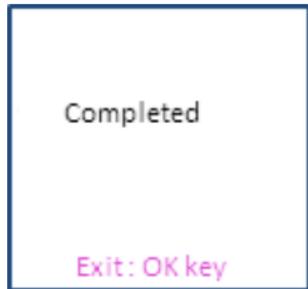
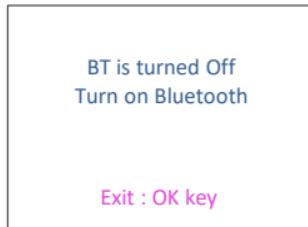
Please refrain from moving
while measuring

Real-time ECG (using bluetooth)



- From the menu, select Real-time ECG → Start measurement, you will see an explanation saying, <Wear the device correctly and press the OK button.>
- After connecting the external ECG cable to the device, attach the disposable ECG electrodes to the left (Yellow), right (Red) chest, and left stomach (White), respectively, and press the OK button.

Real-time ECG (using bluetooth)



- If Bluetooth is turned off, please turn on Bluetooth first.
[Refer to p.40's "Bluetooth Settings"]

- Press the OK button to measure the electrocardiogram.

The measured electrocardiogram is transmitted through Bluetooth in real time.

If you press the OK button during measurement, the measurement will stop.

- When the measurement is completed,

<measurement is completed.> message will come out.

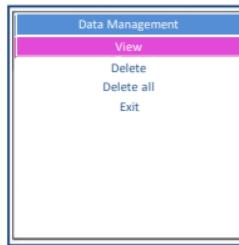
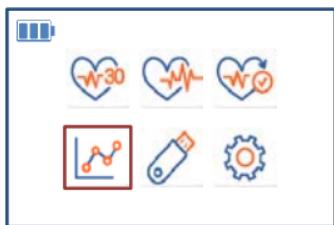
If you press the OK button, it moves to the previous screen.



Please refrain from moving while measuring

Data management

View the data



View
M320130625111913.ECG
M120130625150927.ECG
M120130625091036.ECG
M120130623213944.ECG
M320130623212023.ECG
M120130615112902.ECG
M320130615081813.ECG

1 Mena ➔ Data management

2 View

3 Select the data

- From the menu, select Data management → View, you can see the saved data.
- The data list stored on the device will be sorted in chronological order.
 - * Data starting with "M1" is 30-second ECG data
 - * Data starting with "M3" is continuous ECG measurement data
- You can use the up and down (▲/▼) button to select the data you want to see and press the OK button to see the saved ECG waveform.
- You can exit the previous menu with the left and right (◀/▶) buttons.

Data management

View the data



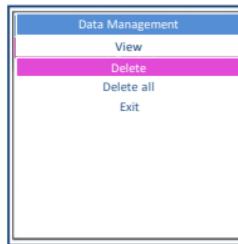
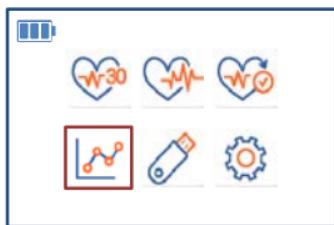
- On the ECG waveform view screen, you can check the entire signal using the left and right (◀/▶) buttons.
- If you press OK after checking the signal, it will go to the previous menu.



- If there is no stored data, message says <There is no stored data>.
 - * If you press the ◀/▶ button, it'll go to the previous menu.

Data management

Delete the data



Delete
M320130625111913,ECG
M120130625150927,ECG
M120130625091036,ECG
M120130623213944,ECG
M320130623212023,ECG
M120130615112902,ECG
M320130615081813,ECG

1 Menu ➔ Data management

2 Delete

3 Select the data

- From the menu, select Data management ➔ Delete, you can delete the saved data.
- The list of data stored on the device is sorted in chronological order of measurement.
 - * Data starting with "M1" is 30-second ECG data.
 - * Data starting with "M3" is continuous ECG measurement data.
- Select the data you want to delete using the up and down (▲/▼) button and press the OK button.
 - * You can exit to the previous menu with the left and right (◀/▶) buttons.

Data management

Delete the data



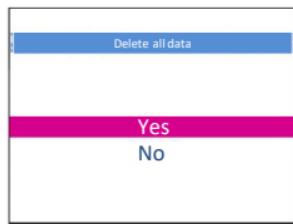
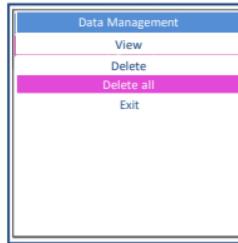
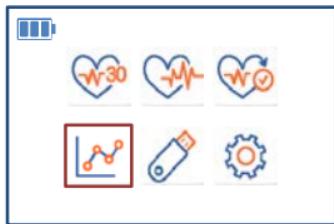
- Select "Yes/No" using the up and down ($\blacktriangle/\blacktriangledown$) button and press the OK button to delete the data.



- If there is no stored data, message says <There is no stored data.>.
* You can exit to the previous menu with the ($\blacktriangleleft/\blacktriangleright$) buttons.

Data management

Delete all data



1 Menu → Data management

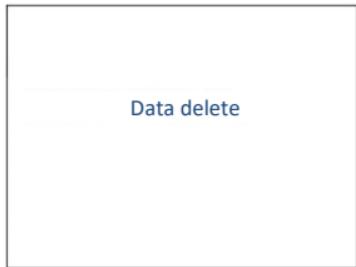
2 Delete all

3 Delete the data

- From the menu, select Data management → Delete all, it is deleting all data on the device (ER-2000 SMART).
- When the message <Do you want to delete all data> appears, use the up and down (▲/▼) button to select "Yes/No" and press the OK button.

Data management

Delete all data



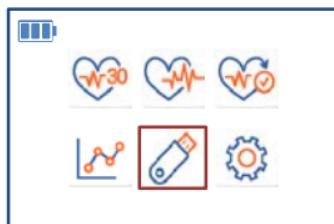
- If "Yes" is selected, data erasing will begin. It takes some time depending on the memory capacity.



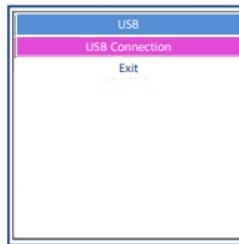
- After all the data was deleted, if you get the message <Deleted all the data.>, you can return to the previous menu by pressing OK.

USB

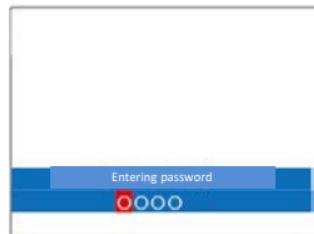
USB (data transmission and reception) connect



1 Menu ➔ USB



2 USB Connection

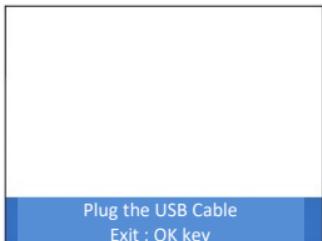


3 Entering password

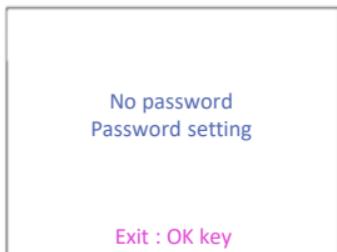
- From the menu, select USB ➔ USB connect, you can connect to the PC.
- USB connection is activated by entering the correct password using the up and down (▲/▼) button. (The password consists of 4 digits.)
- If the product does not have a password set, the user must first set the password in the 'Code Settings' menu to use 'USB Connection'.

USB

USB connect



- The message <Connect USB cable> appears and connect the USB cable to the PC.
* You can cancel it with the OK button
- After connecting to the PC, you can stop the connection with the OK button.



- If the product does not have a password set, the USB connection can be used only when the user first sets the password in the 'Password setting' menu.

USB

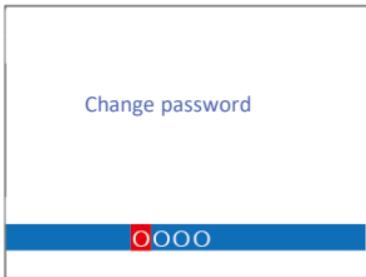
Password setting



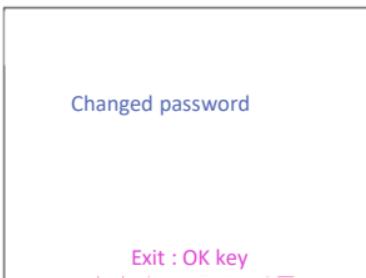
- From the menu, select USB → USB connect, you can connect to the PC.
- You can change your password by entering the correct password using the up and down (▲/▼) button. (The password consists of 4 digits.)
- If the product does not have a password set, it will be executed as "Change password" immediately.

USB

Password setting



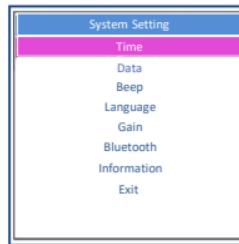
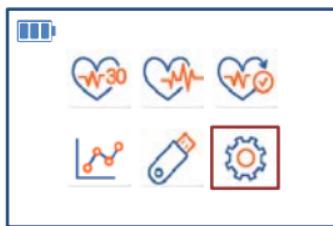
- You can set a 4-digit password using the up and down (▲/▼) button.



- Your password has been successfully changed. You can return to the previous menu with the OK button.

Setting

Time setting



① Menu ➔ Setting

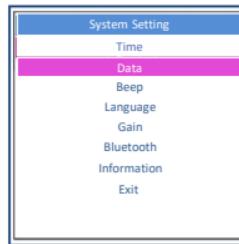
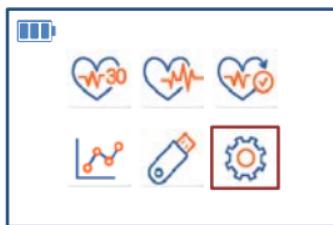
② Time setting

③ Time setting

- Set the current time.
- The location for the change is marked in red and increases or decreases the value by pressing the up and down (▲/▼) button.
- Press the left and right (◀/▶) button to move the location, save it to the last digit, and return to the previous menu.

Setting

Date setting



6 (JUNE) 2013						
WEEK 26			DAY	N: 176		
Mo	Tu	We	Th	Fr	Sa	Su
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

① Menu → setting

② Date setting

③ Year setting

- Set the current date.
- Press the up and down (▲/▼) button to increase or decrease the YEAR value.
- If you press the OK button, it goes to the month setting window.

Setting

Date setting



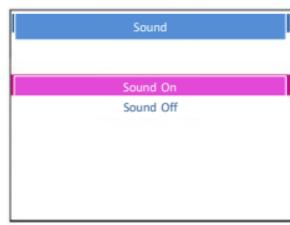
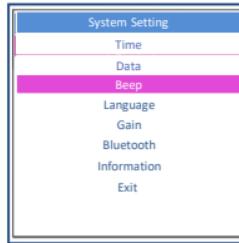
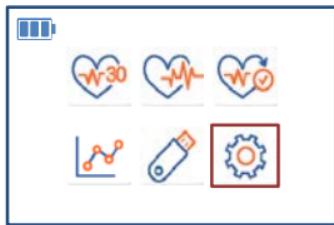
- Press the up and down ($\blacktriangle/\blacktriangledown$) button to increase or decrease the month value.
- If you press the OK button, it goes to the set day setting window.



- Press the up and down ($\blacktriangle/\blacktriangledown$), left and right ($\blacktriangleleft/\blacktriangleright$) buttons to move the red square to select the day value.
- If you press the OK button, the set date value is saved and moved to the previous menu.

Setting

Sound setting



① Menu → setting

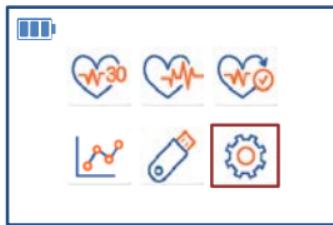
② Sound setting

③ Sound setting

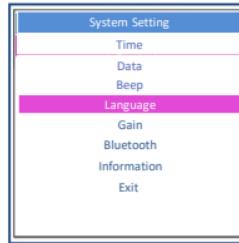
- Set the beep sound on/off beep sound on.
- After setting the sound using the up and down (▲/▼) button is completed, pressing the OK button completes the setting and returns to the previous menu.

Setting

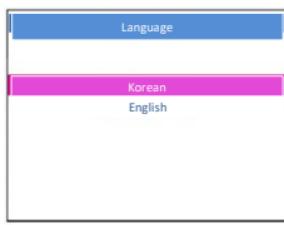
Language setting



1 Menu → setting



2 Language setting

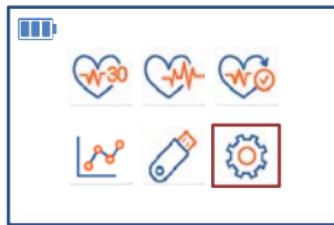


3 Language setting

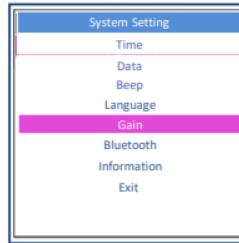
- Set the language to Korean/English.
- After the language setting is completed using the up and down (▲/▼) button, press the OK button to complete the setting and return to the previous menu.

setting

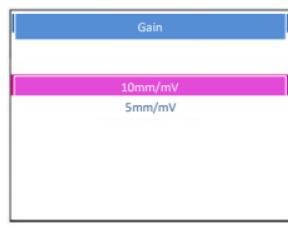
Wave size



1 Menu → setting



2 Wave size

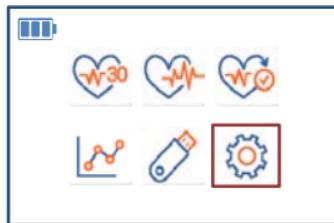


3 Gain setting

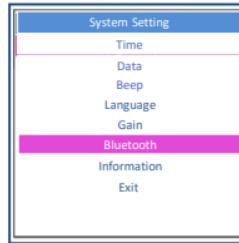
- Sets the gain of the ECG waveform to 10mm/mv or 5mm/mv.
- After the wave size setting is completed using the up and down ($\blacktriangle/\blacktriangledown$) button, press the OK button to complete the setting and return to the previous menu.

Setting

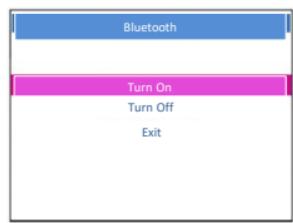
Bluetooth setting



① Menu ➔ setting



② Bluetooth setting

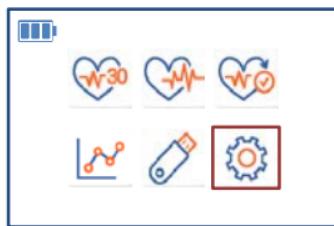


③ Bluetooth ON/OFF

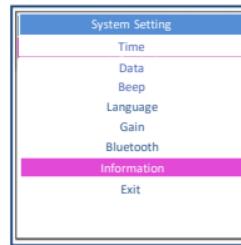
- When the device's Bluetooth is successfully turned on, a 4-digit PIN number for connection is randomly displayed.
You can return to the previous menu with the OK button.
- When the device's Bluetooth is turned off, the message <Bluetooth is turned off.> is appear.
You can return to the previous menu with the OK button.

Setting

System information



1 Menu → setting



2 System information



3 Check the system information

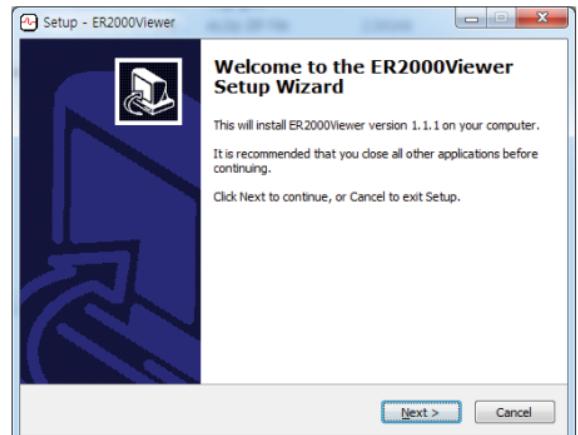
- After checking the system information, press OK to return to the previous menu.

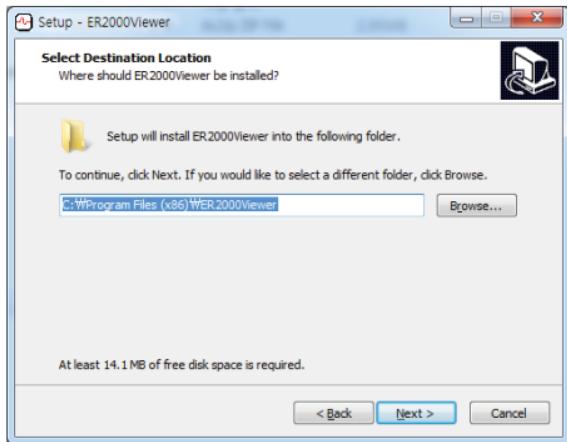
How to use PC Viewer program

Install the Viewer program

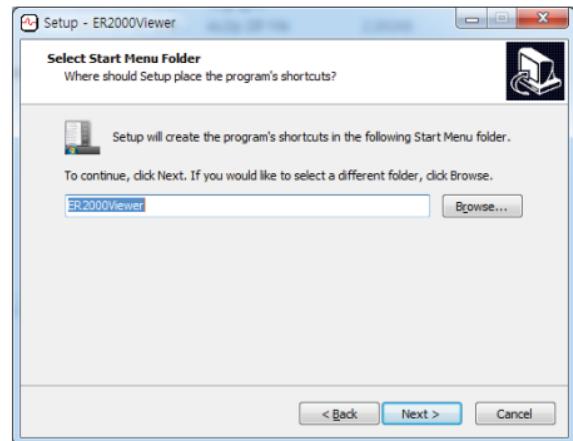
Install the program using the Viewer program inserted into the device.

Connect the device to the computer with a USB (Data Transfer and Charging Cable) to recognize it as a removable disk, go to the Windows Explorer, double-click on the Setup.exe file to run the installer.

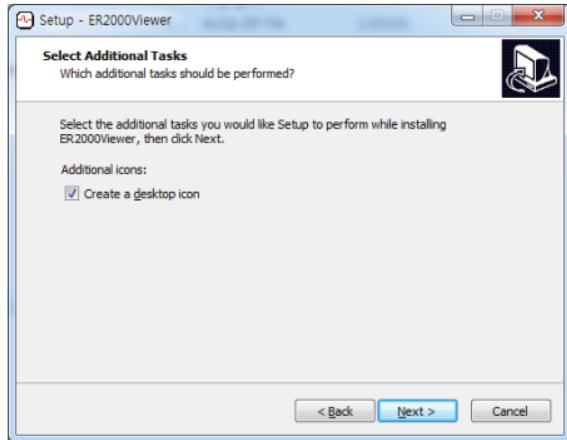




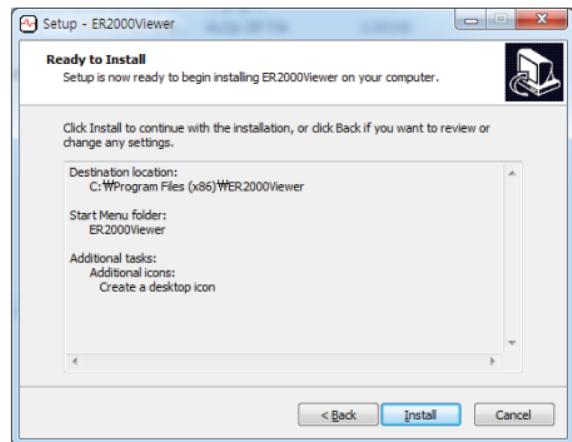
Click the **Next >** button.



Click the **Next >** button.

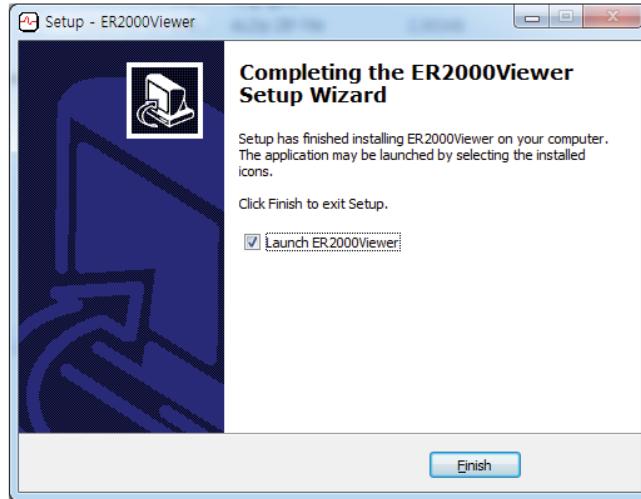


After checking the box, Click the **Next** button.

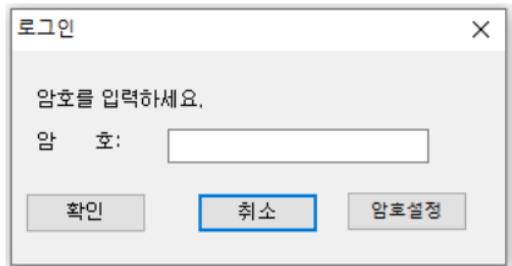


Press the **Install** button to start the installation.

Click the **Finish** button to complete the program installation process. (The shortcut icon is created on the desktop.)

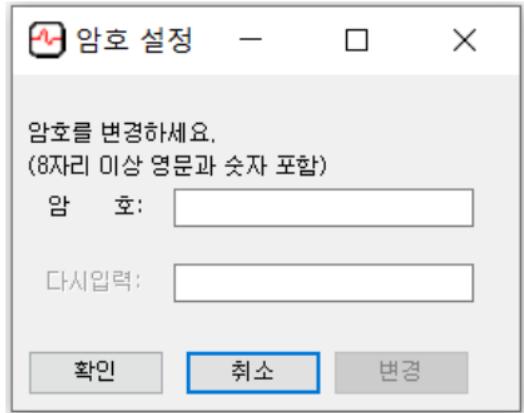


How to use the Viewer program



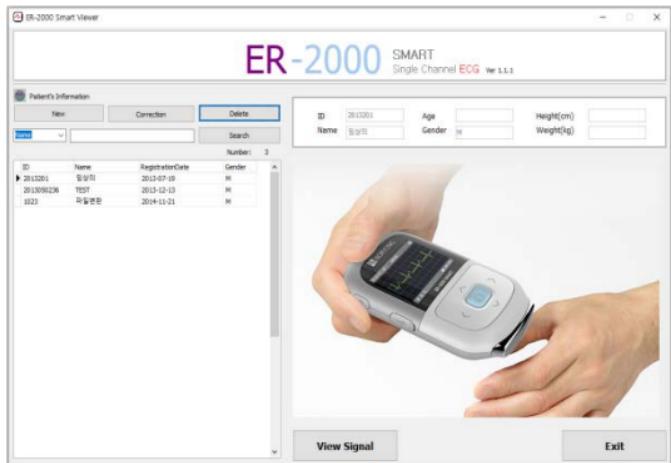
Double-click on the "viewer" icon on the desktop, and the password input window is first executed. If you enter a valid password, it will switch to the main screen. If you enter an invalid password, the program will end.

(If the program runs for the first time, you have to set the password first.)



Change the password of the program. And set the initial password when the program first runs.

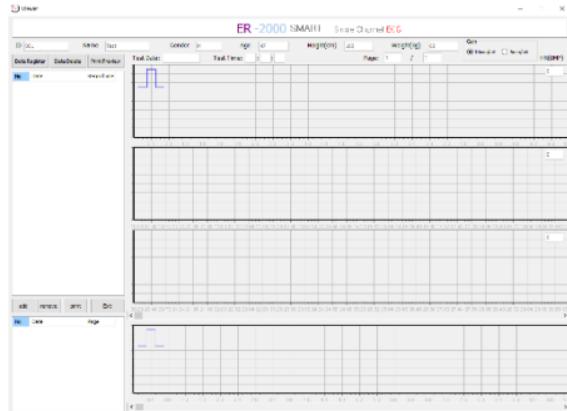
How to use Viewer program



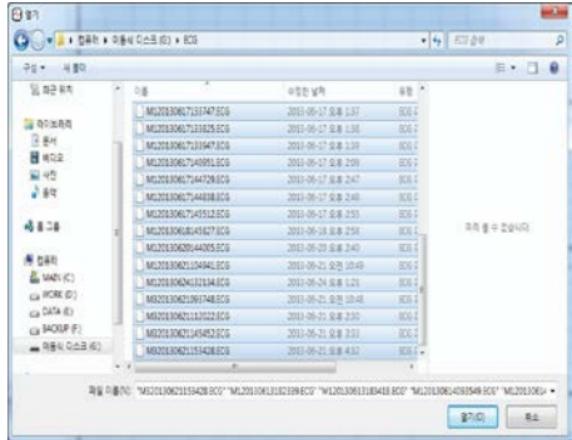
Double-click on the "viewer" icon on the desktop to launch a viewer program for PCs to receive data stored on the device to the PC.



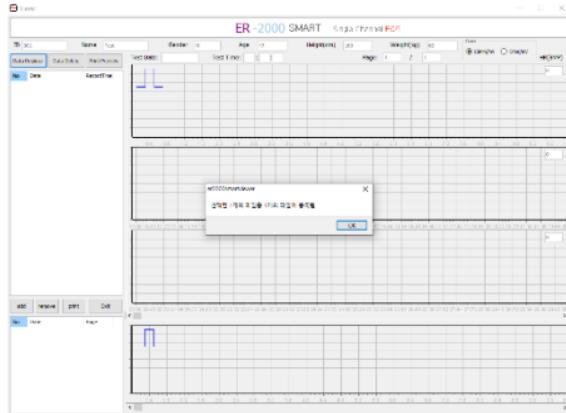
Enter new patient information using the **New** button and click the **OK** button to register the patient. To modify registered patient information, Click to **Correction** modify the information. After registering as a patient, select a patient. When you click the **View Signal** button, it appears in the data transfer and waveform confirmation window.



Data Register By clicking the button, you can download the data measured by the device and save it on your PC.



When you click the **Data Register** button, the Open window appears. After the device is connected to a removable disk, you can check the data stored on the device by opening the ECG folder on that removable disk.
Drag and select the data you want to save and open it.
When you click the button, the data is copied to the PC.
(You can select multiple pieces of data.)



When the copy is completed, a message window appears indicating the number of selected files and the number of files registered successfully.
(However, if a file with the same name is already registered, it is not registered..)

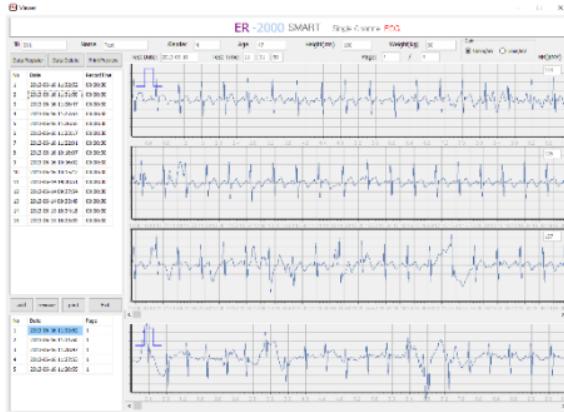


Registered data are sorted in the latest date order in the left list, and you can view ECG waveforms by selecting the desired data.

You can delete the desired data with the **Data Delete** button.



Print Preview When you click the button, the printer preview window appears and you can print it to the connected printer.



Select the data you want to print with the **add** button.

You can register it in the selection list.

Use the **remove** button to register in the selection list.

Data can be deleted.

Use the **print** button to select the data in the selection list.

You can print it out at once.

A/S and Quality assurance

A/S

- This product guarantees quality for one year from the date of purchase. If it is difficult to confirm the warranty period, the warranty period will be applied from the date three months have elapsed since the manufacturing date.
- Depending on the product itself or the defect in the production process, we will repair or exchange it for free.
- Damage caused by consumer negligence does not apply to free repair even within the warranty period.

Check before reporting a malfunction

Solving the problem

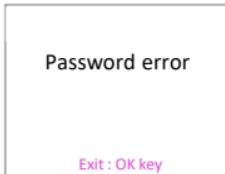
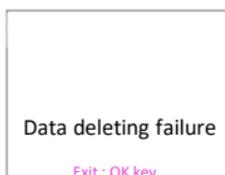
Case	Cause	Solution
I pressed the button but it didn't do anything	The battery is running out	<ul style="list-style-type: none">• Please charge it with the enclosed USB cable and use it
The measurement is complete, but the results don't come out	The SD card is full of capacity	<ul style="list-style-type: none">• Please erase the SD card's data and use it again
When measuring, the waveform shape does not come out and the "—"" straight shape comes out	Skin is dry or my electrode is too cold	<ul style="list-style-type: none">• The skin under the chest and with the right finger in contactApply lotion and measure it• If the electrode is too cold, the signal is temporarilyYou might not be able to get it, so change the measurement location little by littlePlease measure it
ECG waveform is not displayed	Need to exchange products	Inquiries about the official agency
The date doesn't fit at some point	The battery may run out and cause errors	Please refer to p.35 and set the date again

ER-2000 SMART Device

Error	Cause	Solution
Error storing ECG data	Case where the internal SD card is not inserted or broken	<ul style="list-style-type: none">Inquiries about the official agency
USB connection password error	Case where the USB connection password is wrong	<ul style="list-style-type: none">Please enter a valid password.
Error deleting ECG data	Case where the file system of the internal SD card is damaged	<ul style="list-style-type: none">Erase all data and use it after erasing all data

ER-2000 SMART Viewer Program

Error	Cause	Solution
Password Error	Case where the program start password is invalid	<ul style="list-style-type: none">Please enter a valid password
DB Connection Error	The case where the DB file is missing or damaged	<ul style="list-style-type: none">Please install the program again
USB Connection Error	Case where ER-2000 Smart device is not connected via USB	<ul style="list-style-type: none">Inquiries about the official agency
File Path Error	Case with wrong path name or file name	<ul style="list-style-type: none">The program updates automatically

Error	Screen	Solution
Error storing ECG data	 <p>Data are not saved</p> <p>Exit : OK key</p>	<ul style="list-style-type: none"> Inquiries about the official agency
USB connection password error	 <p>Password error</p> <p>Exit : OK key</p>	<ul style="list-style-type: none"> Please enter a valid password
Error deleting ECG data	 <p>Data deleting failure</p> <p>Exit : OK key</p>	<ul style="list-style-type: none"> Erase all data and use it after erasing all data

ER-2000 SMART Viewer Program

Error	Screen	Solution
Password Error		<ul style="list-style-type: none">Please enter a valid password
DB Connection Error		<ul style="list-style-type: none">Please reinstall the program
USB Connection Error		<ul style="list-style-type: none">Connect the ER-2000 SMART device to the PC via USB
File Path Error		<ul style="list-style-type: none">The program updates automatically

Appendix

Specifications of the product

Product name	Portable Electrocardiographic Holter Analyser
Model name	ER-2000 SMART
Purpose of use	A device that records and reproduces electrocardiogram worn by the subject for a long time for electrocardiogram analysis
Channel	1 Channel
Measurement range	30~200bpm, ± 5bpm
Waterproof/dustproof	IP22
Memory	10,000 Hour / 480 Day (Micro SD 16GB)
Electrical safety	Internal power device, CF Device
Battery	3.7Vd.c / 1,800mAh / Life Cycle : 300cycle
Input power	5V 
Motion environment	Temperature : -20°C ~ 60°C (-4°F ~ 140°F) Humidity : 20% ~ 80% RH
Transportation and storage environment	Temperature : -20°C ~ 60°C (-4°F ~ 140°F) Humidity : 20% ~ 80% RH

Appendix

Specifications of the product

Weight	99g
Size	113mm(W) X 66mm(D) X 22mm(H)
Operation time	USB rechargeable, use for up to 24 hours for one full charge (Beef sound and alarm sound off)



= Type CF

Product name	ECG Cable
Model name	ER2000SC1
Length	1.3m

FCC Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and (2) this device must accept any interference received, (2) including interference that may cause undesired operation.

Caution: Any changes or modifications to this device not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This device complies with RF exposure requirement.