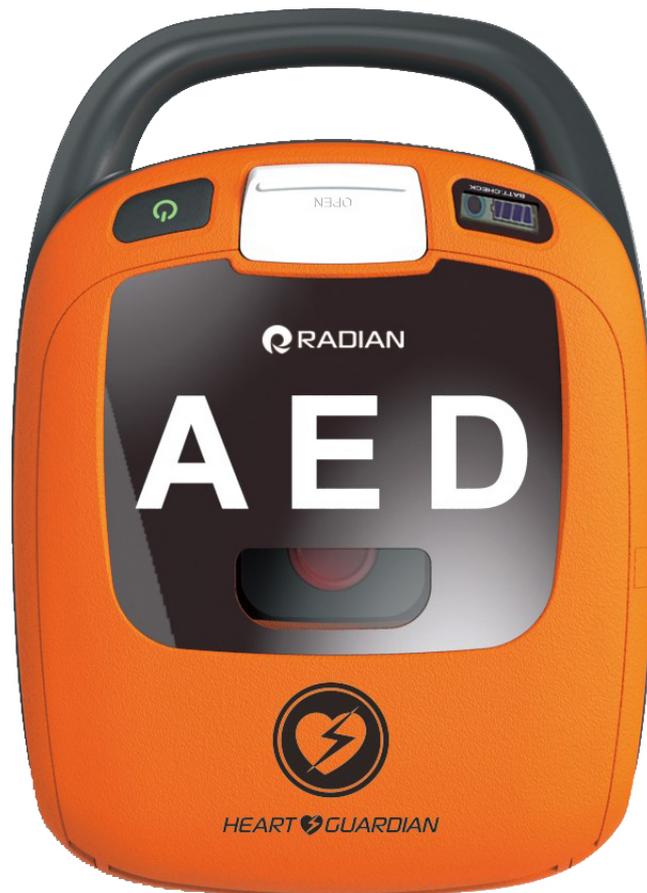


HR-503

HEART  GUARDIAN



HR-503 User Manual

- ☑ Operators are recommended referring the quick-manual provided with the original manual carefully for quick and adequate product operation.
- ☑ Contents of the manual may be changed without prior notification or agreement by Radian.
- ☑ Data without any quotation mark may be different from estimated data as compared to actual data.



1609 ~ 1611, Halla-sigma Valley, 53, Gasan Digital 2-ro
Geumcheon-gu Seoul, Korea
T. 02-6343-6400 F.02-6499-3325
info@radian21.com
www.radian.co.kr

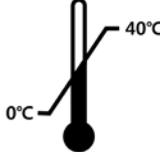
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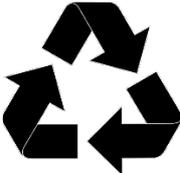
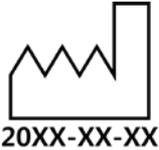
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1 Symbol Descriptions

- ☑ Following symbols refer to the international standard, and are indicated on the surface of the product, battery, AED pads, and packing box
- ☑ Some symbols can be changed/modified/added by RADIANT to follow up with the international standards update

Symbol	Explanation	Symbol	Explanation
	Warning The symbol implements serious hazards that may cause injury or death		Caution The symbol implements hazards that may cause an electric shock, product damage, and malfunction
	Reference Additional reference data is referred		Dangerous Voltage The defibrillator output has high voltage and may present a shock hazard
	Additional info Additional information is described on manual		Type BF Equipment Connected AED to the patient's chest by the AED pads, may withstand the effects of an externally applied defibrillation shock
	Non-Sterile Product/Part is not sterilized		Non-Rechargeable Do not recharge the battery
	Keep Dry AED/Accessories shall be kept dry before or in use		Relative Humidity Humidity range to be maintained

Symbol	Explanation	Symbol	Explanation
	Keep away from ignition materials Do not operate or keep AED around ignition materials		Do not expose or incinerate to open flame
	Expiration date AED pads shall be replaced after marked date		Do not expose to sunlight Do not expose to direct sunlight
	WEEE Waste Electronic Electrical Equipment Separate collection for waste electrical and electronic equipment		Direct Current, DC Direct Current.
	Battery Type Lithium manganese oxide Battery		Temperature Limit Product/Part shall be kept at marked temperature range
	EC Representative European authorized representative		Serial Number
	LOT Batch code		Product Model Number
	Do not use if package is damaged		Single time use only Do not reuse AED pads

Symbol	Explanation	Symbol	Explanation
IP54	Protection Level Protection level that shows anti-dust and waterproof level		Maintenance required
	Recycling Dispose of properly in accordance with all state, province, and country regulations		LATEX Free
	Date of Manufacture 4 digits of the year and 2 digits of month and day which indicate the manufacturing date		Manufacture Name and address of manufacturer
	Bluetooth AED supports Bluetooth wireless communication		Battery Indicator Indicates AED's remaining battery
	Power Button Press the button to operate AED		Electric Shock Button Audio and LED guidance will notice to press the shock button when it is needed
	Adult/Child Mode Select Button Select Adult/Child mode prior to AED pads attachment (Default: Adult mode)		Language Select Button Select a representative language (Default: Korean)

* Button function may be different as per model.

HR-503 A Adult Mode Button
HR-503 B Adult/Child Mode Select Button
HR-503 C Adult/Child Mode Select Button

* Button function may be different as per model.

HR-503 A Child Mode Button
HR-503 B Expert/Amateur Select Button
HR-503 C Volume Button

2 Warning and Caution

- ☑ Please refer to the following for safety use of HR-503
- ☑ Certain contents may be indicated repeatedly in other parts of manual



Do not use if the patient shows any reaction or is conscious

HR-503 is a portable defibrillator manufactured for ventricular fibrillation patients. Prior to AED operation, it is very important to check patient's consciousness and respiration condition; do not use if the patient is conscious and reacting



HR-503 is set as "Adult Mode" as default

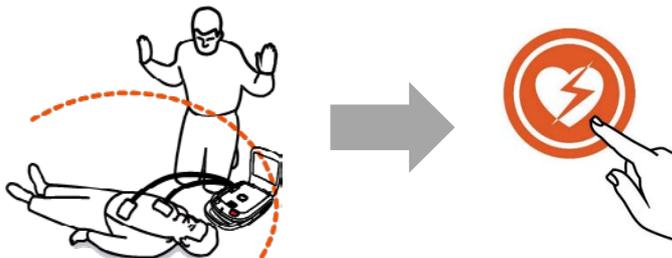
In adult mode, AED delivers about 150J of electric shock to patient. In child mode, about 50J of electric shock is set to be delivered. If the patient is under the age of 7 or weighting below 25kg, please set "Child Mode" by using "Adult/child select button".



Be careful of electric shock hazard

Electric shock can be delivered to operator or bystander through unexpected ways. To avoid this hazard during AED operation, keep followings:

- Do not use AED in standing water, underwater, rain, snowing. Move patient to a dry area
- Confirm and instruct anyone to stay away from the patient prior to pressing 'Shock Button'



- When patient is contacted with any conductive materials such as metals, stay away from the conductive materials



Do not use around flammable materials

To avoid possible fire or explosion hazard, do not use around the following situation/place.

- close to volatile gas or oil
- close to hyperbaric oxygen tank (within 25m)
- close to hydrogen tank (within 25m)
- close to flammable materials





Do not attempt to recharge or cause heat/damage the battery (BT-503)



Recharging or heat/damage on battery(BT-503) may cause an explosion or fire hazard. If the battery is low, please exchange to a new one



Do not attempt to disassemble or repair the AED

Disassembling AED may result in electric shock hazard. RADIANT is not responsible for electric shock hazard resulted by unauthorized disassemble or repair. Please contact local/national sales representative for repair or replacement



Do not use battery not provided by RADIANT

RADIANT is not responsible for damage/malfunction in operation caused by unofficial battery use. Uses of unofficial battery may cause serious damage / malfunction on AED



Attach the AED pads clearly on the patient's bare chest

For accurate ECG analysis and proper electric shock delivery, AED pads shall be attached on the patient's bare chest firmly and tightly. Users shall make sure the patient's skin is clear and dry prior to the AED pad attachment



During ECG analysis, stay away from the patient

Touching the patient during the ECG analysis phase can cause interference with the diagnostic process that may cause increased analysis time, or result analysis error. Avoid contact with the patient while analysis is on progress



AED pads are single-use only and have expiration date

Do not reuse AED pads. Also, always keep the AED package sealed prior to the actual use. If the sealed package is damaged or opened, exchange it to a new one immediately. Once used, or passed expiration date (indicated on the package), please exchange it to a new one.



Operate AED away from electromagnetic interference

This AED is an electronic device of which performance can be influenced by electromagnetic interference. Please operate AED away from other electronic device that can cause electromagnetic interference or turn other electronic devices off to minimize electromagnetic interference. Devices which can cause electromagnetic interference are cellular phones, radio, AC power, transmitter-receiver, X-ray, etc.



Temperature requirement for stable operation/storage

Battery and AED pads of HR-503 can be stored from - 0°C to 40°C for short term period(under 5 days), but recommends at least 1 hour of storage at 20°C ~ 30°C temperature condition prior to actual AED operation. For long-term storage(over 5 days), RADIAN recommends maintaining AED with temperature range from 20°C to 30°C. AED pads and battery may have significant performance degrade with the long-term storage(over 5 days) at out of range of 0°C ~40°C temperature condition.



IP54

Do not expose AED to water or liquid directly

IP54 grade is not capable of blocking direct inflow of liquid completely. In case of water or liquid inflow inside the AED, there may cause malfunction or failure of the AED



Operator is to be well-informed of method of AED operation and CPR in advance

Some national standards restrict AED to be sold by or on the order of a physician or practitioner licensed by law in which operator practices to use or order the use of the AED



The AED requires periodic maintenance for followings:

- Status indicator check
- Battery manufacturing date check
- AED pads expiration date check



Do not use AED for CPR training, experiment, and demo

HR-503 is only used for sudden cardiac arrest patient. Any HR-503 operation on a simulator or a mannequin may cause serious malfunction or damage on AED



Compliance with national and regional regulation

AED maintenance and authorization, responsibility of usage shall be followed by relevant national and regional regulation

**Product disposal**

The AED is classified as electronic device. AED shall be disposed in a way required by the local guideline



HR-503's CPR guidance is consistent with 2015 guidelines defined by AHA and ERC

3 Limited warranty

3.1 Customer requirement and product registration

Product registration regarding the purchased product may be necessary based on the national regulations for AED

3.2 Warranty details

RADIAN Corp., provides warranty to original purchaser of HR-503(including battery and AED pads but varies the covering time periods) that guarantees free replacement and repair service. Warranties and returning policies may vary by products and periods depends on regional regulations and RADIAN's sales policy. Please contact sales representatives for more details.

Following cases are exceptions of warranty coverage:

3.2.1 Defect caused by improper operation not following the user manual

3.2.2 Defect caused by unauthorized repair or modification

3.2.3 Defect caused by external shock including drop

3.2.4 Defect caused by natural disaster such as fire, earthquake, flood, and thunder stroke

3.2.5 Defect caused by use/storage in extreme temperature or humidity environment, please refer to 'Chapter 5 Guidance for maintenance'

3.2.6 Unauthorized alternation of purchase date, purchaser name, vender, and serial number

3.2.7 Products that warranty period is expired

3.2.8 Un-registered AED

3.3 Warranty period

3.3.1 HR-503 (Main Body, excluding battery and AED pads)

- 5 years from date of manufacture (indicated on product label)

3.3.2 Battery (BT-503)

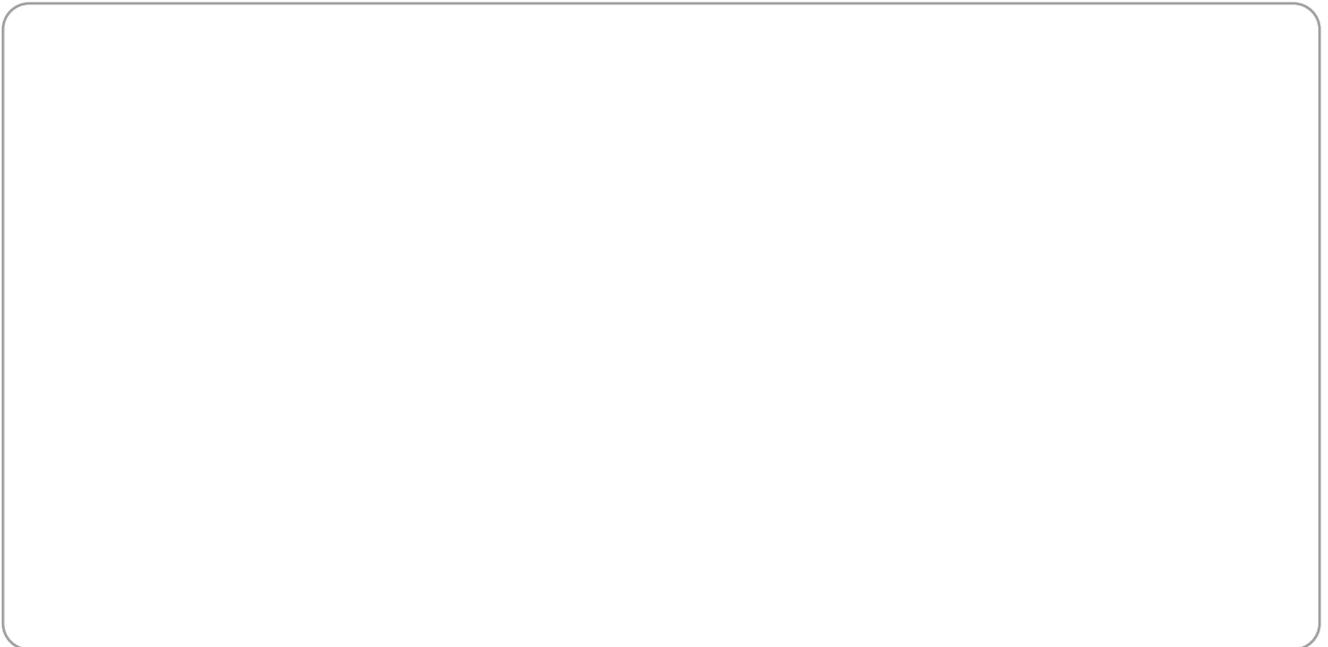
- 4 years from date of manufacture (indicated on battery label)

3.3.3 AED Pads (P-503)

- years from date of manufacture (indicated on the surface of pads)

3.4 Product repair/exchange

An inspection can be performed by Radian (or regional representative) to check the warranty period and trace the defect. Once Radian confirm the defect is caused by one of the manufacturing, development or delivery procedure, repair/exchange may be provided without any shipping charge. Shipping will be completed within maximum of 50 days from the day the product arrives at RADIAN Corp., which are automatically added up to remaining warranty period



4 Product introduction



Please consult the quick guide and user manual prior to AED operation



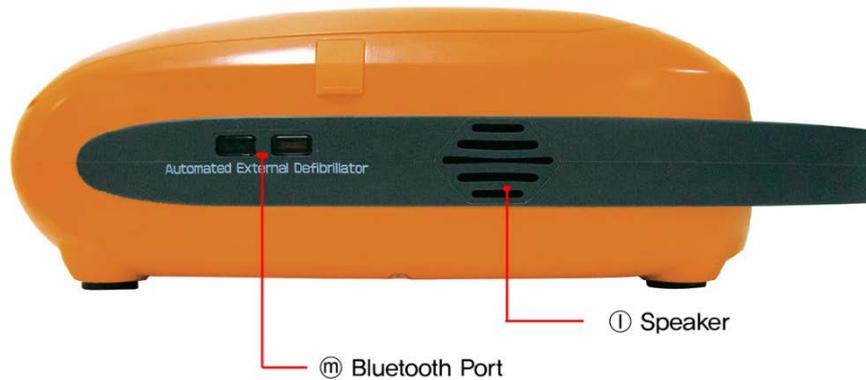
It is highly recommended for every potential user to complete periodic training for CPR and HR-503 operation. Please contact national/local representative for Heart Guardian series to find out detailed CPR and AED operating training schedule

4.1 Product overview

HR-503, a portable electric device operated by battery power, is an easy-to-use Semi-Automated External Defibrillator. The AED automatically analysis patient's ECG and identifies and advise electric shock if it is necessary. Nearly every procedure for AED operation is guided through voice message and beep sound, as well as the visual guidance with picture description with LED. Heart Guardian, HR-503 is manufactured based on CPR guideline of AHA revised in 2015

4.1.1 Functions





(a)	Power Button	Used to turn on or off the product
(b)	Language Select Button	Used to select language used in Audio guidance * Functions may be different as per model (refer to p20~p21)
(c)	Shock Button	Press the button when guidance indicates to deliver charged electric shock to patient
(d)	Adult/Child Mode Select Button	Select Adult/Child mode (Default: Adult mode) * Functions may be different as per model (refer to p20~p21)
(e)	AED Pad Connector	For connection of AED pads and the device
(f)	Open Button	For opening AED cover
(g)	Handle	For carrying AED safely
(h)	Procedure LED Guidance	LED light informs CPR and AED operating procedure to user
(i)	AED Pads	For AED to analyze ECG and deliver shocks
(j)	Cover	Prevents external substances exposure to AED
(k)	Battery Indicator	For indicating remaining battery of AED
(l)	Speaker	Speaker for Audio guidance
(m)	Bluetooth Port	Communication port for transmitting ECG data from AED to PC

4.1.2 Specification

Product Type	Semi-automated External Defibrillator
Auto/Manual Diagnosis	Automatic diagnosis (battery power, circuit power, button operation checks)
ECG complete analysis	FFT ECG Analysis
Language selection	Language selection for Audio Guidance (4 languages)
Compatible Adult/Child	Adult/child mode select button
Charge Method	Hi-Cap charge
Output Range	150J \pm 10% (Adult) / 50J \pm 10% (Child)
Data Storage	Max. 100 of ECG logs can be recorded
Control Button	Power, Shock, Adult/child mode select button, language select button
Battery Type (BT-503)	LiMnO ₂ (12V DC 4.2A)
Number of shock	At least 200 times (with new battery, Child mode)
AED Pads Type (P-503)	AED electric pads(single-use), 2 lead wire(1.8m), 2-hole plug
Product Size (mm)	223.4(W) x 311.7(L) x 91.9(H)mm
Product Weight (kg)	2.1kg (battery, AED case and electric pads excluded)
Life time	5 years from date of manufacture
Product Color	Orange
Basic Components	AED device, AED portable case(HR-B3), AED pads(P-503), Battery(BT-503), User Manual, Quick guide

4.1.3 Accessories

HR-B3 Portable AED case



Model : **HR-B1**

Usage : AED Storage and protection

Type : Fabric, Artificial Leather

Size : 235(W) x 275(D) x 100(H)mm

Weight : 380g

Life time : 1 year(Portable)
10 years(Storage)

P-503, AED Pads



Model : **P-503**

Usage : Delivering electric shocks and impedance signal

Type : Adhesive pads, compatible for both adult/child

Size : 150(W) x 190(D) x 15(T)mm

Weight : 100g

Warranty : 2 years (in case of damage caused by user's mistake, repair / exchange will be charged)

Life time : Single use only, 2 years for unpacked/sealed product from the manufacturing date

BT-503, HR-503 Battery



Model : **BT-503**

Usage : Electric power supply to AED

Type : LiMnO₂ (DC 12V 4.2Ah)

Size : 175(W) x 60(D) x 25(H)mm

Weight : 285g

Warranty : 4 years (in case of damage caused by user's mistake, repair / exchange will be charged)

Life time : 5 years on standby mode

- Life of Battery is different from temperature and humidity during storage. Management is necessary to follow this guidance.
- While keep by wait mode, Life of Battery is decreasing as time goes by and is possible to reduce the number of electric shock

4.2 Indications of use

The Heart Guardian HR-503 is indicated for use on victims of cardiac arrest who are exhibiting the following signs:

- Unconscious
- Not breathing
- Without circulation

The Heart Guardian HR-503 is intended for use by personnel who have been trained in its operation. Users should have received training in basic life support / AED, advanced life support or a physician-authorized emergency medical response training program.

The Heart Guardian HR-503 is intended for use with same electric pads on both adult and child with a separate button operation (adult mode on patients greater than 8 years old or over 25 kg, child mode on patients between 1 and 8 years of age or up to 25 kg). Default is set as adult mode when AED is released.

It is highly recommended for every potential user to complete periodic training for CPR and HR-503 operation. Please contact national/local representative for Heart Guardian series to find out detailed CPR and AED operating training schedule

Heart Guardian, HR-503 is an emergency medical device used for patient who stops breathing and lapsed into unconsciousness due to sudden cardiac arrest. Sudden cardiac arrest patient shows symptoms as below;



No response



Unusual or no breath



Not detection of blood
circulation



AED is prohibited for use in case of response or consciousness of patient

4.2.1. Contraindications for Use

Do not use the Heart Guardian HR-503 when the patient:

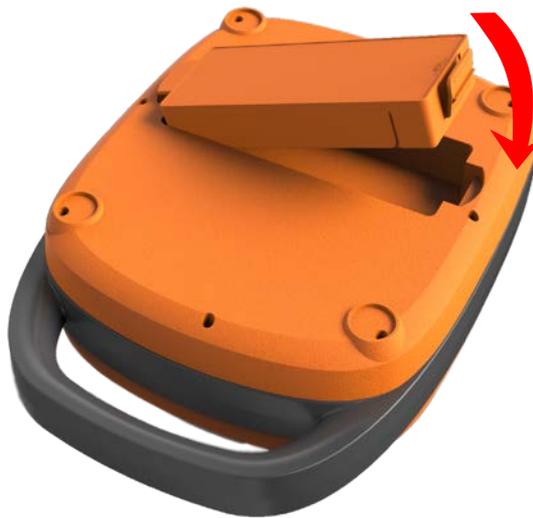
- 1. is conscious; or**
- 2. is breathing; or**
- 3. has a detectable pulse or other signs of circulation.**

4.3 Getting started

Once AED is powered on, every operation procedure is guided by the voice recorded audio guidance and beep sound with picture description and LED. For a brief operation training, refer to quick guide provided with the product

4.3.1 Preparation

- ① Open the package and check product components. If not all components are prepared, please contact national/local representative. Manual and quick guide is also available at 'www.radian.co.kr/en' for downloading
 - I. HR-503 AED (Device, bag included)
 - II. HR-503 User Manual
 - III. P-503 AED Pads
 - IV. BT-503 Battery (Non-rechargeable)
 - V. Quick Guide
- ② Insert a battery pack (BT-503) into the battery slot



- ③ For safe storage, always keep AED in the portable case(HR-B1)
- ④ Place AED at a highly visible and accessible location



Do not remove sealed package which contains AED pads (P-503). Once the package is opened, the adhesive material on AED pads will get dry continuously and would result in improper pads attachment

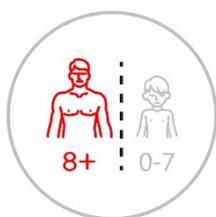
4.3.2 AED Operation

4.3.2.1 Press the power button to turn the AED on



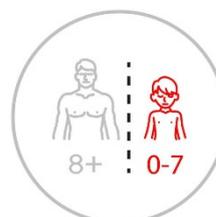
4.3.2.2 Open the cover and set the adult/child mode

Heart Guardian, HR-503 may be used for both adult and child. If it is hard to define the patient's weight and age quickly, proceed further operation procedure with the default mode (adult mode)



Adult Mode (Default)

Above age of 8 or Minimum weight 25kg



Child Mode

Below age of 7 or Maximum weight 25kg

* Additional models with different button function

- Heart Guardian HR-503



Button Function

- Adult mode select button(left) :

Select if the patient is above age of 8 or minimum weight of 25kg. When selected, 'adult mode indicating lamp' will be turned on

- Child mode select button(left) :

Select if the patient is below age of 7 or maximum weight of 25kg. When selected, 'child mode indicating lamp' will be turned on

- Language select button(right) :

Language indicating lamp will be turned on depending on the selected language.

- Heart Guardian HR-503 A



Button Function

- Adult mode select button(left) :

Select if the patient is above age of 8 or minimum weight of 25kg. When selected, 'adult mode indicating lamp' will be turned on

- Child mode select button(right) :

Select if the patient is below age of 7 or maximum weight of 25kg. When selected, 'child mode indicating lamp' will be turned on

- Heart Guardian HR-503 B



Button Function

- Adult mode select button(left) :

Select if the patient is above age of 8 or minimum weight of 25kg. When selected, 'adult mode indicating lamp' will be turned on

- Child mode select button(left) :

Select if the patient is below age of 7 or maximum weight of 25kg. When selected, 'child mode indicating lamp' will be turned on

- Expert Select Button(right) :

Select if the operator is an expert such as a doctor or an emergency medical technician. When selected, 'expert mode indicating lamp' will be turned on

- Non-Expert Select Button(right) :

Select if the operator is a non expert. When selected, 'non-expert mode indicating lamp' will be turned on

- Heart Guardian HR-503 C



Button Function

- Adult mode select button(left) :

Select if the patient is above age of 8 or minimum weight of 25kg. When selected, 'adult mode indicating lamp' will be turned on

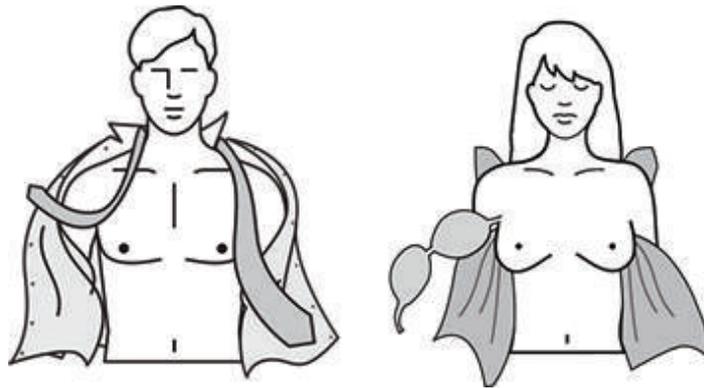
- Child mode select button(left) :

Select if the patient is below age of 7 or maximum weight of 25kg. When selected, 'child mode indicating lamp' will be turned on

-Volume button(right) :

Select to adjust the volume for audio guidance. Default setting is 25%. When pressed once, volume increases to 50%, when pressed twice, volume increases to 75%, when pressed three times, volume increases to 100%. 'volume indicating lamp' will be turned on for the selected volume.

4.3.2.3 Prepare the patient for AED operation



AED shall be placed right next to the patient. Remove clothing from the patient's chest, and make sure the patient's chest is clean and dry. Shaving hair may be necessary for better AED pads attachment



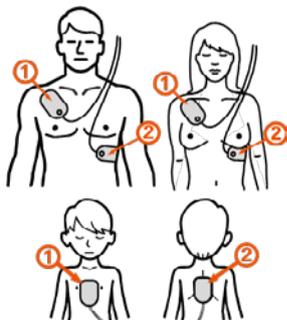
Saving time is very important for sudden cardiac arrest patient
Time shall not be wasted on taking off the clothes. Remove patient's top as quickly as possible even by cutting or ripping it

4.3.2.4 Attach AED Pads to the patient



① Take the AED pads out from the cover

② Remove the package and the covering stickers



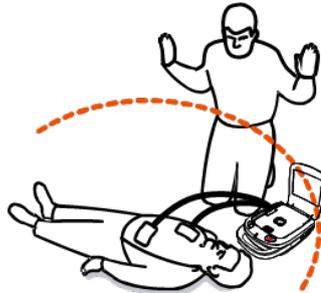
③ Attach the pads to patient's chest

4.3.2.5 ECG Analysis

Once AED pads are clearly attached to the patient's chest, AED starts ECG analysis for patient



During ECG analysis, stay away from patient



For accurate and safe ECG analysis, do not physically contact the patient during ECG analysis

4.3.2.6 Electric shock and CPR

Once ECG analysis is completed, the AED operates as shown below

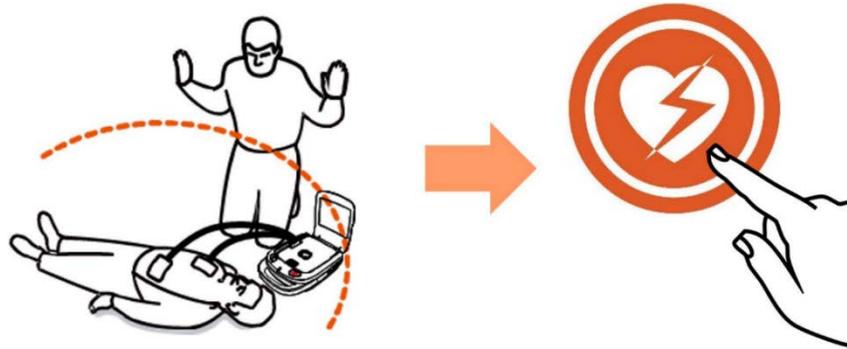
▪ **When Electric Shock is needed (Defibrillation is required)**

- ① Audio guidance: “Electric shocks are needed”
- ② After a while, once recharging is completed, shock button blinks
- ③ Audio guidance: “Press the flashing orange shock button”
- ④ Electric shock is delivered to the patient
- ⑤ After electric shock, perform CPR procedure following audio guidance
- ⑥ Audio guidance: “Start CPR”
- ⑦ Audio guidance: “Compress the chest 30 times”
- ⑧ Beeper: rings 30 times
- ⑨ Audio guidance: “Start mouth to mouth CPR 2 times”
* (There is no audio guidance in the non-expert mode in HR-503B Type)
- ⑩ CPR guidance for ⑥ ~ ⑨ will repeat every 30 seconds and operates as shown below after repeat of 5 cycles



Be careful of electric shock

Electric shock may be delivered to a person who is physically contacting with the patient. Before pushing the shock button, check and instruct others to stay away from the patient



▪ When electric shock is not needed

- ① Audio guidance: ‘No shock is needed’
- ② Audio guidance: ‘If there’s no pulse, please start CPR immediately’

During AED conducts CPR guide, no ECG analysis is proceeded. Once CPR guidance completed, the product informs the rescue progress status via audio message and re-analyzes ECG

▪ Other conditions

In case of AED pads’ mis-attachment to the patient, the product operates as below;

- ① Audio guidance: “Firmly attach the pads to the patient’s bare skin”
- ☑ Even though electric energy charge is completed, if user does not push blinking shock button for more than 15 seconds, AED will conduct discharge the electric energy instead of delivering electric shock to patient through AED pads
- ② Audio guidance: “Shock button was not pressed”

4.3.3 Data management

4.3.3.1 ECG data record

The product automatically saves ECG data based on every events of the AED operation. Those data can be transferred via Bluetooth 2.0 interface to a computer. Pairing may be required to connect AED to computer. Communication with a computer is only available with a computer that has a Bluetooth function

5 Guidance for maintenance

5.1 AED location and periodical maintenance

- 5.1.1** Please set AED at a place where AED can be easily detected and accessed.
RADIAN strongly suggests setting AED close to a telephone in order to call emergency aid service immediately in case of an emergency
- 5.1.2** All components including P-503 electric pads shall be kept together
- 5.1.3** AED shall always be stored with the battery installed
- 5.1.4** Periodically check AED operation and expiration date of battery and AED pads
- 5.1.5** The product shall be stored/operated in following environmental conditions

① **Operating***

- Temperature Range : 0°C to 40°C (32 ~ 104°F)
- Humidity : 5% to 95% (non-condensing)

② **Standby****

- Temperature Range : 0°C to 40°C (32°F to 104°F)
- Humidity: 5% to 95% (non-condensing)

③ **Storage and transport (up to 3 days)*****

- Temperature Range: -20°C to 60°C (-4°F to 140°F)
- Humidity : 5% ~ 95% (non-condensing)

④ **Avoid AED storage in places as below;**

- Place where wide temperature changes happen frequently
- Place where is exposed to direct sunlight
- Wet or flooded places
- Near a heater or heavy electrical devices
- Places where excessive shock or shake may occur
- Near flammable materials
- Places exposed to the extreme environmental weather condition

5.1.6 Battery and AED pads maintenance

① Battery maintenance

If the battery is low, AED may not be operated properly in emergency situation. When status indicator shows X, battery pack shall be replaced immediately. Periodically check manufacturing date indicated on battery label, and replace to new one if it is expired (4 years from manufacturing date)

☑ Replacing battery pack



- Pull out the battery pack to be replaced on backside of the AED, by pressing a lever on left side of the battery pack
- Push in the new battery pack facing the label down to hear ‘click’ sound. When battery is installed, AED starts a self-diagnosis and turns into a standby mode



Do not attempt to recharge or cause heat/damage the battery (BT-503)

To avoid possible fire or explosion hazard, do not use around the following situation/place.

- In the presence of flammable gases
- In the presence of hyperbaric oxygen tank (within 10m)
- In the presence of hydrogen tank (within 10m)

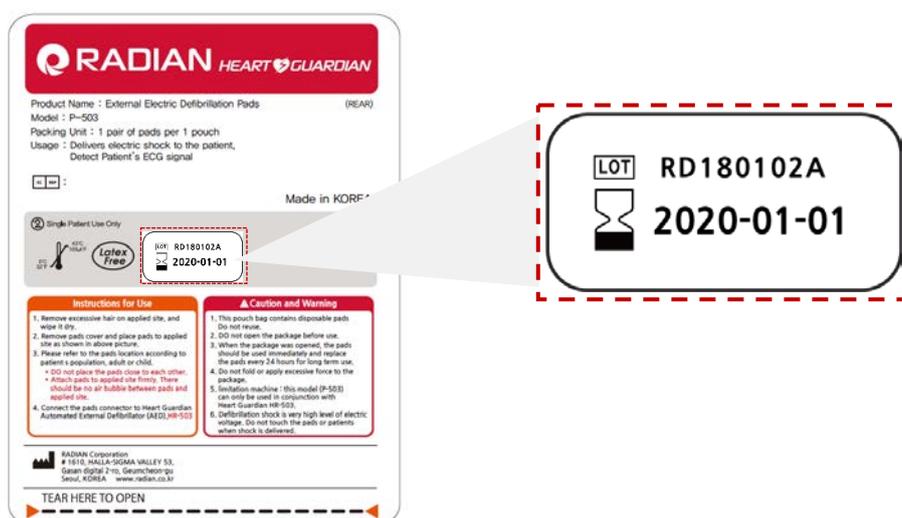


Do not use battery not provided by RADIANT

RADIANT is not responsible for damage/malfunction in product operation caused by use of unofficial battery. Since use of unofficial battery may cause trouble/malfunction, please use the official battery provided by RADIANT

② AED pads maintenance

- AED pads' expiration date shall be checked periodically. Expired AED pads shall be replaced to new one immediately. Expiration date is marked on the package
- If sealing package of AED pads is ripped or damaged, do not use the pads and replace it to new one. When AED pads are exposed to the air, they can only be used within 24 hours
- HR-503 only recognizes P-503 AED pads. Do not use any other AED pads not provided by RADIANT
- RADIANT recommends preparing additional pads with different expiration dates for spare



5.2 After first-time use

If AED was operated for an actual emergency situation, AED maintenance manager shall check-up followings to make AED ready to be used again anytime for everyone.

5.2.1 Exterior inspection after AED operation

- Check exterior appearance of AED, and if it is necessary, please remove contamination. For damage recovery on AED, please contact customer technical support

5.2.2 Components management after AED operation

- If AED pads were used or unpacked, please replace the pads to new ones
- If AED has delivered electric shocks at least over 3 times, and life time has expired (2 years from manufacturing date), RADIANT suggests replacing the battery to a new one. Suggested battery life is 4 years on standby mode

5.3 Cleaning

To clean the AED, wipe the AED with a soft cloth that has been dampened by one of the following:

- Soapy water.
- Isopropyl alcohol (70% solution).

For cables and pads, follow cleaning instructions in the directions for use shipped with those components. Avoid spilling liquid on the AED, especially in connector areas. If liquid is accidentally spilled on the AED, clean and dry thoroughly before reuse. If in doubt about AED safety, refer the unit to qualified service personnel or your local supplier for checking.

6 Troubleshooting

6.1 Self-diagnosis

Power-On Self-test (Operation mode)	Every time when power button is pressed Flash ROM test Charge/Discharge test Battery Output level test
Regular Self-test (Stand-by mode)	Automatically performed once per month on 1 st day Flash ROM test Charge/Discharge test Battery Output level test

If a problem is found in the product during the self-diagnosis test, status indicator shows  and when turned on, error audio guidance and beeping sound will be present. In this state, the product will not operate properly.

6.2 AED conditional alarm



Indication	Description
	Prompts the state of normal operation
	Prompts when error is found during operation
	Prompts the current state of battery
Procedure LED guidance Orange Blink	Guides the current CPR procedure 
Shock Button Light Orange Blink	Prompts the state of preparation for electric shock 

6.3 Troubleshooting

Mode	Alarming Indication	Situation	To do
Standby	<p>Status Indicator: X mark</p> 	AED will be turned off after 8 to 10 times of electric shock or 10 minutes after turned on	Replace the battery to a new one
		Audio message: The battery is low, please change the battery immediately	Replace the battery to a new one
		Audio message: System error	Contact the vender for A/S
		AED is not turning on when pressing the power button.	Replace the battery to a new one, if the battery is a new one, or has already been replaced within 2 years, please contact the vender for A/S
Operating		Audio message: The battery is low, please change the battery immediately	Replace the battery to a new one
		Audio message: System error	Contact the vender for A/S
		Audio message: System will be terminated due to no attachment of the pads	Attach AED pads to the patient properly
		Audio message: Attach the pads to the patient	Attach AED pads firmly to the skin of the patient



Do not attempt to disassemble or repair the AED arbitrarily

Do not attempt to disassemble the AED arbitrarily due to danger of electric shock hazard when high voltage is recharged. RADIAN is not responsible for electric shock resulted from unauthorized disassembly or attempt to repair. Please contact sales representative for defective AED

7 Technical data

7.1 Physical characteristics

Item	Description
Product Type	Semi-automatic external defibrillator
Dimensions	223.4(W) x 311.7(L) x 91.9(H)mm
Weight (Including battery and pads)	2.5kg

7.2 Environmental characteristics

Item	Condition	Detail
Temperature range	Operating*	0 ~ 40°C (32 ~ 104°F)
	Standby**	
	- Short-term (5 days)	0 ~ 40°C (32 ~ 104°F)
	- Long-term	20 ~ 30°C (68°F to 86°F)
	Storage and transport***	-20°C to 60°C (-4°F to 140°F)
Humidity		5 ~ 95% (non-condensing)
Altitude		0 to 4,575m (0 to 15,000ft)

* It is recommended for AED and AED pads to be stored at temperature between 20°C~30°C for normal operation.

7.3 Functionality

Item	Description
FFT ECG Analysis	The AED FFT ECG analysis system automatically analyzes the patient's ECG and advises you when defibrillation is required
Waveform	Biphasic Truncated Exponential (BTE)
Impedance range	25Ω to 175Ω
Electric shock energy	Adult mode: 150J ± 10% Child mode: 50J ± 10%
Charging time	8 seconds from the initiation of charging to be available for discharge (with a new, fully charged battery; with a low-on battery, the charging time can be significantly prolonged)
Operating time	For a new, fully charged battery pack at 20~ 30°C: 200 discharges at maximum energy or 10 hours of continuous ECG monitoring.
Automated Self-tests	Monthly (every 1 st day for each month): Battery, charge/discharge, internal electronics
Audio Guidance/Alerts	Guidance for AED operation and CPR procedure (voice record) Beep sound alarm
Indicators	Overall status light (Battery, AED condition) CPR procedure guidance LED CPR procedure guidance drawings
ECG data record	Max. 100 of ECG logs can be repeatedly recorded
Data communication	Bluetooth 2.0

7.4 Applicable standards

Type	Description
General	<input checked="" type="checkbox"/> 
Safety and performance	
Shock	IEC60068-2-27
Vibration	ISO 10055
Free fall drop	IEC60068-2-31
Degree of Protection (Particle and water ingress)	IEC 60529, IP54
EMC	

7.5 Characteristics of P-503 (AED Pads)

Item	Description
Type	Pre-gelled, self-adhesive, disposable, non-polarized defibrillation pads
Shelf life	2 years
Disposal	Abide by regional/national regulations

7.6 Characteristics for BT-503 (Battery)

Item	Description
Type	Lithium Manganese Dioxide (LiMnO ₂)
Output Voltage	12 VDC 4.2Ah
Disposal	Abide by regional/national regulations
Shelf life	4 years from date of manufacture (can be reduced by temperature condition)

7.7 FFT ECG Analysis

FFT ECG Analysis algorithm analyzes patient's ECG efficiently and accurately to decide whether to deliver shocks to the patient and meets below requirements

- Shockable Rhythm-VF: IEC 60601-2-4, AHA's recommend: >90%
- Shockable Rhythm-VT: IEC 60601-2-4, AHA's recommend: >75%
- Non-shockable—Rhythm-NSR: IEC 60601-2-4, AHA's recommend: >99%
- Non-shockable-Asystole: IEC 60601-2-4, AHA's recommend: >95%
- Non-shockable-all other rhythms: IEC 60601-2-4, AHA's recommend: >95%

Rhythms	Standard advised by AAMI	Minimum Test Sample Size	Test Sample	Shock Decision	No Shock Decision	Performance
Coarse VF	>90% sensitivity	200	209	203	6	97.13%
Fast VT	>75% sensitivity	50	122	100	22	81.97%%
NSR	>99% specificity	100	108	0	108	100.00%
AF, SB, SVT, heart block, idioventricular PVC's	>95% specificity	30	231	0	231	100.00%
Asystole	>95% specificity	100	144	6	138	95.83%



1609 ~ 1611, Halla-sigma Valley, 53, Gasan Digital 2-ro
Geumcheon-gu Seoul, Korea
T. 02-6343-6400 F.02-6499-3325
info@radian21.com
www.radian.co.kr