

# **BeneHeart C & BeneHeart S Series**

## **Automated External Defibrillator**

### **Operator's Manual**

(BeneHeart C1/BeneHeart C1A/BeneHeart C2/BeneHeart C2A/  
BeneHeart C1 Fully Automatic/BeneHeart C1A Fully Automatic/  
BeneHeart C2 Fully Automatic/BeneHeart C2A Fully Automatic/  
BeneHeart S1/BeneHeart S1A/BeneHeart S2/BeneHeartS2A/  
BeneHeart S1 Fully Automatic/BeneHeart S1A Fully Automatic/  
BeneHeart S2 Fully Automatic/BeneHeart S2A Fully Automatic)



© Copyright 2019 Shenzhen Mindray Bio-Medical Electronics Co., Ltd. All rights reserved.

■ Release time: 2019-12

■ Revision: 5.0

### 2.1.1 Intended Use

The BeneHeart C & S series defibrillator, hereafter called the equipment, is intended to be used on adults and children in a sudden cardiac arrest. The patients must be:

- Unresponsive
- Not breathing or not breathing normally

The equipment also guides the operator throughout cardiopulmonary resuscitation (CPR) with voice and/or visual guidance.

The equipment is to be used in public places and facilities by persons who have been trained in its operation. The operator should be trained in basic life support, advanced cardiac life support or other emergency medical response.

### 2.1.2 Contraindications

Do not use the equipment when the patient is showing any of the following:

- Consciousness
- Breathing

## 2.2 Applied Parts

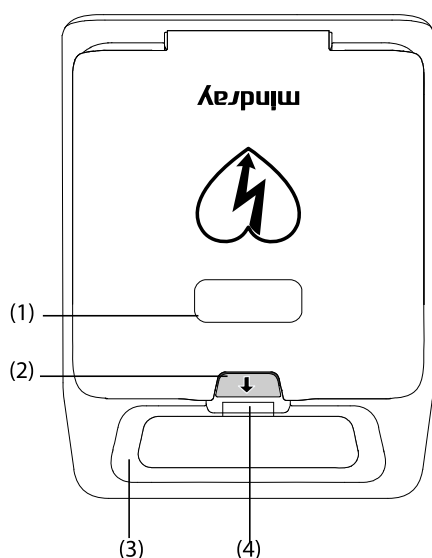
The applied parts of the equipment are:

- Electrode pads
- CPR sensor (if configured)

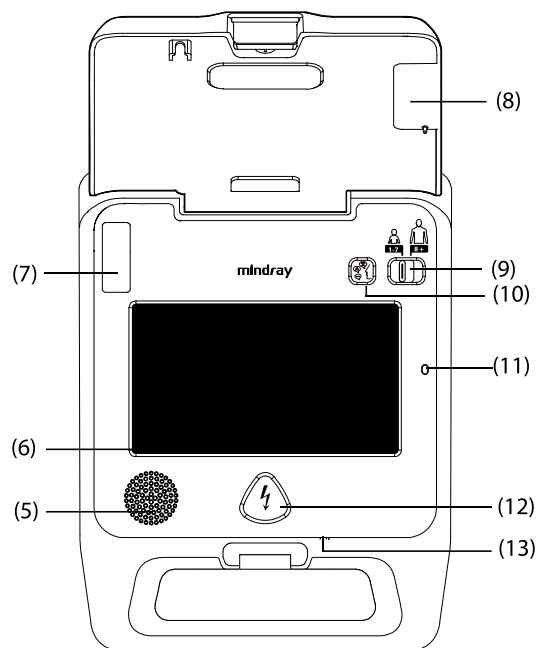
## 2.3 Main Unit

Based on the clinical application, the view that the equipment laid on the ground with lid opened is taken as the reference direction. The following views are defined by the reference direction.

### 2.3.1 Top View



With lid closed



With lid opened

- (1) Pad expiration window: checks the expiration date of pads.
- (2) Latch: opens or closes the lid.
- (3) Handle
- (4) Status indicator
  - Green: the equipment is turned on, and can work correctly.
  - Flashing green: the equipment is in the standby status, and is ready for operation at any time.
  - Flashing red: auto test failure is detected on the equipment.
  - Off: no battery is installed or the battery is malfunctioning.
- (5) Speaker: the equipment automatically adjusts the volume depending on surrounding noise levels by default.
- (6) Display screen (for equipment configured with the screen)
- (7) Pads connector: connects the electrode pads.
- (8) Pads package holder: stores the electrode pads.
- (9) Adult/Child mode switch: flip right or left to switch between adult and child.
- (10) Language button: press to switch between the configured languages.
- (11) Optical sensor (for equipment configured with the screen):  
the equipment automatically adjusts the screen brightness depending on surrounding light by default.
- (12) Shock button (for semi-auto model): press to deliver a shock to the patient.
- (13) Microphone: records voices. It is available only when the record function is enabled.

# 6 Battery

---

## 6.1 Battery Introduction

The equipment is designed to operate using a disposable battery.

## 6.2 Battery Safety Information

---

### WARNING

- **Never charge the disposable battery under any circumstances.**
  - **Do not disassemble, puncture or incinerate batteries. Do not short the battery terminals. They may ignite, explode, or leak, causing personal injury.**
  - **Keep a new spare battery available at all times.**
  - **Battery operating time depends on the time and frequency of using the equipment. Improper use of the battery will reduce its operating time.**
- 

### NOTE

- **Battery operating time depends on the ambient temperature, equipment configuration and operation.**
  - **Poor network quality connecting AED ALERT system will reduce the battery standby life.**
- 

## 6.3 Battery Indications

On-screen battery symbols, battery related voice prompts indicate the current battery status.

### 6.3.1 Battery Power Indicators (for Equipment Configured with the Screen)

The on-screen power indicator indicates the battery status. The power indicator consists of 5 portions, each portion represents a charge of approximately 20% of capacity.



indicates that battery works correctly. The green portion represents the remaining charge.



indicates that the battery power is low or almost depleted. You need to replace the battery immediately.

| Drop                                                  |
|-------------------------------------------------------|
| 1.5 m per IEC 68-2-32, 1 on each of the six surfaces. |

## CAUTION

- The equipment may not meet the performance specifications if stored or used outside the specified temperature and humidity ranges. If the performance of the equipment is degraded due to aging or environmental conditions, contact your service personnel.

## A.3 Physical Specifications

| Main Unit                                                                                                                         | Size<br>(Width × depth × height)  | Weight                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------------|
| BeneHeart C1/BeneHeart C1A/<br>BeneHeart S1/BeneHeart S1A                                                                         | 21.0 cm×28.6 cm×7.8 cm<br>(± 2cm) | 2.0 ± 0.3 kg, including one battery,<br>excluding the Wi-Fi and cellular modules. |
| BeneHeart C2/BeneHeart C2A/<br>BeneHeart S2/BeneHeart S2A                                                                         |                                   | 2.3 ± 0.3 kg, including one battery,<br>excluding the Wi-Fi and cellular modules. |
| BeneHeart C1 Fully Automatic/<br>BeneHeart C1A Fully Automatic/<br>BeneHeart S1 Fully Automatic/<br>BeneHeart S1A Fully Automatic |                                   | 2.0 ± 0.3 kg, including one battery,<br>excluding the Wi-Fi and cellular modules. |
| BeneHeart C2 Fully Automatic/<br>BeneHeart C2A Fully Automatic/<br>BeneHeart S2 Fully Automatic/<br>BeneHeart S2A Fully Automatic |                                   | 2.3 ± 0.3 kg, including one battery,<br>excluding the Wi-Fi and cellular modules. |

## A.4 Display Specifications (for Equipment Configured with the Screen)

|                   |                                                                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Type              | TFT Color LCD                                                                                                                                   |
| Brightness        | Auto, Outdoor Mode, Indoor mode.<br>In the auto mode, the equipment automatically adjusts the screen brightness according to the ambient light. |
| Size              | 7 inch                                                                                                                                          |
| Resolution        | 800×480 pixels                                                                                                                                  |
| Viewed waveforms  | 1                                                                                                                                               |
| Wave viewing time | Max. ≥ 6s (ECG)                                                                                                                                 |

## A.5 Audio Indicators

|         |                                                                               |
|---------|-------------------------------------------------------------------------------|
| Speaker | Gives prompt tones (65 dB to 78 dB).<br>Supports multi-level tone modulation. |
|---------|-------------------------------------------------------------------------------|

# E Voice Prompts

The following table lists voice prompts that may occur during a rescue.

| Condition                                          | Voice Prompt                                                                              | Description                                                                                                                                                                                                   |
|----------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Open the lid                                       | Powered on. Stay calm. Follow the instructions.                                           | The lid is opened.                                                                                                                                                                                            |
|                                                    | Device error. Recommended to replace the Device. Stay calm. Follow the instructions.      | The equipment malfunctions, use one standby equipment or start CPR immediately.                                                                                                                               |
| After turning on the equipment                     | Adult mode                                                                                | The Adult/Child mode switch is pressed to Adult, or the electrode pads connected to the equipment are detected for the adult patient.                                                                         |
|                                                    | Child mode. if the patient is an Adult, adjust the Adult/Child mode switch to Adult mode. | The Adult/Child mode switch is pressed to Child.                                                                                                                                                              |
|                                                    | Child mode                                                                                | The Adult/Child mode switch is pressed to Child, or the electrode pads connected to the equipment are detected for the children.                                                                              |
| Place the electrode pads                           | Remove clothing from patient's chest. Apply pads as shown on Pads.                        | Detecting the response time to the voice prompts, the equipment provides an intelligent voice guide here. This guide quickly helps the rescuer to remove the patient's clothing and place the electrode pads. |
|                                                    | Remove clothing from patient's chest. Plug in pads connector.                             |                                                                                                                                                                                                               |
|                                                    | Remove pads package from lid of AED. Tear open package. Apply pads as shown on Pads.      |                                                                                                                                                                                                               |
|                                                    | Apply pads as shown on Pads.                                                              |                                                                                                                                                                                                               |
|                                                    | Apply pads as shown on Pads.                                                              |                                                                                                                                                                                                               |
|                                                    | Abnormal Pads connection.                                                                 | Pads connection failure, start CPR immediately.                                                                                                                                                               |
| The equipment analyzes the patient's heart rhythm. | Do not touch the patient. Analyzing heart rhythm.                                         | Repeats until analysis of the patient's heart rhythm is completed. This prompt will be interrupted if the equipment is ready to shock.                                                                        |
|                                                    | No shock advised.                                                                         | Notifies non-shockable rhythm has been detected.                                                                                                                                                              |
|                                                    | Motion detected. Do not touch or move the patient.                                        | The equipment detects ECG noise artifacts, stop moving or touching the patient.                                                                                                                               |
|                                                    | Noise detected. Make sure pads are firmly attached.                                       | The equipment detects ECG noise artifacts, better pads contact on the patient's skin is required.                                                                                                             |
|                                                    | Pads off. Analysis interrupted.                                                           | Pads connection failure, the equipment automatically stops the heart rhythm analysis. Reconnect the electrode pads.                                                                                           |

| Condition                       | Voice Prompt                                                                                                                         | Description                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The equipment delivers a shock. | Shock advised.                                                                                                                       | Notifies a shockable rhythm has been detected.                                                                                                                                                                                                                                                                                |
|                                 | Shock will be delivered in: 3, 2, 1                                                                                                  | Prompts the equipment is fully charged and is preparing to deliver a defibrillation shock.                                                                                                                                                                                                                                    |
|                                 | Shock delivered.                                                                                                                     | Prompts the shock is delivered.                                                                                                                                                                                                                                                                                               |
|                                 | Press flashing shock button                                                                                                          | Prompts the equipment is fully charged and ready to deliver the defibrillation shock.                                                                                                                                                                                                                                         |
|                                 | Shock canceled. Shock button was not pressed.                                                                                        | The Shock button is not pressed within the configured time and the equipment cancels the shock.                                                                                                                                                                                                                               |
|                                 | Device error, charge failed.                                                                                                         | The equipment is unable to start charging because of a fault condition. The equipment resumes the rhythm analysis after a charging failure. After three consecutive charging failures, the equipment automatically enters the CPR status.                                                                                     |
|                                 | Device error, shock failed.                                                                                                          | The equipment is unable to deliver a shock because of a fault condition. Or, it is not suitable to deliver a shock to the patient. The equipment disarms itself and resumes the rhythm analysis after a discharging failure. After three consecutive discharging failures, the equipment automatically enters the CPR status. |
|                                 | Shock canceled. Press pads firmly to patient's bare skin.                                                                            |                                                                                                                                                                                                                                                                                                                               |
|                                 | Shock canceled. Pads must not be touching each other.                                                                                |                                                                                                                                                                                                                                                                                                                               |
|                                 | Rhythm change, shock canceled                                                                                                        | The equipment detects a rhythm change and cancels the shock                                                                                                                                                                                                                                                                   |
| Perform CPR                     | Start CPR immediately.                                                                                                               | Prompts to prepare to provide compressions and breaths CPR.                                                                                                                                                                                                                                                                   |
|                                 | Give chest compressions immediately.                                                                                                 | Prompts to prepare to provide compressions-only CPR.                                                                                                                                                                                                                                                                          |
|                                 | Continue to compress without rescue breaths.                                                                                         |                                                                                                                                                                                                                                                                                                                               |
|                                 | Place one hand on center of chest, the other hand should be on top of first hand. Interlock the fingers. Continue to push down hard. |                                                                                                                                                                                                                                                                                                                               |
|                                 | Place one hand on center of chest. Keep arms straight. Continue to push down hard.                                                   |                                                                                                                                                                                                                                                                                                                               |
|                                 | Keep arms straight. Continue to push down hard.                                                                                      |                                                                                                                                                                                                                                                                                                                               |
|                                 | Interlock the fingers. Continue to push down hard.                                                                                   |                                                                                                                                                                                                                                                                                                                               |
|                                 | 100 compressions remaining.                                                                                                          |                                                                                                                                                                                                                                                                                                                               |
|                                 | 50 compressions remaining.                                                                                                           |                                                                                                                                                                                                                                                                                                                               |
|                                 | 20 compressions remaining.                                                                                                           |                                                                                                                                                                                                                                                                                                                               |



| Condition                | Voice Prompt                                                       | Description                                                               |
|--------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------------|
| Perform CPR              | Push down hard.                                                    | Prompts to use more effort for compressions.                              |
|                          | Continue to push down hard.                                        |                                                                           |
|                          | Stop CPR.                                                          | Prompts to stop CPR.                                                      |
|                          | Continue with compressions.                                        | Prompts to continue CPR.                                                  |
|                          | Give two rescue breaths.                                           | Prompts to give breath to the patient.                                    |
|                          | One                                                                |                                                                           |
|                          | Two                                                                |                                                                           |
|                          | Follow the metronome to give 200 compressions approximately.       | Prompts the CPR metronome pacing the speed of compressions.               |
|                          | Follow the metronome to give 30 compressions and 2 rescue breaths. | Prompts to prepare to provide compressions and breaths CPR.               |
|                          | Follow the metronome to give 15 compressions and 2 rescue breaths. |                                                                           |
| Use a CPR sensor for CPR | Incomplete recoil                                                  | Prompts to use more effort and release all pressure when moving hands up. |
|                          | Compress faster                                                    | Prompts to adjust the compression rate.                                   |
|                          | Compress slower                                                    |                                                                           |
|                          | Compress deeper                                                    | Prompts to adjust the compression rate.                                   |
|                          | Compress shallower                                                 |                                                                           |