# CARDIAC SCIENCE AEDs

G3 third generation

POWERHEART AED G3 Pro
automated external defibrillator

## Instructions for Use


CARDIAC SCIENCE

# AED OVERVIEW

Become familiar with the controls and how to use the AED properly before operating the product.

CONTENTS:



## AED DESCRIPTION:

The AED is a self-testing, battery-operated automated external defibrillator (AED). After applying the AEDs defibrillation electrodes (pads) to the patient's chest, the AED automatically analyzes the patient's electrocardiogram (ECG) and advises the operator to push the button and deliver a shock if needed. The AED guides the operator through the rescue using a combination of voice prompts, audible alerts, and visible indicators. At the discretion of Advance Life Support (ALS) personnel, the AED can be converted to manual override mode, and deliver a shock by pushing the shock button to deliver therapy. The AED can also provide non-diagnostic ECG monitoring.

Persons authorized to operate AEDs must have training in accordance to state, province or country regulations.

## OPERATING MODES

The AED has three operating modes. The AED is pre-set to AED mode, but the user can change the mode during each unique rescue. The energy delivered is determined by the Medical Director and programmed into the AED prior to the rescue.

### AED MODE (DEFAULT)

For patients exhibiting signs of sudden cardiac arrest. Once defibrillation electrodes are placed on the patient, the AED analyzes the heart rhythm. If a shockable rhythm is detected, the AED automatically charges to the pre-set variable energy protocol and prompts rescuer to push the SHOCK button to deliver therapy.

### MANUAL MODE

For patients exhibiting signs of sudden cardiac arrest. Once the defibrillation electrodes are placed on the patient, a trained ALS rescuer may wish to read the ECG display to determine whether or not a shock is required. This mode is activated by pushing the manual button once then again to confirm; the device will begin charging. If the rescuer deems that the rhythm is shockable, therapy can be delivered by pressing the SHOCK button. Then, the AED reverts back to AED mode. By entering this mode, the rescuer is taking responsibility to identify a shockable rhythm and to administer a shock.

REMAIN IN MANUAL MODE – (this optional mode can be enabled using MDLink software) with Remain in Manual Mode enabled and the user enters manual mode, the AED will remain in manual mode and not revert to the AED mode.

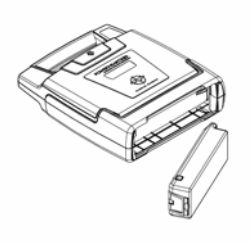
### ECG MONITORING MODE

For patients who require basic ECG monitoring. Non-diagnostic ECG patient monitoring can be activated by inserting the ECG patient monitoring cable into the electrode socket on the AED, connecting the 3-lead patient cables to the specialized ECG electrodes and placement as directed onto the patient. Should the AED detect a shockable rhythm, defibrillation electrodes should be placed on the patient and the connector should be plugged into the electrode socket on the AED to enable a defibrillation shock.

## BATTERIES

The 9300P is shipped with either an IntelliSense Battery (model 9145) or a rechargeable battery (model 9144). Confirm which battery is included with the AED and see the applicable instructions below.

### INSTALLATION



- Insert battery as shown.
- Push firmly to snap into place.
- Open the lid for 5 seconds.
- The Status Indicator turns GREEN

### INTELLISENSE BATTERY

- When the last battery indicator (LED) is red, the battery is low. Replace the battery right away.
- A new battery typically takes 10 seconds to charge the AED to maximum energy.
- Output voltage: 12VDC (max)
- Batteries are non-rechargeable
- Lithium contents: 9.2g (max)
- Check local regulations for disposal information

| MODEL | FULL OPERATIONAL REPLACEMENT GUARANTEE | TYPICAL SHOCKS |
|---|---|---|
| 9145 Lithium | 1 year from date of installation or 12 hours of use, whichever is sooner | Up to 290 |

## RECHARGEABLE BATTERY

Either the non-rechargeable battery (model 9145) or the re-chargeable battery (model 9144) may come standard with the Powerheart Pro (model 9300P). The battery charger (model 9044) is sold separately. The re-chargeable battery meets all respective IEC standards. All configurations comply with system standard, IEC 60601-1-1.

DIRECTIONS FOR USE:

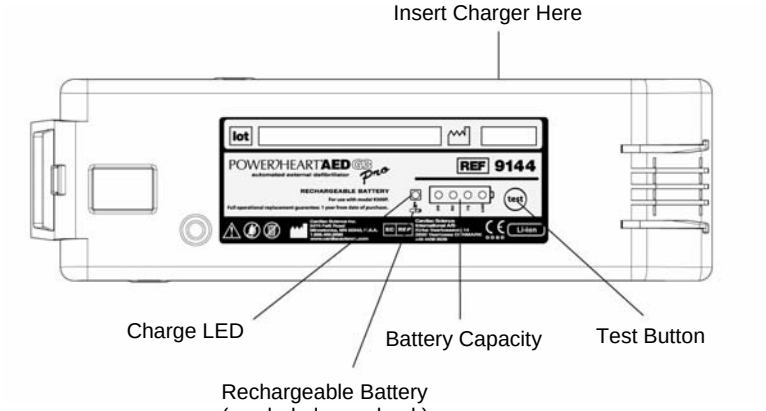
- The rechargeable battery is shipped half-charged. Charge battery fully before using.
- To charge, remove the rechargeable battery from the AED; the rechargeable battery can only be recharged when removed from the Powerheart AED G3 Pro.
- Plug the charger into an appropriate electrical outlet.
- Insert the charger cable into the rechargeable battery and ensure the yellow LED above the rechargeable battery symbol is on. Charging is complete when the yellow Charge LED goes out, and the four green Fuel Gauge LEDs are continuously lit.
- Remove the charger cable from the battery when done charging. Charging may be terminated early by removing the charger cable from the battery. If the battery is charged for a minimum of 3 hours, the stated capacities will be met.

*Note*: It is recommended that you keep a spare, non-rechargeable battery nearby. For longest battery life, when storing battery, discharge half-way. Do not store for extended periods at high temperature.

- The Powerheart AED G3 Pro will first indicate "Low Battery" while there is still sufficient charge remaining to perform at least one rescue. It is recommended to recharge the battery as soon as practical after the "Low Battery" indication. It is considered normal operation for the battery capacity gauge to show some remaining capacity when the "Low Battery" indication first occurs.

If the yellow Charge LED blinks continuously, a charging error has occurred. Contact the customer service in the event of a charging error.

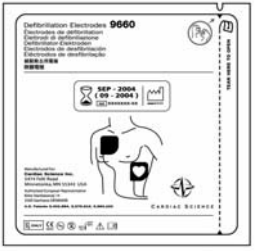
## RECHARGEABLE BATTERY




## SPECIFICATIONS

| | |
|---|---|
| Battery Voltage: | 11.1 V |
| Chemistry: | Lithium-ion. Refer to local regulations. |
| Compatibility: | Powerheart AED G3 Pro model 9300P |
| Battery Capacity: | 60 shocks minimum (100 shocks typical) or 3 hours minimum of ECG display time (6 hours typical). |
| Battery Charge Time: | 3 hours for stated capacity, 4.5 hours to fully charge completely depleted battery. |
| Battery Standby: | 6 months |
| Battery Life: | 2.5 years or 300 Battery charge-discharge cycles, whichever comes first. |
| Battery Weight: | 1 lb. 3 oz |

## ELECTRODES (DEFIBRILLATION)




The defibrillation electrodes are already installed in the AED when shipped to you. Confirm that they are installed. Then, ensure that the expiration date is visible through the clear window of the lid. Make sure the STATUS INDICATOR is GREEN.

ABOUT THE ELECTRODES (DEFIBRILLATION)

- Self-adhesive, disposable defibrillation electrodes
- Minimum combined surface area: 228cm$^2$
- Extended length of lead wire: 1.3m

*Electrodes refer to as "Defibrillation Electrodes".*
*ECG electrodes are referred to as "ECG electrodes".*
*Pediatric electrodes are referred to as "Pediatric Attenuated Defibrillation Electrodes" or "Pediatric Electrodes".*

## RESCUEREADY® STATUS INDICATOR


When this STATUS INDICATOR is GREEN, the AED is RescueReady. This indicates the AED self-tests have verified the following:

- Battery has an adequate charge.
- Pads are properly connected and are functional.
- Integrity of the internal circuitry is good.


When the STATUS INDICATOR is RED check AED pads, battery and/or call customer service.

## AUDIBLE MAINTENANCE INDICATOR

When the daily, weekly, or monthly self-test determines maintenance is required, an audible beep is sounded every 30 seconds until the lid is opened, or the battery power is depleted. Opening and closing the lid will deactivate the beep. If the next automatic self-test does not correct the error, the beep will be reactivated.

## AFTER A RESCUE ATTEMPT

After transferring the patient to Advanced Life Support personnel, prepare the AED for the next rescue:

1. Retrieve the rescue data stored in the internal memory of the AED.
2. Erase the internal memory of the AED.
3. Connect a new pair of pads to the AED.
4. Close the lid.


5. Verify the STATUS INDICATOR on the AED handle is GREEN.

## SYMBOL DESCRIPTIONS

The following symbols may appear in this resource guide, on the AED, or on its optional components. Some of the symbols represent standards and compliances associated with the AED and its use. Symbols for separately sold, optional accessories such as the Rechargeable Battery Option and the ECG Patient Cable Kit can be located on the literature shipped with these products.

Dangerous Voltage: The defibrillator output has high voltage and can present a shock hazard. Please read and understand all safety alerts in this manual before attempting to operate the AED.

Attention!: Identifies important information in this resource guide, in the manual, on the AED, or on its component parts regarding the safe and proper use of the AED.

Defibrillator Proof Type BF Equipment: The AED, when connected to the patient's chest by the pads, can withstand the effects of an externally applied defibrillation shock.


CE Mark: This equipment conforms to essential requirements of the Medical Device Directive 93/42/EEC.

IP24 The AED is protected against the effects of splashing water in accordance with IEC 60529.

Classified by ETL Semko with respect to electric shock, fire and mechanical hazards only in accordance with UL 60601-1, CAN/CSA C22.2 No.601.1-M90, EN60601-1 and EN60601-2-4. Conforms to UL Standard UL60601-1. Certified to CAN/CSA Standard C22.2 No. 601.1-M90.

International symbol for ON. Open the lid to turn on the AED.

Open the lid to turn ON the AED.

Indicates the AED battery status. The illuminated areas indicate the remaining battery capacity.

## SYMBOL DESCRIPTIONS (CON'T)

Indicates AED requires maintenance by authorized service personnel.


When the SHOCK indicator is lit, push this button to deliver a defibrillation shock.


When pushed and confirmed, activates manual mode.

A red indicator with a BLACK X means the AED requires operator attention or maintenance, and is not RescueReady. This symbol will be referred to as RED in the remainder of this manual.

A green indicator without a BLACK X means the AED is RescueReady. This symbol will be referred to as GREEN in the remainder of this manual.

Use electrodes by this date.


Date of manufacture, year and month.


Date of factory recertification (R)


Latex free.

Disposable. Single patient use only.

Tear here to open.

Do not recharge battery.

1. Position of pads on the chest of patient.
2. If flashing, check electrodes. The electrodes are missing, not connected or have compromised functionality.


For use by or on the order of a Physician, or persons licensed by state law.

Dispose of properly in accordance with all state, province, and country regulations.

Do not incinerate or expose to open flame.

Explosion Hazard: Do not use in the presence of a flammable gas, including concentrated oxygen.


Upper and lower temperature limits.


Device model number, battery model number


Lot number


Lithium sulfur dioxide

Additional information is provided in the AED Operation and Service Manual.

Points to important information regarding the use of the AED.

Lift here

Manufacturer


Authorized European Representative

The Z-Bar provides a relative visual indicator of the total transthoracic impedance between the two defibrillation pads.

Indicates placement of ECG leads and ECG electrodes.


C-UL US Classification Mark: indicates compliance with US and Canadian safety requirements.

GS Mark: indicates compliance with German safety requirements.


Lithium Ion

Rechargeable Battery

Charge LED: Solid yellow indicates battery charging, blinking yellow indicates charging error.

Battery Capacity: Indicates the AED battery status. The illuminated areas indicate the remaining battery capacity when the test button is pressed.


Test Button: Push to view battery capacity

Symbol for the marking of electrical and electronic equipment that must be recycled.

## SAFETY PERFORMANCE STANDARDS

DIMENSIONS

| Measurement | Dimension |
|---|---|
| Height | 8 cm (3.3 in) |
| Width | 27 cm (10.6 in) |
| Depth | 31 cm (12.4 in) |

WEIGHT

| Model | Weight with Batteries and Pads |
|---|---|
| 9300P | 3.20 kg (7.0 lb) |

ENVIRONMENTAL OPERATION AND STANDBY CONDITIONS

| Atmosphere | Condition |
|---|---|
| Temperature | 0°C to 50°C (32°F to 122°F) |
| Humidity | 5% to 95% (non-condensing) |
| Pressure | 57kPa (+15,000ft) to 103kPa (-500ft) |

SHIPMENT AND TRANSPORT ENVIRONMENTAL CONDITIONS (for up to 1 week)

| Atmosphere | Condition |
|---|---|
| Temperature | -30°C to 65°C (-22°F to 149°F) |
| Humidity | 5% to 95% (non-condensing) |
| Pressure | 57kPa (+15,000ft) to 103kPa (-500ft) |

AED MODEL 9300P

The AED has been designed and manufactured to conform to the highest standards of safety and performance including electromagnetic compatibility (EMC). The Cardiac Science AED Model 9300P and pads conform to the applicable requirements of the following:


CE
CE Marked by BSI 0086 per the Medical Device Directive 93/42/EEC of European Union.


ETL
Classified by ETL Semko with respect to electric shock, fire and mechanical hazards only in accordance with UL 60601-1, CAN/CSA C22.2 No.601.1-M90, EN60601-1 and EN60601-2-4. Conforms to UL Standard UL60601-1. Certified to CAN/CSA Standard C22.2 No. 601.1-M90.

Electrical, Construction, Safety and Performance
IEC 60601-1 (1998), Amendments 1 (1991) & 2 (1995)
IEC 60601-2-4 (2002)
ANSI/AAMI DF-39 (1993)

Electromagnetic Compatibility (EMC)
IEC 60601-1-2 (2001)
IEC 60601-2-4 Section 36
ANSI/AAMI DF-39 (1993) Section 3.3.21

## EMISSIONS

| Field | Standard or Compliance |
|---|---|
| E-M | EN 55011/CISPR 11, Group 1, Class B |
| Magnetic | ANSI/AAMI DF39, <0.5mT on surface, except for within 5cm of the lid magnet and the speaker |

## IMMUNITY

| Field | Standard or Compliance |
|---|---|
| E-M | IEC 61000-4-3, Level X, (20V/m)<br>IEC 60601-2-4, Section 36.202.3 (20V/m)<br>AAMI DF39, Section 3.3.21.2.1 |

## IMMUNITY (CON'T)

| Field | Standard or Compliance |
|---|---|
| Magnetic | IEC 61000-4-8 (2001)<br>IEC 60601-2-4 (2002), Section 36.202.8<br>AAMI DF39, Section 3.3.21.2.3 80A/m, 47.5Hz – 1,320Hz |
| ESD | IEC 61000-4-2, Level 3<br>IEC 60601-2-4 (2002), Section 36.202.2<br>6KV contact discharge, 8KV air gap discharge |

## ENVIRONMENTAL CONDITIONS

| Condition | Standard or Compliance |
|---|---|
| Free Fall Drop | IEC 60068-2-32 (1975) AM 2 (1990), 1 meter |
| Bump | IEC 60068-2-29 (1987), 40g and 6000 bumps |
| Vibration (Random) | IEC 60068-2-64 (1993): 10Hz – 2KHz, 0.005 – 0.0012 $g^2$/Hz |
| Vibration (Sine) | IEC 60068-2-6 (1995): 10Hz – 60Hz, 0.15 mm and<br>60Hz – 150Hz, 2g |
| Enclosure Protection | IEC 60529 (2001), IP24 |

## SHIPPING AND TRANSPORTATION CONDITIONS

ISTA Procedure 2A

## STORAGE AND SHIPPING CONDITIONS – RECHARGABLE BATTERY

| Condition | Standard or Compliance |
|---|---|
| Shock and Vibration: | The Battery, as installed in the Powerheart AED G3 Pro, meets the following: |
| Bump: | (IEC 60068-2-29): 40g, 6 ms duration, 1.5 m/s $\Delta V$, 1000 bumps in each direction. |
| Random Vibration: | (IEC 60068-2-64): 10hz - 2khz @ 0.005 - 0.0012 g2/Hz. |
| Transport: | Passes testing per UN "Recommendations of the Transport of Dangerous Goods, Manual of Test and Criteria" (ST/SG/AC.10/11/Rev.3) Addendum 2 (ST/SG/AC.10/27/Add.2) |

## BATTERY CHARGER

| | |
|---|---|
| Power Requirements: | 90 to 132 VAC or 198 to 264 VAC at 47 to 63 Hz |

The Charger operates from, and accepts standard IEC mains power cables.

## HOW TO PERFORM A RESCUE

Step 1: ASSESS


The patient is unresponsive.

AND

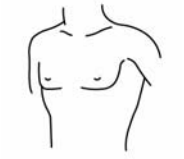
The patient is not breathing.

CALL EMERGENCY MEDICAL SERVICES

When the patient is under 8 years of age or weighs less than 55lbs (25kg), the AED should be used with the Pediatric Attenuated Defibrillation Electrodes. Therapy should not be delayed to determine the patient's exact age or weight. See the directions for use accompanying pediatric electrodes for procedure on changing adult electrodes to pediatric and the Medical Director can change energy protocols if necessary.

STEP 2: PREPARE

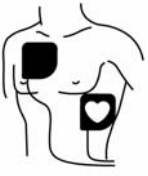
- Open the AED lid.



- Remove clothing from the patient's chest.
- Ensure the skin site is clean and dry.
- Dry the patient's chest and shave excessive hair if necessary.

STEP 3: PLACE PADS

- Tear open package and remove pads.
- Peel one pad from plastic liner.



- Place one pad on bare upper chest.
- Peel second pad and place on bare lower chest as shown.

*Note*: When using polarized pads (P/N 9660) see the diagram on the pads for specific placement of each pad.

STEP 4: ANALYZE AND SHOCK DELIVERY (AED MODE)


The voice and text prompts will guide you through.

- *"DO NOT TOUCH PATIENT! ANALYZING RHYTHM."*


If a shockable rhythm is detected, follow these instructions:

- *"SHOCK ADVISED."*
- *"CHARGING"*
- *"STAND CLEAR! PUSH FLASHING BUTTON TO DELIVER SHOCK."*

If the patient's rhythm changes to a non-shockable rhythm before the actual shock is delivered, the AED will advise that the rhythm has changed and issue the prompt *"RHYTHM CHANGED, SHOCK CANCELLED."* The AED will override the charge and prompt the user to start CPR.

STEP 5: CPR

- When instructed, start CPR
- Give 30 compressions followed by 2 breaths.

At the end of the CPR period, the voice prompts will direct you to repeat steps 4 and 5 if required.

## USING MANUAL OVERRIDE (MANUAL MODE)

For use by qualified ALS personnel only. The AED has a manual override feature which overrides the AED's automatic analysis protocol. By entering this mode, the rescuer is taking responsibility to identify a shockable rhythm and to administer a shock. The default setting for the manual override is "enabled". When enabled, the Manual Override function allows the user to charge the AED and deliver a shock at the user's discretion. After the shock button is pushed or 30 seconds has elapsed, the device will automatically exit the manual mode and return to the AED mode.

Optionally, after entering manual override, it may be desirable to have the AED remain in the manual override mode for the duration of the rescue. This feature can be enabled during the initial set up of the AED using MDLink software and checking the box, "Remain in Manual Mode".

STEP 1: Please refer to steps 1 – 3 on pages 17-19

STEP 2: Lift blue plastic cover on far left of diagnostic panel.

STEP 3: Push the MANUAL button once to initiate. The voice prompt and corresponding text prompts will indicate *"Entering manual mode. Press button again to confirm".*

STEP 4: The MANUAL button must be pushed again to confirm and convert to manual mode. The voice prompts will indicate, *"Manual Mode".*

STEP 5: The voice prompts and corresponding text prompts will indicate, *"If rhythm is shockable, press SHOCK button to deliver therapy"*. Read the ECG and determine if the rhythm is shockable. If so, press the SHOCK button to delivery therapy.

*Note:* The RHYTHMx analysis algorithm is disabled in manual mode. It is the rescuer's responsibility to determine if a shock is necessary.

STEP 6: The AED will revert to AED MODE and prompt the user to begin CPR. Follow the voice prompts.

If "REMAIN IN MANUAL MODE" has been enabled (using MDLink software) The AED will remain in Manual Mode and not revert to the AED mode. When this option is enabled, after a manual shock is delivered, or the operator does not press the shock button for 30 seconds, the device will remain in manual mode. The text display will show "Manual Mode", and the operator may press the "Manual Mode" button to initiate charging again if the operator determines that a shock is necessary.

STEP 7: To re-enter manual mode, press the MANUAL button ONCE.

*Note:* Should the rescuer initiate manual mode and decide that AED MODE is more appropriate, the AED will revert back to AED MODE 30 seconds after charging is complete. (This does not apply if "REMAIN IN MANUAL MODE" has been enabled – see step 6 above.

EXITING MANUAL MODE

Default: The device will return to AED mode after:

- Pushing the shock button
- 30 seconds has elapsed without pushing the shock button
- Closing the AED lid momentarily
- Attaching the optional 3-lead ECG monitoring cable
- Disconnecting the pads from the AED
- Removing the pads from the patient

EXITING MANUAL MODE WHEN "REMAIN IN MANUAL MODE" IS ENABLED:

- Closing the AED lid momentarily
- Attaching the optional 3-lead ECG monitoring cable (upon reattaching the defibrillation pads the AED will be in manual mode).

## ECG DISPLAY FOR ONGOING MONITORING (ECG MONITORING MODE)

At the discretion ALS personnel, the AED can be used for ongoing ECG monitoring. By using a separately sold ECG Patient Monitoring Kit, the AED provides non-diagnostic ECG display of the patient's heart rhythm for attended patient monitoring. It is not necessary to turn the device off prior to connecting the ECG cable. While connected to the AED, the shock capability is disabled.

Indications for use:
A conscious or breathing patient, regardless of age.

Contraindications:
No known contraindications.

The separately sold ECG Monitoring Cable Kit is required to use this feature. The Kit is designed for connection to ECG electrodes per AAMI or IEC color convention. Once connected the AED displays and evaluates the patient's ECG (Lead II). Follow all prompts from the AED.

See the Directions for Use included in the ECG Patient Monitoring Kit for specific instructions.

# SAFETY TERMS AND DEFINITIONS

## BEFORE OPERATING THE POWERHEART AED G3 PRO

Become familiar with the various safety alerts in this section.

Safety alerts identify potential hazards using symbols and words to explain what could potentially harm you, the patient, or the Powerheart AED G3 Pro.

## INDICATIONS FOR USE

The AED with STAR Biphasic Waveform is intended to be used by personnel who have been trained in its operation. The operator should be qualified by training in basic life support, CPR/AED or other physician-authorized emergency medical response. The device is indicated for emergency treatment of victims exhibiting symptoms of sudden cardiac arrest who are unresponsive and not breathing. If the victim is breathing post-resuscitation, the AED should be left attached to allow for acquisition and detection of the ECG rhythm. If a shockable ventricular tachyarrhythmia recurs, the device will charge automatically and advise the operator to deliver therapy; or when in manual override mode, ALS personnel will monitor the ECG display and deliver a shock by pushing the shock button to deliver therapy.

When the patient is a child under 8 years of age or weighs less than 55 lbs (25kg), the AED should be used with the Model 9730 Pediatric Attenuated Defibrillation Electrodes. Therapy should not be delayed to determine the patient's exact age or weight.

## SAFETY TERMS AND DEFINITIONS

The triangle attention symbol shown below, left, identifies the potential hazard categories. The definition of each category is as follows:

*DANGER:* This alert identifies hazards that will cause serious personal injury or death.

*WARNING:* This alert identifies hazards that may cause serious personal injury or death.

*CAUTION:* This alert identifies hazards that may cause minor personal injury, product damage, or property damage.

## SAFETY ALERT DESCRIPTIONS

The following is a list of Cardiac Science AED safety alerts that appear in this section and throughout this resource guide. You must read, understand, and heed these safety alerts before attempting to operate the AED.

*DANGER:* Fire and Explosion Hazard
Exercise caution when operating the AED close to flammable gases (including concentrated oxygen) to avoid possible explosion or fire hazard.

*WARNING:* Shock Hazard
Defibrillation shock current flowing through unwanted pathways is potentially a serious electrical shock hazard. To avoid this hazard during defibrillation abide by all of the following:

- Do not touch the patient, unless performance of CPR is indicated
- Do not touch metal objects in contact with the patient
- Keep defibrillation electrodes clear of other electrodes or metal parts in contact with patient
- Disconnect all non-defibrillator proof equipment from the patient before defibrillation

*WARNING:* Shock and Possible Equipment Damage
Disconnect all non-defibrillator proof equipment from the patient before defibrillation to prevent electrical shock and potential damage to the equipment.

*WARNING:* Battery (P/N: 9145) is NOT Rechargeable
Do not attempt to recharge the battery. Any attempt to recharge the battery may result in an explosion or fire hazard. Only battery (P/N: 9144) is rechargeable.

*WARNING:* Shock Hazard
Do not disassemble the AED! Failure to observe this warning can result in personal injury or death. Refer maintenance issues to Cardiac Science authorized service personnel.

*WARNING:* Battery Serviceability
Do not disassemble the battery! Failure to observe this warning can result in personal injury or death. Refer maintenance issues to authorized service personnel.

## SAFETY ALERT DESCRIPTIONS (CON'T)

*CAUTION:* Use only Approved Equipment
The Rechargeable battery is made solely for Powerheart AED G3 Pro, and is NOT to be used with any other AED models. Using batteries, pads, cables, or optional equipment other than those approved by the manufacturer may cause the AED to function improperly during a rescue.

*CAUTION:* Temperature Extremes
Exposing the AED to extreme environmental conditions outside of its operating parameters may compromise the ability of the AED to function properly. The RescueReady® daily self-test verifies the impact of extreme environmental conditions on the AED. If the daily self-test determines environmental conditions outside of the AEDs operating parameters, a "SERVICE REQUIRED" alert will be issued to prompt the user to move the AED to environmental conditions within the acceptable operating parameters at once. See page 10.

*CAUTION:* Lithium Sulfur Dioxide Battery
Pressurized contents: Never recharge, short circuit, puncture, deform, or expose to temperatures above 65°C (149°F). Remove the battery when discharged.

*CAUTION:* Lithium-ion Battery
Never short circuit, puncture, deform, or expose to temperatures above 65°C (149°F).

*CAUTION:* Battery Disposal
Recycle or dispose of the lithium battery in accordance with all federal, state and local laws. To avoid fire and explosion hazard, do not burn or incinerate the battery.

*CAUTION:* Possible Improper AED Performance
Using electrodes that are damaged or expired may result in improper AED performance.

*CAUTION:* Possible Radio Frequency (RF) Susceptibility
RF susceptibility from cellular phones, CB radios and FM 2-way radio may cause incorrect rhythm recognition and subsequent shock advisory. When attempting a rescue using the AED, do not operate wireless radiotelephones within 1 meter of the AED – turn power OFF to the radiotelephone and other like equipment near the incident.

*CAUTION:* Possible Interference with Implanted Pacemaker
Therapy should not be delayed for patients with implanted pacemakers and a defibrillation attempt should be made if the patient is unconscious and not breathing. The AED has pacemaker detection and rejection, however, with some pacemakers the AED may not advise a defibrillation shock.[1]

Placing Electrodes:

- Do not place the electrodes directly over an implanted device.
- Place the electrode pad at least one inch from any implanted device.

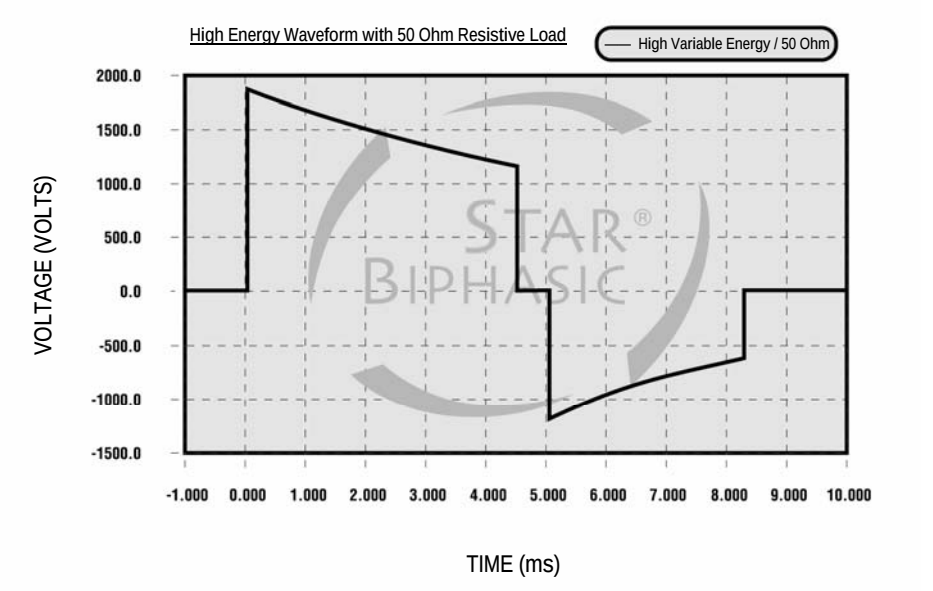
*CAUTION:* Moving the Patient During a Rescue
During a rescue attempt, excessive jostling or moving of the patient may cause AEDs to improperly analyze the patient's cardiac rhythm. Stop all motion or vibration before attempting a rescue.

*CAUTION:* Case Cleaning Solutions
When disinfecting the case, use a non-oxidizing disinfectant, such as ammonium salts or a glutaraldehyde based cleaning solution, to avoid damage to the metal connectors.

*[1] Cummins, R., ed., Advanced Cardiac Life Support; AHA (1994): Ch. 4.*

## STAR BIPHASIC WAVEFORM

The waveform generated by the Cardiac Science AED is a BIPHASIC TRUNCATED EXPONENTIAL waveform that is compliant with ANSI/AAMI DF2 and DF39. The following is a graph of the waveform voltage as a function of time when the AED is connected to a 50 Ohm resistive load.



## ENERGY LEVELS

Table A1 - Ultra-Low Current Powerheart AED Models 9300P Waveform (all values are typical)

| Patient's Impedance (Ohms) | Phase 1 | | Phase 2 | | Energy (Joules) |
|---|---|---|---|---|---|
| | Voltage (Volts) | Duration (ms) | Voltage (Volts) | Duration (ms) | |
| 25 | 1390 | 3.3 | 730 | 3.2 | 145-195 |
| 50 | 1420 | 4.5 | 915 | 3.2 | 130-175 |
| 75 | 1430 | 5.8 | 980 | 3.2 | 120-160 |
| 100 | 1435 | 7.0 | 1020 | 3.2 | 110-150 |
| 125 | 1440 | 8.3 | 1040 | 3.2 | 105-140 |

Table A2 - Low Variable Energy Powerheart AED Models 9300P Waveform (all values are typical)

| Patient's Impedance (Ohms) | Phase 1 | | Phase 2 | | Energy (Joules) |
|---|---|---|---|---|---|
| | Voltage (Volts) | Duration (ms) | Voltage (Volts) | Duration (ms) | |
| 25 | 1570 | 3.3 | 825 | 3.2 | 200-250 |
| 50 | 1600 | 4.5 | 1030 | 3.2 | 170-210 |
| 75 | 1610 | 5.8 | 1105 | 3.2 | 120-160 |
| 100 | 1615 | 7.0 | 1150 | 3.2 | 150-180 |
| 125 | 1620 | 8.3 | 1170 | 3.2 | 140-170 |

## ENERGY LEVELS (CON'T)

Table A3 - High Variable Energy Powerheart AED Models 9300P Waveform (all values are typical)

| Patient's Impedance (Ohms) | Phase 1 | | Phase 2 | | Energy (Joules) |
|---|---|---|---|---|---|
| | Voltage (Volts) | Duration (ms) | Voltage (Volts) | Duration (ms) | |
| 25 | 1885 | 3.3 | 990 | 3.2 | 265-360 |
| 50 | 1920 | 4.5 | 1240 | 3.2 | 235-320 |
| 75 | 1930 | 5.8 | 1325 | 3.2 | 215-295 |
| 100 | 1940 | 7.0 | 1380 | 3.2 | 200-270 |
| 125 | 1945 | 8.3 | 1405 | 3.2 | 190-260 |

## PATIENT IMPEDANCE

The Cardiac Science Biphasic Truncated Exponential (BTE) waveform utilizes variable energy. The actual energy delivered will vary with the patient's impedance and the device will deliver a shock when impedance is between 25-180 Ohms. Energy will be delivered at three different levels referred to as ultra-low variable energy, low variable energy, and high variable energy as shown in the above waveform tables.

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