PHYSIO CONTROL

# LIFEPAK® 15 MONITOR/DEFIBRILLATOR

LIFEPAK 15 MONITOR/DEFIBRILLATOR
12-LEAD
TRANSMIT
CODE SUMMARY
PRINT

LIFEPAK

## Building on a Proud Legacy

The pioneer in portable defibrillation and monitoring technology, Physio-Control continues to define the standard for cardiac emergency care equipment.

Our LIFEPAK devices have been carried to the top of Mount Everest and launched into orbit on the International Space Station. More than half a million units are in use today on fire rescue rigs, ambulances and hospital crash carts worldwide. Since Physio-Control was founded in 1955, our products have helped save tens of thousands of lives and positively impacted countless more.

Even as we bring ground-breaking products to market, some things don't change. As always, the LIFEPAK brand stands for a rugged, portable device that you can trust—every single day.

**A LIFEPAK device never stands on its own.** Our goal is to provide complete solutions for cardiac emergencies—from first responder through the hospital. Our products are systems. Everything works with you—whether it's accessories, disposables, flexible energy dosing, or data solutions that help you capture patient data and learn from it to improve care.

When you buy a LIFEPAK monitor/defibrillator, you get a leading-edge monitor/defibrillator AND the company that stands behind it. With Physio-Control, you get:

- The pioneers of prehospital cardiac monitoring and defibrillating equipment.
- Innovators continually at the forefront of improving patient care—ADAPTIV™ biphasic technology up to 360J to give patients the best chance at survival; secure, web-based flow of ECG data to help improve STEMI patient outcomes; and carbon monoxide monitoring to catch the number-one cause of poisoning deaths.
- The most comprehensive warranty in the business.
- Industry-leading technical field service.
- A company that has been in business for more than five decades.

We're inspired and informed by the rescuers who rush our products to life-threatening emergencies every day. Knowledge gained from working with the world's largest EMS organizations keeps us innovating—raising the bar on durability and clinical standards.

The New Standard

## The New Standard

Your monitor is measured by what it can do for you. You need a product with the latest clinical capabilities. One designed to provide the performance you need today and in the future, and one tough enough to ensure it continues to deliver in all conditions you encounter when delivering emergency care.

Physio-Control defibrillators have set the standard for over 50 years, and the *15* raises the bar. Leading the way with new clinical and operational innovations, and surrounded with legendary 360 degree ruggedness that defines LIFEPAK TOUGH.™

## The New Standard...

## ...in Clinical Innovation

- **New monitoring parameters**—Detect hard-to-diagnose conditions and improve patient care with Masimo® Rainbow® Technology. The *15* is the first monitor integrating noninvasive monitoring for carbon monoxide, $SpO_2$ and methemoglobin (to detect chemical exposures and certain drugs).

- **Advanced support for treating STEMI patients**—Easily acquire a pre-medication 12-lead ECG and then rely on the *15* to continuously monitor all 12 leads in the background and alert you to changes via our ST-Segment Trending feature. Using your *15* in conjunction with the Web-based LIFENET STEMI Management Solution lets you automatically and simultaneously share critical patient data with multiple patient care teams throughout a region.

- **Most potent escalating energy available**—ADAPTIV™ biphasic technology provides the option to escalate to 360J for best results. Recent studies have shown that refibrillation is common among VF cardiac arrest patients and that defibrillation of recurring episodes of VF is increasingly difficult.[1,2,3] Another recent randomized controlled clinical trial shows the rate of VF termination was higher with an escalating higher energy regimen of 200J and over.[1] The *15* gives you the option to escalate your energy dosing up to 360J for difficult-to-defibrillate patients.

- **Proven CPR guidance**—Demonstrated to aid users in performing compressions and ventilations within the recommended range of the AHA Guidelines,[4] the CPR Metronome uses audible prompts to guide you without distracting vocal critique. And get the post-event feedback you need to improve CPR performance with CODE-STAT™ Data Review Software with Advanced CPR Analytics.

## ...in Operational Innovation

- **Dual-mode LCD screen with SunVue™**—With one touch, switch from full-color to high-contrast SunVue mode for the best sunlight viewability in the industry. A large screen (8.4 inches diagonally) and full-color display provide maximum viewability from all angles.
- **Upgradable platform**—Our products are built as platforms—flexible to adapt to evolving protocols and new guidelines and upgradeable when you are ready to deliver new therapies. With more processing power and speed, the *15* is designed to grow as your needs change, helping you avoid costly premature replacements. This flexibility means the *15* is ready for the anticipated changes coming from the 2010 Guidelines.
- **Latest Lithium-ion battery technology**—Battery power that beats or matches every competitor in the market. Enough juice to run a shift, with less weight. And the smart technology included in this battery system helps you manage your battery inventory appropriately letting you know when battery life is coming to an end.
- **Data connectivity**—As you treat patients, collect monitoring data in your LIFEPAK monitor/defibrillator. Then easily connect to ePCR and other systems so information flows to where it's needed. Bluetooth® has been simplified so you just touch a button to transmit data.
- **Attention to detail**—We didn't overlook a thing. Finishing touches on this next-generation monitor/defibrillator include an ergonomic handle, larger SPEED DIAL for easy selection, and updated, easy-to-clean keypad.

## ...LIFEPAK TOUGH

- **Works when dropped, kicked, soaked, dirty**—Just like you. The LIFEPAK 15 monitor/defibrillator passes 30-inch drop tests—equal to falling off a cot or dropping it in transit. IP44 rating means it keeps working in steady wind, rain and other harsh environments.
- **Toughened inside and out**—We listened to your feedback and added a shock-absorbing handle, a double-layer screen that can take a beating from doorknobs and cot handles, and redesigned cable connections for confident monitoring and therapy delivery.
- **Unmatched field service**—Our one-of-a-kind service team* operates 24/7 in North America. The unit's self-checking feature alerts the service team if the device needs attention—so you know it's ready when you need it.

* A variety of customized service options are available.

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LIFEPAK 15 MONITOR/DEFIBRILLATOR
PHYSIO CONTROL
13:31:59
69
99
38
107
70
85
12
288J
II x1.0
SpO2
50
CO2
0
12-LEAD
TRANSMIT
CODE SUMMARY
PRINT
CO2
SpO2
NIBP
ECG
P1
P2
DANGER Explosion hazard. Do not use in the presence of flammable gases.
WARNING Hazardous electrical output. For use only by qualified personnel.

# LIFEPAK 15 Monitor/Defibrillator
## The New Standard in Emergency Care

1. The only monitor/defibrillator on the market with Carbon Monoxide and Methemoglobin monitoring integrated into the device.
2. ST-Trend Tracking and 12-lead ECG transmissions via the LIFENET STEMI Management Solution makes the *15* a vital part of decreasing EMS-to-Balloon (E2B) response times.
3. CPR Metronome is a proven technology[4] that actively guides users to a consistent compression rate without the need for extra external hardware.
4. Latest Lithium-ion battery technology allows for nearly six hour run time and an approximate two-year replacement cycle.
5. Redesigned cable connector gives you the confidence for secure therapy delivery.
6. Ergonomically designed handle has built-in shock absorbers for cushion and fits two gloved hands for easy pass off.
7. With one touch, switch from LCD color view to SunVue mode for best viewing in sunlight available.

**With nearly 100,000 LIFEPAK 12 devices in the field worldwide, we had an incredible natural laboratory to work with in designing the LIFEPAK 15 monitor/defibrillator.**

# LIFEPAK 15 Monitor/Defibrillator
## The New Standard in Emergency Care

### Working WITH you
Our five decades of working with EMS organizations gives us the depth of knowledge to offer innovative solutions that really work.

### Continuum of care
From the streets to the emergency room to your administrative office, we offer a full suite of solutions, whether your need is emergency response or quality control analysis.

Our product line ranges from AEDs for minimally trained responders (LIFEPAK CR® Plus AED) to compact, powerful defibrillators for BLS crews (LIFEPAK 1000 defibrillator) to sophisticated devices for ALS (LIFEPAK 12 and LIFEPAK 15 monitor/defibrillators) to the ideal hospital crash-cart device (LIFEPAK 20e defibrillator/monitor). Consistency among our products means you can count on uniform energy doses across LIFEPAK devices, easily share data, and minimize training costs.

### Quality CPR to help save more lives
Physio-Control equips the new LIFEPAK 15 monitor/defibrillators with proven[4] CPR guidance (the CPR Metronome) and offers the LUCAS™ Chest Compression System, designed to provide effective, consistent and uninterrupted compressions according to AHA Guidelines.

In tandem with CODE-STAT 7.0 Data Review software with Advanced CPR Analytics, these products give you a powerful feedback loop to drive improvements in resuscitation outcomes.

### Linking field and hospital to improve STEMI patient survival
Studies show a significant association between prehospital 12-lead ECGs and shorter E2B times for patients with Acute Coronary Syndrome (ACS). Two recent studies found the effect was strongest when the cath lab was activated while the patient was still en route to the hospital.[7,8] Minutes matter—if E2B time stretches from 90 minutes to 120 minutes, mortality for ACS has been shown to increase 40%.[5]

Transmitting 12-lead ECGs from the field with the LIFEPAK 12 or LIFEPAK 15 monitor/defibrillator via the LIFENET Cardiac Care network can help you meet the AHA/ACC 90-minute door-to-balloon guideline for patients with ST-segment elevation myocardial infarction (STEMI).[6] While care teams focus on patients, the STEMI Management Solution from Physio-Control securely delivers ECG data when and where it's needed, linking prehospital, emergency room, and Percutaneous Coronary Intervention treatment teams.

### Connecting patient data across your system
Collect patient data in your LIFEPAK monitor/defibrillator and push the data out to other systems, including electronic Patient Care Reporting (ePCR). Our data management solutions make it easy to transfer patient information from LIFEPAK devices to your PC, consolidate patient data, and analyze outcomes across your system.

Use DT EXPRESS™ Data Transfer Software to download critical event and waveform data from LIFEPAK devices to your PC, add supplemental patient data, print out a hardcopy report, and store records on a disk. Export data to CODE-STAT™ 7.0 Data Review Software with Advanced CPR Analytics to consolidate all dispatch, treatment and outcome data into a single e-file.

### We've got you covered
We build our products LIFEPAK TOUGH and back them with the most comprehensive warranty in the business. We make them easy to configure for your patient care protocols and we provide software upgrades as technology advances.

To help you get the most out of your Physio-Control products, your sales representative will provide inservice training, and we also offer specialized instruction—ranging from self-paced CDs to live webcasts to on-site classes.

When you need service, you can turn to the largest and best-trained network of field technical service representatives in the industry. On call 24 hours a day, 7 days a week (North America), our goal is to return your phone call within two hours, to work with you to quickly assess the problem and find the best solution.

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# The New Standard in Emergency Care

Experience the legendary quality that has made LIFEPAK products and services the clear favorite around the world.

**As your trusted partner in saving lives, we offer a full suite of solutions from field to hospital, whether your need is emergency response or quality control analysis.**

## LIFEPAK® Defibrillators/Monitors

### LIFEPAK 12 Defibrillator/Monitor

Over 80,000 LIFEPAK 12 defibrillator/monitors are in use today—on rescue rigs and in hospitals worldwide. Feedback from this global community keeps us innovating—adding features to help you in your lifesaving work. The LIFEPAK 12 defibrillator/monitor packs multi-parameter therapeutic and diagnostic functions into a rugged, portable device. Use a tool that can tackle today's patient care needs and adapt to tomorrow's challenges.

### LIFEPAK 20e Defibrillator/Monitor

Building on the design of its predecessor, the LIFEPAK 20e defibrillator/monitor is compact, lightweight and easy to rush to the scene or use during transport. The *20e* is highly intuitive to use, putting early, effective defibrillation into the hands of first responders. The *20e* skillfully combines AED function with manual capability so that ACLS-trained clinicians can quickly and easily deliver advanced daignostic and thereapeutic care. Clinically advanced and packed with power, the *20e* uses Lithium-ion battery technology that provides extended operating time for transporting patients from one area of the hospital to another and includes ADAPTIV biphasic technology up to 360 joules.

### LIFEPAK CR® Plus Automated External Defibrillator

Designed for minimally trained rescuers in commercial and public settings, the *CR Plus* guides the rescuer step by step with calm, clear voice prompts. Simple to use, it is built with the same advanced defibrillation technology used by EMS and hospital personnel.

### LIFEPAK 1000 Defibrillator

The *1000* is a powerful and compact device designed to treat cardiac arrest patients and provide continuous cardiac monitoring capabilities. Built-in flexibility allows the *1000* to be programmed for use by first responders or professionals and enables care providers to change protocols as standards of care evolve. A large, intuitive screen displays graphics and ECG readings that are clear and easy to read from a distance. The most rugged defibrillator in the LIFEPAK fleet, you can carry the *1000* with confidence into the harshest environments.

## CPR Assistance

### LUCAS™ Chest Compression System

Designed to provide effective, consistent and uninterrupted compressions according to AHA Guidelines, the device is used on adult patients in out-of-hospital and hospital settings. Maintaining high-quality hands-free compressions frees responders to focus on other lifesaving therapies and enables them to wear seatbelts during transport.

## LIFENET® System

### LIFENET STEMI Management Solution

Enabling a seamless, secure and flexible flow of ECG data from prehospital to hospital helps you quickly identify STEMI patients, improve door-to-balloon times and reduce false-positive cath lab activations. With the touch of a button, EMS responders send 12-lead ECG data from medical-informatics-enabled LIFEPAK defibrillator/monitors to multiple endpoints, over a virtual STEMI care network created using our web application and secure datacenter and your gateway devices like smartphone PDAs and existing hospital PCs.

### CODE-STAT™ Data Review Software with Advanced CPR Analytics

This post-event review tool annotates chest compressions onto the patient's continuous ECG report and calculates CPR statistics, helping you meet 2005 AHA Guidelines. The software simplifies data collection and reporting by consolidating all dispatch, treatment and outcome data into a single e-file. Download, review, manage, and analyze emergency medical data from multiple LIFEPAK defibrillators. The application also facilitates quality analysis and business decisions, allowing creation of benchmarking and trending reports to review your system's performance.

### DT EXPRESS™ Data Transfer Software

The simple Windows-based software application manages data from LIFEPAK devices. The software makes it easy to download critical event and waveform data to your PC, add supplemental patient data, print out a hardcopy report, and store records on a disk. For storage and on-screen viewing of reports, export files to CODE-STAT data review software.

## GENERAL

**The LIFEPAK 15 monitor/defibrillator has six main operating modes:**

**AED Mode:** for automated ECG analysis and a prompted treatment protocol for patients in cardiac arrest.

**Manual Mode:** for performing manual defibrillation, synchronized cardioversion, noninvasive pacing, and ECG and vital sign monitoring.

**Archive Mode:** for accessing stored patient information.

**Setup Mode:** for changing default settings of the operating functions.

**Service Mode:** for authorized personnel to perform diagnostic tests and calibrations.

**Demo Mode:** for simulated waveforms and trend graphs for demonstration purposes.

## PHYSICAL CHARACTERISTICS

**Weight:**

Basic monitor/defibrillator with new roll paper and two batteries installed 8.6 kg (18.9 lb);

Fully featured monitor/defibrillator with new roll paper and two batteries installed: 9.1 kg (20.1 lb)

**Lithium-ion battery:** 0.59 kg (1.3 lb)

**Accessory Bags and Shoulder Strap:** 1.77 kg (3.9 lb)

**Standard (hard) Paddles:** 0.95 kg (2.1 lb)

**Height:** 31.7 cm (12.5 in)

**Width:** 40.1 cm (15.8 in)

**Depth:** 23.1 cm (9.1 in)

## DISPLAY

**Size (active viewing area):** 212 mm (8.4 in) diagonal; 171 mm (6.7 in) wide x 128 mm (5.0 in) high

**Resolution:** display type 640 dot x 480 dot color backlit LCD

**User Selectable Display Mode:** full color or SunVue™ high contrast

**Display:** a minimum of 4 seconds of ECG and alphanumerics for values, device instructions, or prompts

**Display:** up to three waveforms

**Waveform Display Sweep Speed:** 25 mm/sec for ECG, $SpO_2$, IP, and 12.5 mm/sec for $CO_2$

## DATA MANAGEMENT

The device captures and stores patient data, events (including waveforms and annotations), and continuous waveform and patient impedance records in internal memory.

The user can select and print reports, and transfer the stored information via supported communication methods.

**Report Types:**

- Three format types of CODE SUMMARY™ critical event record (short, medium, and long)
- 12-lead ECG with STEMI statements
- Continuous ECG (transfer only)
- Trend Summary
- Vital Sign Summary
- Snapshot

**Memory Capacity:** Total capacity is 360 minutes of continuous ECG and 400 single waveform events.

Maximum memory capacity for a single patient includes up to 200 single waveform reports and 90 minutes of continuous ECG.

## COMMUNICATIONS

The device is capable of transferring data records by wired or wireless connection.

Serial Port RS232 communication + 12V available

Limited to devices drawing maximum 0.5 A current

Bluetooth® technology provides short-range wireless communication with other Bluetooth-enabled devices

## MONITOR

### ECG

**ECG is monitored via several cable arrangements:**

A 3-wire cable is used for 3-lead ECG monitoring.

A 5-wire cable is used for 7-lead ECG monitoring.

A 10-wire cable is used for 12-lead ECG acquisition. When the chest electrodes are removed, the 10-wire cable functions as a 4-wire cable.

Standard paddles or QUIK-COMBO pacing/defibrillation/ECG electrodes are used for paddles lead monitoring.

**Frequency Response:**
Monitor: 0.5 to 40 Hz or 1 to 30 Hz

Paddles: 2.5 to 30 Hz

**Lead Selection:**

Leads I, II, III (3-wire ECG cable)

Leads I, II, III, AVR, AVL, and AVF acquired simultaneously (4-wire ECG cable)

Leads I, II, III, AVR, AVL, AVF, and C lead acquired simultaneously (5-wire ECG cable)

Leads I, II, III, AVR, AVL, AVF, V1, V2, V3, V4, V5, and V6 acquired simultaneously (10-wire ECG cable)

**ECG Size:** 4, 3, 2.5, 2, 1.5, 1, 0.5, 0.25 cm/mV (fixed at 1 cm/mV for 12-lead)

**Heart Rate Display:**

20–300 bpm digital display

Accuracy: ±4% or ±3 bpm, whichever is greater

QRS Detection Range Duration: 40 to 120 msec

Amplitude: 0.5 to 5.0 mV

Heart Symbol: flashes for each QRS detection

**Common Mode Rejection (CMRR):** ECG Leads: 90 dB at 50/60 Hz

### $SpO_2$

**Sensors: MASIMO® Sensors including Rainbow Sensors**

**Displayed Saturation Range:** 50 to 100%

**Saturation Accuracy:** 70–100% (0–69% unspecified)

**Adults/Pediatrics:**
±2 digits (during no motion conditions)
±3 digits (during motion conditions)

Dynamic signal strength bar graph

Pulse tone as $SpO_2$ pulsations are detected

**$SpO_2$ Update Averaging Rate User selectable:** 4, 8, 12 or 16 seconds

**$SpO_2$ Sensitivity User selectable:** Normal, High

**$SpO_2$ Measurement:** Functional $SpO_2$ values are displayed and stored

**Pulse Rate Range:** 25 to 240 bpm

**Pulse Rate Accuracy (Adults/Pediatrics):**
±3 digits (during no motion conditions)
±5 digits (during motion conditions)

Optional $SpO_2$ waveform display with autogain control

### SpCO™

**Sensor: Only Rainbow Sensors**

**SpCO Concentration Display Range:** 0 to 40%

**SpCO Accuracy:** ±3 digits

### SpMet™

**Sensor: Only Rainbow Sensors**

**SpMet Saturation Range:** 0 to 15.0%

**SpMet Display Resolution:** 0.1% up to 10%, then single digit resolution up to 15%

**SpMet Accuracy:** ±1 digit

### NIBP

**Blood Pressure Systolic Pressure Range:** 30 to 255 mmHg

**Diastolic Pressure Range:** 15 to 220 mmHg

**Mean Arterial Pressure Range:** 20 to 235 mmHg

**Units:** mmHg

**Blood Pressure Accuracy:** ±5 mmHg

**Blood Pressure Measurement Time:** 20 seconds, typical (excluding cuff inflation time)

**Pulse Rate Range:** 30 to 240 pulses per minute

**Pulse Rate Accuracy:** ±2 pulses per minute or ±2%, whichever is greater

**Operation Features Initial Cuff Pressure:** User selectable, 80 to 180 mmHg

**Automatic Measurement Time Interval:** User selectable from 2 min to 60 min

**Automatic Cuff Deflation Excessive Pressure:** If cuff pressure exceeds 290 mmHg

**Excessive Time:** If measurement time exceeds 120 seconds

### $CO_2$

**$CO_2$ Range:** 0 to 99 mmHg

**Units:** mmHg, %, kPA

**Respiration Rate Accuracy:**
0 to 70 bpm: ±1 bpm
71 to 99 bpm: ±2 bpm

**Respiration Rate Range:** 0 to 99 breaths/minute

**Rise Time:** 190 msec

**Response Time:** 3.3 seconds (includes delay time and rise time)

**Initialization Time:** 30 seconds (typical), 10-180 seconds

**Ambient Pressure:** automatically compensated internally

**Optional Display**: $CO_2$ pressure waveform

Scale factors: Autoscale, 0–20 mmHg (0–4 Vol%),0–50 mmHg (0–7 Vol%), 0–100 mmHg (0–14 Vol%)

### Invasive Pressure

**Transducer Type:** Strain-gauge resistive bridge

**Transducer Sensitivity:** 5μV/V/mmHg

**Excitation Voltage:** 5 VDC

**Connector:** Electro Shield: CXS 3102A 14S-6S

**Bandwidth:** Digital filtered, DC to 30 Hz (< -3db)

**Zero Drift:** 1 mmHg/hr without transducer drift

**Zero Adjustment:** ±150 mmHg including transducer offset

**Numeric Accuracy:** ±1 mmHg or 2% of reading, whichever is greater, plus transducer error

**Pressure Range:** -30 to 300 mmHg, in six user selectable ranges

### Invasive Pressure Display

**Display:** IP waveform and numerics

**Units:** mmHg

**Labels:** P1 or P2, ART, PA, CVP, ICP, LAP (user selectable)

### Trend

**Time Scale:** Auto, 30 minutes, 1, 2, 4, or 8 hours

**Duration:** Up to 8 hours

**ST Segment:** After initial 12-lead ECG analysis, automatically selects and trends ECG lead with the greatest ST displacement

**Display Choice of:** HR, PR ($SpO_2$), PR (NIBP), $SpO_2$,(%), SpCO,(%), SpMet,(%), $CO_2$ ($EtCO_2$/$FiCO_2$), RR ($CO_2$), NIBP, IP1, IP2, ST

## ALARMS

**Quick Set:** Activates alarms for all active vital signs and includes an indicator for which alarms are active.

**VF/VT Alarm:** Activates continuous Continuous Patient Surveillance System (CPSS) monitoring in Manual mode

**Apnea Alarm:** Occurs when 30 seconds has elapsed since last detected respiration

**Heart Rate Alarm Limit Range:** Upper, 100–250 bpm; lower, 30–150 bpm

## INTERPRETIVE ALGORITHM

**12-Lead Interpretive Algorithm:** University of Glasgow 12-Lead ECG Analysis Program, includes AMI and STEMI statements

## PRINTER

**Prints continuous strip of the displayed patient information and reports**

**Paper Size:** 100 mm (3.9 in)

**Print Speed:** 25 mm/sec or 12.5 mm/sec

Optional: 50 mm/sec time base for 12-lead ECG reports

**Delay:** 8 seconds

**Autoprint:** Waveform events print automatically (user selectable)

**Frequency Response:**

Diagnostic: 0.05 to 150 Hz or 0.05 to 40 Hz

Monitor: 0.5 to 40 Hz or 1 to 30 Hz

## DEFIBRILLATOR

**Biphasic Waveform:** Biphasic Truncated Exponential

**The following specifications apply from 25 to 200 ohms, unless otherwise specified:**

**Energy Accuracy:** ±1 joule or 10% of setting, whichever is greater, into 50 ohms ±2 joules or 15% of setting, whichever is greater, into 25-175 ohms.

**Voltage Compensation:** Active when disposable therapy electrodes are attached. Energy output within ±5% or ±1 joule, whichever is greater, of 50 ohms value, limited to the available energy which results in the delivery of 360 joules into 50 ohms.

**Paddle Options:** QUIK-COMBO® pacing/defibrillation/ECG electrodes (standard). Cable Length 8 foot long (2.4 m) QUIK-COMBO cable (not including electrode assembly).

Standard paddles (optional)

### Manual Mode

**Energy Select:** 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 30, 50, 70, 100, 125, 150, 175, 200, 225, 250, 275, 300, 325, and 360 joules

**Charge Time:** Charge time to 360 joules in less than 10 seconds, typical

**Synchronous Cardioversion:** Energy transfer begins within 60 msec of the QRS peak

**Paddles Lead Off Sensing:** The transition point at which device changes from assuming that QUIK-COMBO electrodes are properly connected to patient to assuming that electrodes are not connected is 300±50 ohms.

### AED Mode

**Shock Advisory System™ (SAS):** an ECG analysis system that advises the operator if the algorithm detects a shockable or non-shockable ECG rhythm. SAS acquires ECG via therapy electrodes only.

**Shock Ready Time:** Using a fully charged battery at normal room temperature, the device is ready to shock within 20 seconds if the initial rhythm finding is "SHOCK ADVISED"

**Biphasic Output:** Energy Shock levels ranging from 150–360 joules with same or greater energy level for each successive shock

**cprMAX™ Technology:** In AED mode, cprMAX™ technology provides a method of maximizing the CPR time that a patient receives, with the overall goal of improving the rate of survival of patients treated with AEDs.

**Setup Options:**

- Auto Analyze: Allows for auto analysis. Options are OFF, AFTER 1ST SHOCK
- Initial CPR: Allows the user to be prompted for CPR for a period of time prior to other activity. Options are OFF, ANALYZE FIRST, CPR FIRST
- Initial CPR Time: Time interval for Initial CPR. Options are 15, 30, 45, 60, 90, 120, and 180 seconds.
- Pre-Shock CPR: Allows the user to be prompted for CPR while the device is charging. Options are OFF, 15, 30 seconds.
- Pulse Check: Allows the user to be prompted for a pulse check at various time. Options are ALWAYS, AFTER EVERY SECOND NSA, AFTER EVERY NSA, NEVER
- Stacked Shocks: Allows for CPR after 3 consecutive shocks or after a single shock. Options are OFF, ON
- CPR Time: 1 or 2 User selectable times for CPR. Options are 15, 30, 45, 60, 90, 120, 180 seconds and 30 minutes.

## PACER

**Pacing Mode:** Demand or non-demand rate and current defaults (user configurable)

**Pacing Rate:** 40 to 170 PPM

**Rate Accuracy:** ±1.5% over entire range

**Output Waveform:** Monophasic, truncated exponential current pulse (20 +1.5 msec)

**Output Current:** 0 to 200 mA

**Pause:** Pacing pulse frequency reduced by a factor of 4 when activated

**Refractory Period:** 200 to 300 msec ±3% (function of rate)

## ENVIRONMENTAL

**Unit meets functional requirements during exposure to the following environments unless otherwise stated.**

**Operating Temperature:** 0° to 45°C (32° to 113°F); -20°C (-4°F) for 1 hour after storage at room temperature; 60°C (140°F) for 1 hour after storage at room temperature

**Storage Temperature:** -20° to 65°C (-4° to 149°F) except therapy electrodes and batteries

**Relative Humidity, Operating:** 5 to 95%, non-condensing. NIBP only: 15 to 95%, non-condensing

**Atmospheric Pressure, Operating:** -382 to 4,572 m (-1,253 to 15,000 ft). NIBP only: -152 to 3,048 m (-500 to 10,000 ft)

**Water Resistance, Operating:** IP44 (splash proof, dust and sand resistant) per IEC 529 and EN 1789 (without accessories except for 12-lead ECG cable, hard paddles, and battery pack)

**Vibration:** MIL-STD-810E Method 514.4, Propeller Aircraft - category 4 (figure 514.4-7 spectrum a), Helicopter - category 6 (3.75 Grms), Ground Mobile - category 8 (3.14 Grms), EN 1789: Sinusoidal Sweep, 1 octave/min, 10-150 Hz, ±0.15 mm/2 g

**Shock (drop):** 5 drops on each side from 18 inches onto a steel surface EN 1789: 30-inch drop onto each of 6 surfaces

**Shock (functional):** Meets IEC 60068-2-27 and MIL-STD-810E shock requirements 3 shocks per face at 40 g, 6 ms half-sine pulses

**Bump:** 1000 bumps at 15 g with pulse duration of 6 msec

**Impact, Non-operating:** IEC 60601-1 0.5 + 0.05 joule impact UL 60601-1 6.78 Nm impact with 2-inch diameter steel ball. Meets IEC62262 protection level IK 04.

**EMC:** EN 60601-1-2:2001 Medical Equipment - General Requirements for Safety - Collateral Standard: Electromagnetic Compatibility - **Requirements and Tests EN 60601-2-4:2003:** (Clause 36) Particular Requirements for the Safety of Cardiac Defibrillators and Cardiac Defibrillator-Monitors

**Cleaning:** Cleaning 20 times with the following: Quaternary ammonium, isopropyl alcohol, hydrogen peroxide

**Chemical Resistance:** 60 hour exposure to specified chemicals: Betadine (10% Povidone-Iodine solution), Coffee, Cola, Dextroxe (5% Glucose solution), Electrode Gel/Paste (98% water, 2% Carbopol 940), HCL (0.5% solution, pH=1), Isopropyl Alcohol, NaCl solution (0.9% solution), Cosmetic discoloration of the paddle well shorting bar shall be allowed following exposure to HCL (0.5% solution).

## POWER

**Dual battery:** Capability with automatic switching

**Low battery indication and message:** Low battery fuel gauge indication and low battery message in status area for each battery

**Replace battery indication and message:** Replace battery fuel gauge indication, audio tones and replace battery message in the status area for each battery. When replace battery is indicated, device auto-switches to second battery. When both batteries reach replace battery condition, a voice prompt instructs user to replace battery.

**Battery Capacity** For two, new fully-charged batteries, 20°C (68°F)

| Operating Mode | | Monitoring (minutes) | Pacing (minutes) | Defibrillation (360J discharges) |
|---|---|---|---|---|
| Total Capacity to Shutdown | Typical | 360 | 340 | 420 |
| | Minimum | 340 | 320 | 400 |
| Capacity After Low Battery | Typical | 21 | 20 | 30 |
| | Minimum | 12 | 10 | 6 |

## BATTERY

**Battery Specifications**

**Battery Type:** Lithium-ion

**Weight:** 0.59 kg (1.3 lb)

**Voltage:** 11.1V typical

**Capacity (rated):** 5.7 amp hours

**Charge Time (with fully depleted battery):** 4.5 hours (typical)

**Battery indicators:** Each battery has a fuel gauge that indicates its approximate charge. A fuel gauge that shows two or fewer LEDs after a charge cycle indicates that the battery should be replaced.

**Charging Temperature Range:** 5° to 35°C (41° to 95°F)

**Operating Temperature Range:** 0° to 50°C (32° to 122°F)

**Long Term (>1 day) Storage Temperature Range:** 0° to 35°C (32° to 95°F)

For more than 50 years, Physio-Control, maker of the renowned LIFEPAK defibrillators, has been developing technologies and designing devices that are legendary among first response professionals, clinical care providers and the community.

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**All information including comparative statements are valid as of March 2009.**

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