R Series

Technical Specifications

Taking Resuscitation to Heart

The ZOLL® R Series® monitor/defibrillator provides clinicians with comprehensive support for resuscitation. This includes cutting-edge technology to help you meet current guidelines for achieving high-quality CPR, as well as OneStep™ electrodes that simplify and speed therapy. And to help ensure that the R Series will be Code-Ready®, it conducts an automated self-test daily.

Driving High-Quality CPR

- CPR Dashboard™ featuring Real CPR Help® — Guides rescuers with real-time audio and visual feedback on CPR quality measures. It provides numeric displays of depth and rate and visual indicators of compression release, as well as a unique Perfusion Performance Indicator™.
- See-Thru CPR® — Reduces the duration of pauses during CPR by filtering out the CPR artifact so rescuers can see whether an organized underlying rhythm has developed without stopping compressions.

Comprehensive Readiness Checks

The R Series extends testing beyond the basic test shock to checking more than 100 individual indicators of readiness, including electronics, batteries, cables, electrodes, and defibrillator discharge. A green check mark or a red X on the defibrillator indicates the status of the device, as determined during its last automated self-test. If a problem is detected, the R Series will turn on the display and an alert will be visible. When used with OneStep electrodes, even the electrodes are tested automatically every 24 hours.

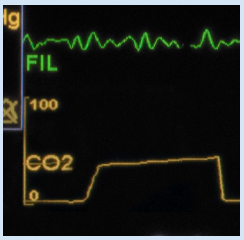
Unmatched Clinical Excellence

- Unique, constant-current 40-msec pacing has the highest capture rate at the lowest average current required, assuring efficacy and patient comfort.[1]
- Our high-current Rectilinear Biphasic™ waveform delivers the highest constant current at the optimal duration for defibrillation.
- The most extensive pediatric capabilities in an ALS defibrillator: CPR feedback coupled with a pediatric AED algorithm.

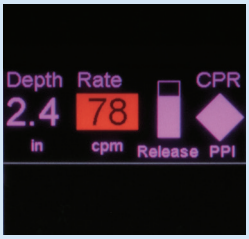
ZOLL®

General

Size: 8.2 in (20.8 cm) high x 10.5 in (26.7 cm) wide x 12.5 in (31.7 cm) deep.
Weight: 13.6 lbs (6.2 kg) with OneStep™ Cable and SurePower™ battery pack; 15.2 lbs (6.9 kg) with paddles.
Power Sources: AC Mains: 100 to 120 V AC (50/60 Hz), 220 to 240 V AC (50 Hz); Battery: Rechargeable lithium ion battery pack.
Low Battery Indicator: A "LOW BATTERY" message appears on the monitor when there is less than 15 minutes of ECG monitoring.
Design Standards: Meets or exceeds applicable requirements of UL 60601, AAMI DF80, IEC 60601-2-4, EN 60601-2-25, and 60601-2-27.
Patient Safety: All patient connections are electrically isolated.
Environmental: Operating Temperature: 0°C to 40°C; Storage and Shipping Temperature: -20°C to 60°C; Humidity: 5% to 95% relative humidity, noncondensing; Vibration: IEC 68-2-6 and IEC 68-2-34; Shock: IEC 68-2-27, 50 g 6mS half-sine; Operating Pressure: 594 to 1060 millibars; Particle and Water Ingress: IEC 529, IP22; Electromagnetic Compatibility (EMC): CISPR 11 Class B Radiated and Conducted Emissions; Electromagnetic Immunity: AAMI DF80, EN 61000-4-3 to 10 V/m; Electrostatic Discharge: AAMI DF80, EN 61000-4-2; Conducted Susceptibility: EN 61000-4-4, 61000-4-5, 61000-4-6.



Mainstream and sidestream capnography options available



CPR Dashboard™ featuring Real CPR Help®

ADVANCING RESUSCITATION. TODAY.®

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Defibrillator

Waveform: Rectilinear Biphasic.™
Patient Impedance Range: 15 to 300 ohms.
Energy Selections: 1 to 10, 15, 20, 30, 50, 75, 100, 120, 150, and 200 joules selected using controls on front of the defibrillator or sternum paddles. (Note: When using appropriate pediatric resuscitation electrodes, the 75-joule setting is replaced by 70- and 85-joule settings.)
Smart Step Energy Levels: Automatically escalates energy through a configured adult or pediatric protocol.
Energy Display: Shown on monitor for both selected and delivered.
Charge Time: Less than 7 seconds with a new, fully charged battery (first 15 charges to 200 joules); longer charge times may result with a depleted or older battery.
Synchronized Mode: Synchronizes defibrillator pulse to patient's R wave. "SYNC" message displayed on monitor and markers shown on both monitor and recorded ECG.
Charge Controls: Control from front of defibrillator or apex paddle.
Paddles: External apex/sternum paddles; adult plates slide off to expose pediatric electrode surface.
Code Readiness Testing: Verifies defibrillator hardware, therapy delivery cable (with both paddles and electrodes), electrode condition and expiration (with select OneStep electrodes) without the need for a separate test fixture.

ECG Monitoring

Patient Connection: 3-lead ECG cable, 5-lead ECG cable, paddles, or hands-free electrodes; selectable by front panel switch.
Input Protection: Fully defibrillator protected. Circuits designed to prevent distortion of ECG signal by pacer pulse.
Implanted Pacemaker Spike Display: Circuits designed to detect most implanted pacemaker spikes and display a marker on the ECG trace.
Bandwidth: 0.5 to 21 Hz (-3dB) standard; 0.05 to 150 Hz diagnostic with configurable options of 0.5 Hz to 40 Hz or 1 Hz to 21 Hz.
Lead Selection: I, II, III aVR, aVL, aVF, V, P1, P2, P3 with OneStep Pacing electrode.
ECG Size: 0.5, 1.0, 1.5, 2.0 or 3.0 cm/mV display on monitor.
Heart Rate Display: 0 to 300 bpm ±5%.
Heart Rate Alarm: User selectable for tachycardia at 60 to 280 bpm; for bradycardia at 20 to 100 bpm. On/Off status displayed on the screen.

CPR Dashboard Featuring Real CPR Help

Activated when OneStep Complete, OneStep CPR, and OneStep Pediatric CPR electrodes are connected.
Detection Technology: Accelerometer.
Compression Depth: Detected between 0.75 in (1.9 cm) and 3.0 in (7.6 cm), with an accuracy of ±0.25 inches (0.6 cm).
Compression Rate: Detected between 50 and 150 compressions per minute.
Release Bar: Ensures proper release off of the chest.
Feedback: Configurable audio and visual prompts for rate and depth issued when compressions fall outside of AHA/ERC recommendations.
CPR Idle Time Display: Indicates elapsed time since last detected chest compression.
Perfusion Performance Indicator (PPI): Integrates compression depth and rate in order to rapidly visualize CPR performance per AHA/ERC recommendations.

See-Thru CPR Filter

Removes compression-related artifact from the ECG via an adaptive filtering technique.

Display

Screen Type: Color, VGA liquid crystal display (LCD).
Screen Size: 6.5 inches (16.5 cm) diagonally.
Sweep Speed: 25 mm/sec.
Viewing Time: 5 seconds with standard display format.
Channels: 3.
Information: Heart Rate, Leads/Pads, Alarm On/Off, Selected Energy, Delivered Energy, User Prompts and Warnings, Code Readiness Test Results, SpO_2, NIBP, $EtCO_2$, Pacer Functions, Code Markers, CPR Dashboard.

Battery Packs*

Type: 10.8 V (nominal) rechargeable lithium ion.
Capacity: 5.8 amp hours.
Weight: 1.7 lb (0.77 kg).
Recharge Time: 5 hours or less with integral charger.
Operating Time: >4 hours of continuous ECG monitoring; 100 maximal energy (200 joules) discharges; 3.5 hours of continuous ECG monitoring and pacing at 60 mA, 80 ppm.

Recorder

Technology: 90 mm thermal array; 80 mm grid width.
Speed: 25 mm/sec, 6-second delay.
Printing Modes: Manual or automatic.
Annotations: Time, date, defibrillation energy, patient impedance, heart rate, pacer output, QRS synchronization marker, ECG size, ECG lead, alarm, defibrillator test results, analyze ECG, ECG bandwidth.

I/O, Storage, Communications

Sync In: 0 to 5 V (TTL Level) pulse, active high, 5 to 15 ms in duration, no closer than 200 ms apart; energy transfer begins within 25 ms of the leading edge of the synch in pulse.
Marker Out: 0 to 5 V (TTL Level) pulse, active high, 10 ms in duration, the leading edge of the pulse occurs within 35 ms of R wave peak.
ECG Output: 1.0 V/cm of deflection on recorder; <25 ms delay from the patient ECG input.
Card Slot: Compact flash compatible.
Internal Memory: Disk on chip.

Advisory Defibrillation

Shock Advisory Function: Evaluates ECG rhythm to determine if shock delivery is required.
Shockable Rhythms: Ventricular fibrillation with amplitudes >100 µV, and wide-complex ventricular tachycardia with rates >150 bpm for adults or >200 bpm for pediatric applications. Refer to Operator's Manual for details on sensitivity and specificity performance.
Protocol Configurations: Configurable for either CPR or shock-first-driven protocols. Energy sequences can be configured for single or multiple shocks with fixed or escalating energy levels. The CPR interval length is configurable in 1-minute increments up to 4 minutes.

External Pacing

Type: VVI demand; asynchronous (fixed rate) when used without ECG leads or in asynchronous (ASYNC) pacing mode.
Pulse: Rectilinear, constant current: 40 ms ±2 ms; variable 0 to 140 mA ±5% or 5 mA, whichever is greater. Rate is variable from 30 to 180 ppm ±1.5%.
Output Protection: Fully defibrillator protected and isolated.
OneStep Pacing: Eliminates the need to connect separate ECG leads when used in conjunction with OneStep Pacing and OneStep Complete electrodes.

Pulse Oximetry with Masimo SET® Technology

Saturation Range: 1-100% (%SpO_2) with a resolution of 1%.
Pulse Rate Range: 25-240 ppm with a resolution of 1 ppm.
Saturation Accuracy: Non-motion conditions ±2% for adults/pediatrics; ±3% for neonates. During motion ±3% for all patients.
Pulse Rate Accuracy: Non-motion conditions ±3 ppm. During motion ±5 ppm.

Mainstream CO_2 Capnostat 5 Sensor

Principle of Operation: Nondispersive infrared (NDIR) single-beam optics, dual wavelength, no moving parts.
Warm-up Time: Full specifications within 2 minutes at an ambient temperature of 25°C. Capnogram in 20 seconds.
Environmental: Operating Temperature of sensor: 0°C to 45°C, Storage and Shipping Temperature: -40°C to 70°C.

Sidestream CO_2 LoFlo Sensor

Principle of Operation: Nondispersive infrared (NDIR) single-beam optics, dual wavelength, no moving parts.
Warm-Up Time: Full specifications within 2 minutes at an ambient temperature of 25°C. Capnogram in 20 seconds
Environmental: Operating temperature: 0°C to 40°C, Storage and Shipping Temperature: -40°C to 70°C.

NIBP

Patient Population: Adult, Pediatric.
Method: Oscillometric.
Control: Automatic and manual measurement.

WiFi Capable

WiFi 802.11 a/b/g/n Ambicom-specific 1100C-CF Card P/N 8005-000101-01 compatibility.
Typical Readiness File: 750K.
Typical Code Data File: 1.2 MB.

*Values listed for a new battery operating at 20°C.

[1]Zoll PM, et al. *Circulation.* 1985;71(5):937-44.

Specifications subject to change without notice.

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