

# STARLING™ SV

- 100% non-invasive flow-based measurement of Stroke Volume
- Validated against traditional monitoring technologies
- Accuracy not affected by vasopressors, inotropes, shock states
- Quick and easy set up
- Provides real-time, hemodynamic trend information
- Mechanically ventilated or spontaneously breathing
- No invasive lines required



## Unique clinical tools

- Fluid-Management Protocols for both PLR and Bolus Challenges
- Provides Dynamic Assessments of Fluid Responsiveness, supporting CMS Quality Measures, ERAS, Surviving Sepsis Campaign Bundles, and ESICM endorsements
- Arterial blood pressure display (from external monitor)
- Connectivity options include numeric and graphic output to Excel and EHR Systems

## Advanced interface and usability

- Color, customizable, touch-screen display
- On-screen tutorial of sensor setup and monitor operation
- Large display for viewing at a distance
- Medical standard patient-cable connector
- Excel reports to USB drive with Fluid-Management graphs
- Noninvasive sensors, easy-to-apply, up to 48 hours use

# Specifications

## General

**Product Name:** Starling SV  
**Technology:** BIOREACTANCE®  
**Method of Measurement:** Non-invasive continuous hemodynamic monitor  
**Dimensions:** 29cm x 22cm x 19cm  
**Sensors:** Cheetah Sensors (CMS25)  
**Weight:** 4.3kg

## Specifications

**Safety Requirements:**  
Standard Class I Equipment BF type applied part  
Electrical Safety per IEC 60601-1  
EMC per IEC 60601-1-2

## Summary

**Display:** 10.4" TFT 800 x 600 pixels  
**Control:** Touch screen, knob, buttons  
**Connections:**

- 1x Serial Port
- 2x USB A
- 1x USB A dedicated to data download
- 1x USB B
- 1x LAN
- Power cable inlet connector
- Plug connector for potential equalization
- SpO2 connector
- NIBP connector

## Battery

**Type:** Chargeable Lithium-Ion  
**Charge Time:** 4 hrs  
**Operating Time:** Approximately 5 hr. when fully charged  
**Access:** Easy access for battery replacement

## Power

**AC Mains:** 90v-240v  
**Rated Voltage/Current:** 100V to 240V AC/2A  
**Rated Frequency:** 50/60 Hz  
**Fuses:** 2x T2AL250V

## Ambient conditions

**Operation condition:** 10-40°C/ 50-104°F, 50-75% RH  
**Atmospheric pressure:** 700hPa to 1060hPa  
**Storage condition:** 0-50°C/ 32-122°F, 50-75% RH  
**Delivery condition:** 0-50°C/ 32-122°F, 50-75% RH

## Main features

**Displays:**

- Hemodynamic Dashboard display
- Raw Waveform display
- Tabular display

**Multiple trends Display:**  
Screen trending display options: 5 min – 10 hrs

**Protocol Dynamic Assessments:**

- Passive Leg-Raise
- Fluid Bolus Challenge

**Events Marker**

**Connectivity to external 3rd-party system:**  
via serial port, LAN or Wi-Fi

**Data Streaming Rate:** 30 sec, 1 min, 3 min, 5 min, 7 min, 10 min

**Maximum Baud Rate (Serial):** 115200 baud  
**Minimum Baud Rate (Serial):** 9600 baud  
**LAN Rate:** 10/100 bps

**Data Format:** XML

**Manual Data Entries:**

- MAP
- SpO2
- Hgb

**Data updates on screen:** Every 30 sec or 1 min

## NIBP specification

**Suntech Medical Technology**

**Method of Measurement:** Oscillometric. Diastolic values correspond to Phase 5 Korotkoff sounds.

**Accuracy:** Meets accuracy requirements of ANSI/AAMI SP10, EN1060-4 and ISO 81060-2

**Pressure Accuracy:** The static pressure measurement is within  $\pm 3$ mmHg throughout the temperature range.

**Measurement Ranges – Pressure**  
ADULT: 40-260 mmHg

**Measurement Ranges – Pulse Rate**

- 30 to 220 BPM (beats per minute)

**Safety:** Independent safety microprocessor monitors cuff pressure, measurement time, as well as the operation of the main microprocessor.

**Standards:**

- IEC60601-1:1997 2nd Edition
- IEC60601-1:2005 3rd Edition
- IEC/EN60601-2-30:1999/2000
- IEC 80601-2-30:2009
- AAMI SP10:2002(R)2008
- ISO 81060-2:2009
- EN1060-1:1996+A2:2009
- EN1060-3:1997+A2:

## NELL-1 SpO2 functionality

**Covidien (NELLCOR) Inc**

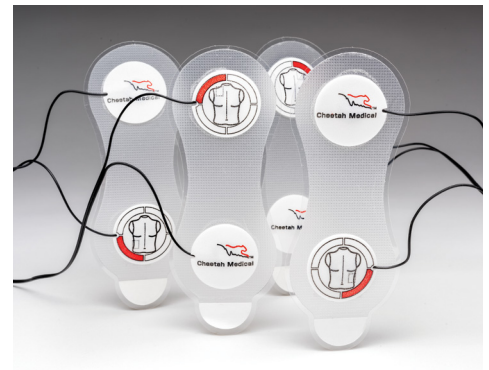
**Operation Altitude:** 1,000 feet below sea level to 10,000 feet above sea level

**Mechanical Shock:** Per IEC 600068-2-27, 100G, 6 ms half sine

**Sinusoidal Vibration:** Per IEC 600068-2-6, 10 Hz to 500 Hz, 1 G peak, 10 sweeps/axis

**Random Vibration:** Per IEC 600068-2-34, 20 Hz to 500 Hz, 0.02 g2/Hz

**Operating Temperature:** 0 °C to 60 °C  
**Storage Temperature:** -40 °C to +70 °C  
**Relative Humidity:** 15% to 95% non-condensing  
**Storage Altitude:** 1,000 feet below sea level to 20,000 feet above sea level  
**Vibration:** Per NISTA Project 1A  
**Drop:** Per NISTA Project 1A  
**Saturation:** 1% to 100% SpO2  
**SpO2 Accuracy:** 70-100%



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