



# ECG PATIENT SIMULATOR FIVE LEAD



**PS-2005**

**USER MANUAL**



**BC BIOMEDICAL  
PS-2005  
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## WARNING

All connections to patients must be removed before connecting the Device Under Test (DUT) to the Simulator. A serious hazard may occur if the patient is connected when testing with the Simulator.

Do not connect any leads from the patient directly to the Simulator or DUT.

## CONTACT INFORMATION

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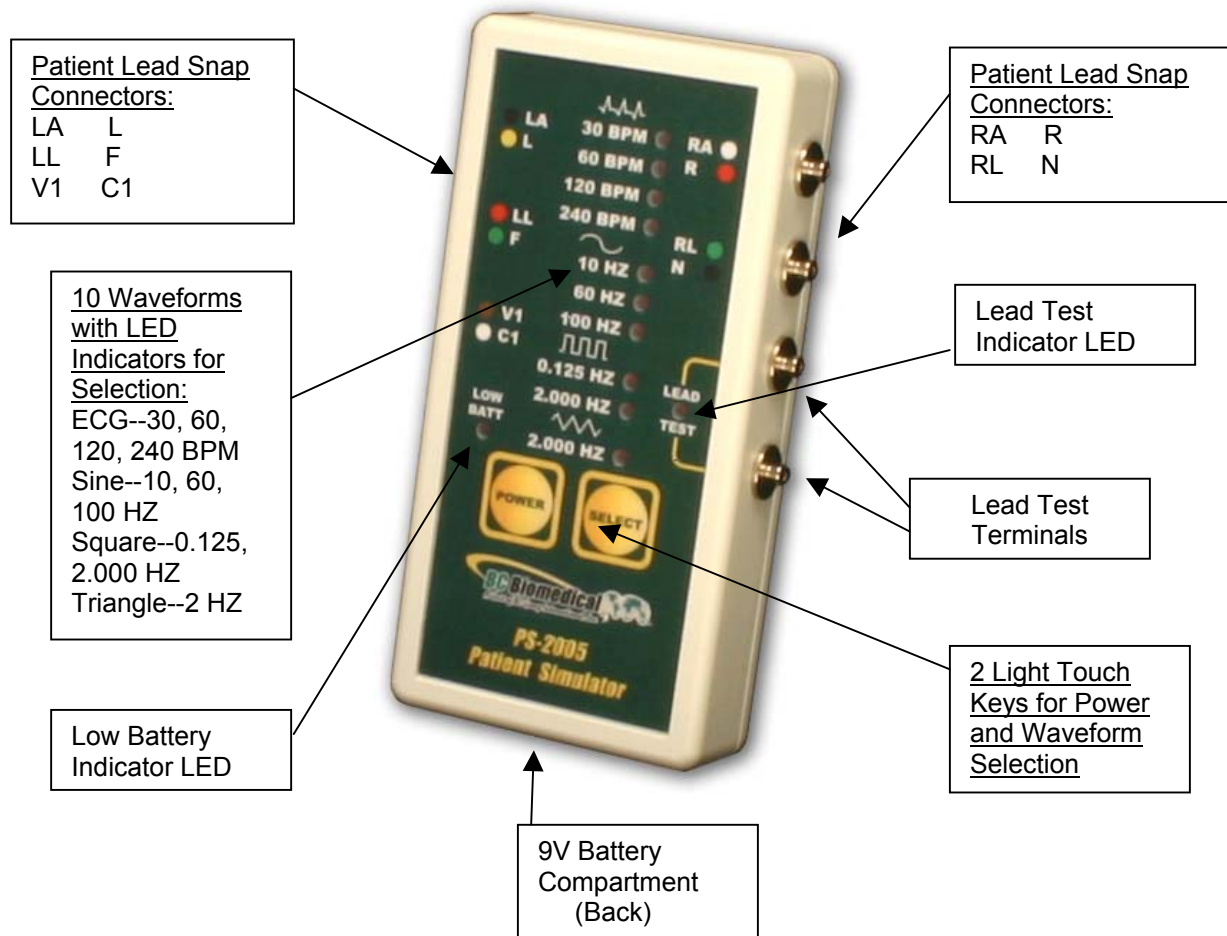
**BC GROUP  
PS-2005  
PATIENT SIMULATOR**

The Model PS-2005 is a Microprocessor based Patient Simulator. It provides ECG Simulation with four waveforms with constant QRS duration and six machine performance testing waveforms. The following are highlights of some of the main features:

- 6 PATIENT LEAD SNAP CONNECTORS
- ECG: 30, 60, 120 AND 240 BPM
- SINE: 10, 60 AND 100 HZ
- SQUARE: 0.125 AND 2.0 HZ
- TRIANGLE: 2 HZ
- AMPLITUDE ACCURACY: +/- 2%
- FREQUENCY ACCURACY: +/- 0.5% OF SETTING
- 9 VOLT BATTERY POWER
- LOW BATTERY INDICATOR
- % BATTERY LIFE INDICATOR
- LEAD TEST FUNCTION
- HIGH IMPACT PLASTIC CASE
- LIGHT TOUCH KEYS – NO KNOBS OR SWITCHES

## OVERVIEW

This section looks at the layout of a PS-2005 and gives descriptions of the elements that are present.



The unit is controlled by 2 light touch keys. They allow the user to select waveforms and control the power for the unit.


There are 10 LEDs to provide the user with information about waveforms that are generated, 1 LED for Lead Test confirmation and 1 LED for Low Battery Indication.

## Patient Lead Snap Connectors

AHA and IEC color-coded labels are located on the face of the unit to aid in connecting the corresponding U.S. and International Patient Leads.

| <b>AHA Label</b>                 | <b>IEC Label</b>                 | <b>Description</b>   |
|----------------------------------|----------------------------------|--|
| RA                               | R                                | Right Arm  |
| LA                               | L                                | Left Arm   |
| RL                               | N                                | Right Leg<br>(reference or ground)   |
| LL                               | F                                | Left Leg   |
| V1<br>V2<br>V3<br>V4<br>V5<br>V6 | C1<br>C2<br>C3<br>C4<br>C5<br>C6 | V Leads (V1-V6)<br>(U.S. and Canada)<br>also referred to as pericardial,<br>precordial or unipolar chest leads<br><br>Chest Leads (C1-C6)<br>(International) |


## Waveform Selection

There is one key and 10 LEDs in the Waveform Selection Control Section. The LEDs indicate which waveform is generated. The  key sequentially selects each waveform. Internally, the microprocessor has stored in memory the digitalized waveforms. It sends the selected waveform to a D/A converter that generates an accurate analog representation. This waveform is then sent through a resistor network, developing the appropriate signals on the output terminals.

## **Lead Test Terminals**

There are two test terminals on the side of the unit that allow for a quick test of the continuity of the lead cables. Connecting one end of the cable to one terminal and the other end to the other terminal will test the cable. If the cable is OK (less than 1000 ohms), the LEAD TEST LED in the lower right of the face will light.

## **Power Key**

The  key turns the unit off and on.

## **Auto Power Off**

The unit will automatically turn off after 10 minutes of no key activity to conserve the battery.

To override this feature and keep the unit on continuously, press and hold the SELECT key while turning the unit on. This will keep the unit on until it is manually turned off. The “Low Batt” LED will illuminate for 3 sec to indicate that the Auto Power Off feature has been turned off.

## **Power Supply**

The unit utilizes a 9 Volt Alkaline Battery in the rear battery compartment. When the unit detects a LOW BATTERY, the LED in the lower left of the face will blink, indicating the need to change the battery.

### **Percent of Battery Life Indicator**

The unit provides an indication of the Percent of battery life left on the 9 Volt Alkaline Battery. An A/D converter monitors the battery voltage. Continuously holding down the SELECT key will change the 10 waveform LEDs into a Percent of Battery Life display, with each LED representing 10%. The stack will strobe up to the present level and flash. This sequence will continue while the SELECT key is depressed.

## MANUAL REVISIONS

| <u>Revision #</u> | <u>Program #</u> | <u>Revisions Made</u>       |
|-------------------|------------------|-----------------------------|
| Rev 01            | DT7344           | Origination                 |
| Rev 02            | DT7344CB         | Format and Pictures Updated |

## LIMITED WARRANTY

**WARRANTY:** BC GROUP INTERNATIONAL, INC. WARRANTS ITS NEW PRODUCTS TO BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP UNDER THE SERVICE FOR WHICH THEY ARE INTENDED. THIS WARRANTY IS EFFECTIVE FOR TWELVE MONTHS FROM THE DATE OF SHIPMENT.

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## SPECIFICATIONS

| <b>SCALES &amp; RANGES</b> |                   |
|----------------------------|-------------------|
| Normal Sinus Rhythm        |                   |
| Rate                       | 30,60,120,240 BPM |
| Performance                |                   |
| Sine Wave                  | 10,60,100 Hz      |
| Square Wave                | 0.125, 2.000 Hz   |
| Triangle Wave              | 2.000 Hz          |

| <b>OUTPUT</b>             |             |
|---------------------------|-------------|
| LEAD 1                    | 1.75 mV     |
| LEAD 2                    | 2.75 mV     |
| LEAD 3                    | 1.00 mV     |
| LEAD TO LEAD<br>IMPEDENCE | 1000 Ohms   |
| LEAD TEST<br>IMPEDENCE    | < 1000 Ohms |

| <b>ACCURACY</b> |                 |
|-----------------|-----------------|
| AMPLITUDE       | +/- 2 % Lead II |
| FREQUENCY       | 0.5 %           |

| <b>PHYSICAL</b> |  |
|-----------------|--|
| ENCLOSURE       | 5.12 x 2.56 x 0.97 Inches<br>(130 x 65 x 25 mm)<br>ABS Plastic |
| WEIGHT          | > ½ Lb<br>(> 0.23 Kg)  |
| FACE PLATE      | Lexan, Back printed  |
| OPERATING RANGE | 15 to 40 degrees C   |
| STORAGE RANGE   | -20 to 65 degrees C  |

| <b>ELECTRICAL</b> |   |
|-------------------|---|
| POWER             | Battery, 9 VDC<br>(NEDA 1604)<br>Alkaline |

**NOTES**