

**OPERATING INSTRUCTIONS**  
**GENERAL DEVICES**  
**MODEL EIM 105-30Hz**  
**PREP-CHECK ELECTRODE IMPEDANCE METER**

## **1 OVERVIEW**

The EIM 105-30 HZ is a hand-held, battery powered devices intended to measure the electrical impedance of bio-potential electrodes applied to patients. Impedance readings, measured at 30 Hz with no D.C. polarizing current, and are presented on a large liquid crystal display, and assisted by “GOOD” and “POOR” lamps.

By means of a lead selector switch, impedance is measured between selected electrode and the two other electrodes, which are automatically placed in a parallel combination. This feature simplifies the identification of a bad electrode, electrode site or lead wire.

Powered by a common 9 volt battery, battery life is enhanced by an Auto-Off feature. The meter also includes a built-in 100K precision test impedance.

## **2 CONTROLS AND INDICATORS**

### **2.1 “ON” BUTTON**

The ON button turns the Prep-Check on. The Prep-Check automatically turns itself off after approximately one and a half (1.5) minutes.

### **2.2 “GOOD” LIGHT**

The green GOOD light flashes at impedances BELOW 5,000 ohms, indicating an acceptable electrode impedance.

The light flashes brighter as impedance **decreases** (improves).

### **2.3 “POOR” LIGHT**

The red POOR light flashes at impedances ABOVE 10,000 ohms, indicating poor electrode contact OR a defective wire or patient cable.

The light flashes brighter as impedance **increases** (worsens). The light flashes momentarily for an intermittently defective lead wire or patient cable.

## **2.4 LEAD WIRE/PATIENT CABLE JACKS**

The three color-coded safety DIN (shrouded 0.060") jacks marked "+", "C" and "-" accept standard safety DIN lead wire connectors.

## **2.5 "LEAD SELECTOR" SWITCH**

The four position LEAD SELECTOR switch selects ONE of up to THREE electrodes to be checked. The two remaining electrodes are connected together (in parallel) and used for a "return path".

The impedance of the parallel combination of two electrodes is always LESS than either electrode.

An example of how the LEAD SELECTOR switch works is as follows: When the LEAD SELECTOR switch is pointing to the "+" position, the meter is assessing the "+" electrode impedance. The impedance measured represents the SUM of the "+" electrode **and** the parallel combination of the "C" and the "-" electrodes (the "C" and the "-" are connected together). If the "+" electrode had an impedance of 2K Ohms, the "C" electrode an impedance of 3K Ohms, and the "-" electrode an impedance of 150K Ohms (a bad electrode), the meter would read (approximately) 5K Ohms for both the "+" and the "C" positions. When the switch was moved to the "-" position however, the reading would be 150K Ohms.

The "T" (TEST) position introduces an impedance of 100,000 ohms.

In the TEST mode, the digital display must read between 97.0 and 103.0 and the red "POOR" light must be ON.

## **2.6 CONTACT IMPEDANCE DIGITAL DISPLAY**

The CONTACT IMPEDANCE display indicates contact impedance in thousands of ohms (K ohms).

For example, a reading of "50.0" indicates 50,000 (50 K) ohms. The highest reading is "199.9" (199,900 ohms). Impedances above 199,900 (199.9K) ohms read "1."

The legend "BAT" will appear in the lower left hand corner of the display when the Prep-Check's battery requires replacement.

### **3 OPERATION**

The PREP-CHECK is used to test electrode contact impedance as follows:

- 3.1 Prepare electrode site using recommended procedures.
- 3.2 Attach lead wires to electrodes.
- 3.3 Apply electrodes to prepared sites using recommended procedures.
- 3.4 Place lead wires in the appropriate jacks of the PREP-CHECK.
- 3.5 Measure impedance.
- 3.6 Good contact is indicated by the green “GOOD” light. The digital readout should read less than 5,000 (5K) ohms (05.0). Poor contact impedance is indicated by the red “POOR” light (impedance GREATER than 10,000 (10K) ohms (10.0)).
- 3.7 Electrodes indicating poor may have to be replaced or the site prepped again. A defective lead wire will also indicate poor.
- 3.8 Lead wires are tested by stretching the lead wire with moderate force. A defective lead wire will cause the red “Poor” light to flash or stay on continuously.
- 3.9 Lead wire snaps may be tested by moving them around on the electrode. A bad snap will cause the RED light to flash briefly or stay on continuously.
- 3.10 Remove lead wires from the PREP-CHECK and connect to the monitor cable.

### **4 MAINTENANCE**

The PREP-CHECK needs no maintenance other than routine battery replacement and periodic calibration. Zero and 100 K ohm controls, located on the side (near wrist strap ring) are provided for calibration.

#### **4.1 BATTERY REPLACEMENT**

Replace the battery (standard 9 Volt alkaline battery) when the “BAT” legend appears in the digital display. The battery is located beneath a sliding panel on the underside of the instrument.

#### **4.2 ZERO ADJUSTMENT**

To adjust the ZERO reading, place a wire between the “+” and the “-” jacks and set the LEAD switch to the “+” position. Using a fine screwdriver, adjust the ZERO control through the RIGHTMOST hole on the LOWER side of the instrument for a reading of 00.0. Do not force the control as this will cause damage.

#### **4.3 100K OHM CALIBRATE ADJUSTMENT**

Place the LEAD SELECTOR switch in the “T” (TEST) position. Adjust the CALIBRATE control through the LEFTMOST hole on the LOWER side of the instrument for a reading of 100.0. Do not force the control as this will cause damage.

#### **4.4 GOOD IMPEDANCE LEVEL ADJUSTMENT**



