

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

Connect a resistance decade box to the “+” and “C” jacks. Set the LEAD SELECTOR switch to the “+” position. Adjust the decade box to 5,000 ohms or to the desired GOOD impedance value. Using a screwdriver, adjust the GOOD impedance level control through the small RIGHTMOST hole on the left of the top side of the instrument. Adjust such that the GOOD light just begins to blink. Do not force the control as this will cause damage.

4.5 POOR IMPEDANCE LEVEL ADJUSTMENT

Repeat above instructions for the GOOD level adjust using desired POOR impedance level and LEFTMOST hole on the left of the top side of the instrument. Do not force the control as this will cause damage. Adjust for 10,000 ohms or to some other desired impedance value.

5 TECHNICAL SPECIFICATIONS

Measurement Range:.....100 to 199,900 ohms
Accuracy: +/- 3% of reading, +/-300 ohms
Test Current:.....9uA(RMS), +/-10%, @ 30Hz, +/-10%
Direct Current:0.0 uA DC
Displays:.....3 1/2 digit LCD readout
 GOOD LED @ Z<5K
 POOR LED @ Z>10K
Self Test:Internal 100K ohm 1% resistor
Electrodes Tested:3 (each measured with respect to the other two)
Electrode Selection:4 Position Lead Selector Switch
Electrode Connections:Three safety DIN (0.060” shrouded pins)
User Available Adjustments:Zero, Cal, Good and Poor Levels
Power:9 Volt alkaline battery, type MN1604
Operating Current:21 mA
Battery Test:Continuous, LO-BATT indication on LCD
Battery Access:.....Slide-off cover
Cabinet:ABS Plastic, 3.6” x 6” x 1.9”

Note: Specifications subject to change without notice.

