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Human Body Resistance and Temperature Measurement Device

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Keywords	Detector , Linearization , Moisture , Resistance , Temperature
Abstract	This paper discusses the design and construction of a human body resistance and temperature measurement device. The device measures the human body temperature and resistance when the sensing probes are placed in contact with the human skin. The design analysis was based on simple electronic circuit theories leading to specification and choice of components used for the construction of the system. After the construction and testing with various individuals the human body resistance and temperature was found to be within the ranges of 1K Ω to 210K Ω and 36.10C to 37.50C respectively. The paper discusses the various effect of current on the human body and their implication. The system can be adapted to various fields such as bio-technology, security (lie detector), safety equipment in industries and companies to determine insulation.
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Human Body Resistance and Temperature Measurement Device

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Keywords: Detector, Moisture, Resistance, Temperature and Linearization.

Abstract. This paper discusses the design and construction of a human body resistance and temperature measurement device. The device measures the human body temperature and resistance when the sensing probes are placed in contact with the human skin. The design analysis was based on simple electronic circuit theories leading to specification and choice of components used for the construction of the system. After the construction and testing with various individuals the human body resistance and temperature was found to be within the ranges of $1K\Omega$ to $210K\Omega$ and $36.1^{\circ}C$ to $37.5^{\circ}C$ respectively. The paper discusses the various effect of current on the human body and their implication. The system can be adapted to various fields such as bio-technology, security (lie detector), safety equipment in industries and companies to determine insulation.

Introduction

Due to advancement in technology, human reliance on electricity is on the increase but shock hazards are the major drawback on its use. Safety devices and equipment that help to prevent or reduce shock possibilities are of increasing importance. Under stress or when exposed to conditions involving tension, the human body shows visible changes in its physiological responses such as heart beat rate, blood pressure, temperature, skin resistance to mention a few. With appropriate sensors and transducers these physical quantities can be converted into electrical or intermediate electrical quantities that can be measured by appropriate electronic equipment. The measurement of resistance in engineering practice is important to determine how much current a particular body can withstand on the application of a known voltage [1]. This knowledge helps an individual operating a particular machine or electronic device to select the right amount of insulation necessary to prevent shock hazards. Today measurement of body resistance is used to identify patients at risk of hypovolemia (reduced total body fluid) [2]. The measurement of human body temperature finds suitable application in the medical field and also it helps an individual determine whether or not his body temperature is within the acceptable temperature range. A temperature measurement device [3] which enables women to determine their ovulation by monitoring their body temperature is presently in use. Treatment of heart attack patients by subjecting them to a state of induced hypothermia which requires temperature measurement and monitoring is also being used today by health workers. [4]

Methodology

In order to achieve the aim set out, ongoing research on body temperature [3,4] and resistance [2,5] were studied and various design options and their cost implications were considered. The body resistance and temperature measurement device can be categorized into three major units. These are: the power supply unit, the detector and linearization unit and the output display unit.

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