Temperature Monitoring System for Baby Warmer

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Abstract

The device consists of a rectangular enclosed zone in which the infant is placed, and an overhead heater that delivers radiant heat and a fan which is used for cooling purpose. Temperature sensor LM35 is used for temperature monitoring purpose, which measures the temperature of baby. Heat output can be control through (feedback mode) for thermoregulation. Temperature is displayed on LCD as well as on PC for monitoring purposes. Visual and audio alarms are present for safety.

Keywords: - *Temperature sensor, Microprocessor, Controlling unit, Heater.*

INTRODUCTION

Baby warmer is one type of an incubator system which used for intensive care of the new born, premature. It provides a safe environment, which has fresh air, clean and sterile ambient conditions for the babies. In addition to these, the incubator environment provides a homogeneous and stable temperature.

Premature infants have thinner skin, which allows surface blood vessels to more readily lose heat to the environment. Prolonged cold stress in neonates can cause oxygen deprivation, hypoglycaemia, and metabolic acidosis; therefore, energy conservation provided by thermal support is critical and hence their temperature needs to be maintained by an incubator.

Infant incubator is used mainly to keep a baby's core temperature stable at 37º C. Premature babies (babies born before they are due to be born) have undeveloped nervous systems and also lack the energy to regulate their own temperature, which drop significantly because of heat loss from conduction (heat loss to cooler surfaces in direct contact with the infant), convection (heat loss to air moving past the infant), radiation (heat loss to cooler objects not in direct contact with the infant), and water evaporation (heat loss from the infant's lungs and skin surface).

Every year, about 1 million infants in the developing world die due to heat loss and dehydration that can be prevented by an intensive care unit. Thus, the function of the incubator is to compensate for these disadvantages and provide a congenial atmosphere for the infants.

OBJECTIVES OF THE STUDY

Design and development of microcontroller-based temperature and humidity controller for an infant incubator and controls these two parameters constantly which are very critical for the normal growth of the new born (premature) babies.

LITERATURE SURVEY

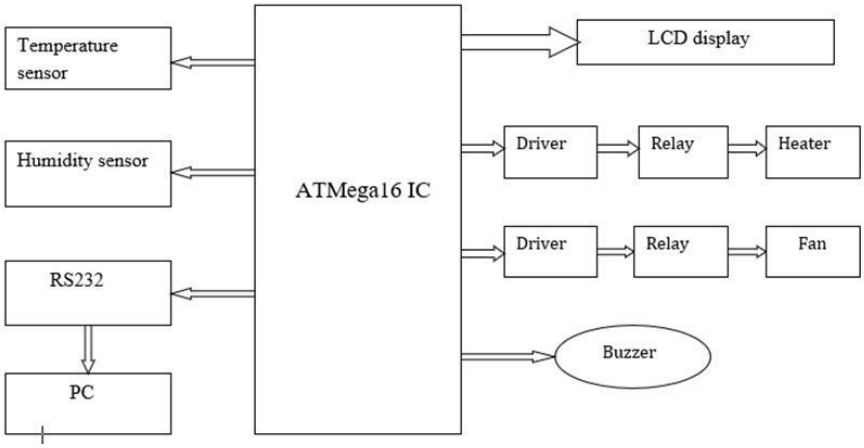
A system for controlling the heating and temperature monitoring of infant incubators and infant warmers is provided with an incubator or infant warmer space, a heater for heating the space as well as a first temperature sensor and a second temperature sensor. An input device for input of one or more control setting works in conjunction with a control device connected to the heater and to the first temperature sensor and the second temperature sensor. The control device forms a control temperature from an input first skin temperature target control setting for a first patient and an input of a second skin temperature target control setting for a second patient and further patients if present and controls the heater based on a difference between the control temperature and an actual temperature value based on a first actual temperature sensed by the first temperature sensor and a second actual temperature sensed by the second temperature sensor [1].

Radiant warmers result in increased IWL compared to incubators. This needs to be taken into account when calculating daily fluid requirements. The results of this review do not provide sufficient evidence concerning effects on important outcomes to guide clinical practice. Further randomised controlled trials are required to assess the effects of radiant warmers versus incubators in neonatal care on important short- and long-term outcomes, with particular attention to extremely low birthweight infants in the early neonatal period [2].

The present invention relates to an infant care warmer adapted to provide heat for the warming of an infant and, more particularly, to a method of controlling the intensity of a heater used in an infant warmer. In the treatment of infants, and particularly those born prematurely, it is necessary to provide heat to the infant during the treatment of such infants and to minimize the heat loss of the infant. Accordingly, a common apparatus for providing such heat is an infant warmer.

PROPOSED METHODOLOGY

Temperature and humidity are two very important parameters that need to be monitored continuously in the infant incubator chamber so that similar environment can be replicated for the pre-term infant or new born baby. Temperature can be displayed in terms of ?C and humidity in terms of relative humidity which is expressed as % Relative Humidity (%RH).For the design and development of the system, the methodology used involves the software and hardware implementation.



An ATmega16 AVR Microcontroller is used for carrying out all the required computations and control. It has an in-built Analog to Digital converter. Hence an external ADC is not required for converting the analog temperature input into digital value.

An inexpensive temperature sensor LM35 is used for sensing the ambient temperature. The system will get the temperature from the sensor IC and will display the temperature on the LCD. This temperature is compared with the set point temperature declared by the user (also displayed on the LCD) using a keypad. We are implementing On/Off control for controlling the temperature.

The temperature must be within a certain range otherwise continuous On/Off of the controlling elements (heater and fan) will cause damage to them.

We consider some temperature range to be compared to the set temperature. If the Room /Chamber temperature goes beyond the upper limit then fan will be switched ON and if temperature goes below the lower limit then heater will be switched ON. At set point both the heater and the fan will be Off.

We use buzzer in this system for safety if desire output is not achieved.

FUTURE SCOPE

Presently three temperature sensors are used in system or circuit. We can enhance the accuracy of system by introducing air temperature control mode, water reservoir temperature control mode and relative humidity control. We make model of the baby warmer with temperature and humidity control system. Water reservoir use for maintain the infant temperature and fan and heater are also used.

CONCLUSION

Presently three temperature sensors are used in system or circuit. We can enhance the accuracy of system by introducing air temperature control mode, water reservoir temperature control mode and relative humidity control. We make model of the baby warmer with temperature and humidity control system. Water reservoir use for maintain the infant temperature and fan and heater are also used.

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