

Survey on Performance Of Heat Sensors

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Abstract

Heat sensors are widely used in thermal and heat-transfer engineering applications. Commercial heat sensors currently available for harsh environments, however remain limited due to complications in positioning/attaching the sensor onto the component, the inability to operate at high temperatures, and potentially altering or degrading the engineering device by the physical presence of the sensor. In this paper different types of heat sensor are designed and also explained about how they are useful in specific field. In this paper the extensive survey on various types of heat sensor designs were reported. The authors who used such types of heat sensors are also mentioned her.

Keywords: Sensor, Temperature, Thermocouples, Area, Accuracy

1. Introduction

The heat sensors are normally used to detect the temperature variation in specific places. Depending upon the place the sensor type may differ. Such sensor may avoid disasters. They can also be used in places like shopping malls, hospitals, forest areas, industries etc.,

2. Surveyed designs

V.F.Mitin et al., (2009) analyzed the Thermocouple sensor that indicate temperature by measuring a change in voltage. As temperature goes up, the output voltage of the thermocouple rises. Often the thermocouple is located inside a metal or ceramic shield that protects it from exposure to a variety of environments. Mitin used thermocouple for the measurement of Contact Temperature. During Slider Asperity Interaction on Magnetic Recording Disks using thermocouple sensors whereas the thin film thermocouple sensors have been fabricated on a magnetic recording slider. In this paper he report a novel integrated thermocouple/resistive temperature sensor that can be used to measure the contact temperatures during flying as well as for measuring the average temperature of the interface. This is done in order to increase the information storage density of the magnetic hard disks.

Chih-Hao Chen et al., (2009) proposed Infrared sensors, which is also called non contacting sensors. As an example, if you hold up a typical infrared sensor to the front of your desk without contact, the sensor will tell you the temperature of the desk by virtue of its radiation - probably 68°F at normal room temperature. The motion control system for a cleaning robot based on infrared sensors. An infrared sensor system has been developed for complete coverage navigation of a floor-cleaning. But the robot needs powerful sensors to build a precise map and to localize itself, for that purpose IR sensor is used it will cover vast area and detects an unexpected obstacle while cleaning. And this will avoid recleaning .

R.Berger et al., (2009) analyzed bimetallic devices. Bimetallic devices take advantage of the expansion of metals when they are heated. In these devices, two metals are bonded together and mechanically linked to a pointer. When heated, one side of the bimetallic strip will expand more than the other. And when geared properly to a pointer, the temperature is indicated. Advantages of bimetallic devices are portability and independence from a power supply. However, they are not usually quite as accurate as are electrical devices, and you cannot easily record the temperature value as with electrical devices like thermocouples or RTDs; but portability is a definite advantage for the right application.

Bimetallic micro chemical sensors were recently used to study evolution in chemical reactions. These devices able to detect heat change, whereas it is mostly used in the study of chemical reaction. Even if the sample value changes it will be noted by the bimetallic strip. These people used micro chemical based bimetallic to determine the change at phase transitions in n-alkanes.

Xiaoh Wang et al., (2009) analyzed Thermometers. Its a well-known liquid expansion devices. They come in two main classifications: the mercury type and the organic, usually red, liquid type. The

distinction between the two is notable, because mercury devices have certain limitations when it comes to how they can be safely transported or shipped. They explained that how he used thermometer in his paper. In this paper the artificial neural network (FLANN) and least square support vector regression (LSSVR) are discussed. A final linear equation will be obtained after all the process become over calibration data of the infrared thermometer IRT/c are used to test and to speed up the training speed of FLANN.

G. Hache et al., (2009) analyzed a design named Change-of-state temperature sensors, which measures change in the state of a material brought about by a change in temperature, as in a change from ice to water and then to steam. Commercially available devices of this type are in the form of labels, pellets, crayons or lacquers. Their approach is on Mobility Change-of-State Detection Using a Smartphone-based, this approach uses an accelerometer signal to identify changes-of-state caused by starting/stopping and postural change. They explored a smart phone-based approach with the device worn on the pelvis, since this is a common location for wearing a phone. They applied signal processing and analysis to extract accelerometer signal features and to detect a user's change-of-state.

Sherwood Parker et al., (2009) proposed silicon diode sensor that has been developed specifically for the cryogenic temperature range. Essentially, they are linear devices where the conductivity of the diode increases linearly in the low cryogenic regions. Whatever sensor you select, it will not likely be operating by itself. Since most sensor choices overlap in temperature range and accuracy, selection of the sensor will depend on how it will be integrated into a system. They used silicon diode for cell edge sensitivity measurement in three dimensional. Silicon sensors having n-type and p-type electrodes that go from one surface, through the substrate, and end on the other surface, making a three-dimensional array.

3. Conclusion

Survey has been done for various types of heat sensor. While comparing the performance of various types of sensors thermocouple sensor detect the heat range more accurate than the other sensors and also have many advantage in that. It is also known as TPA81. It has an inbuilt microcontroller so no need of the external connection. Sensitivity range of thermocouple array detecting infra-red is about 2um-22um.

4. References

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