

Monitoring of Blood Flow Using Ultra Sound Blood Flow Meter

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Introduction

Blood flow in a body can be measured using an ultra sound blood flow meter. This mainly consists of the following parts they are power supply, transmitter, speaker and a receiver. This blood flow can be measured by its flow velocity by shift in frequency of continuous ultra sound wave. Here the sensor we use is piezoelectric sensor. this piezoelectric is used in many ways for example this can be used in knee joint energy harvester where the moment in the body makes loss of energy whenever the sensor is place near the knee joint there will be a loss of energy which is taken by the sensor and the transducer present inside the sensor converts the energy into electrical form and the electrical form is displayed in a digital format and then we can calculate the amount of energy consumed during a walk.

Coming to here ultrasound waves are transmitted by the transmitter and these waves are reflected by the blood flow and the reflected waves are received by the receiver present in the sensor. And here Doppler shift takes place this Doppler shift calculates the velocity of flow by using echo signals frequency and velocity of sound in the blood. This ultra sound blood flow meter emits ultra sound waves into the blood flow and the ultra-sonic sound waves are affected by the depth of the blood vessel and they may also get impacted by temperature, density, viscosity etc. they reflect back due to these properties of blood. This can be calculated by the time difference like the time taken by the ultrasonic wave to collide with the blood flow and reflect back with some time delay this gives the information about the blood vessel depth.

Ultrasonic flow meters are affected by acoustic properties of the fluid. Ultrasonic flow meter that uses the Doppler shift is called reflection or Doppler flow meters. There are two

types' blood flow meters they are transit time flow meter and Doppler flow meter. the transducer used in this is an acoustic transducer used for conversion of pressure or mechanical stress into electrical force and it is used for measuring physical quantity like force pressure stress etc. these flow meters have high accuracy, rapid response these are unaffected by pressure, temperature and viscosity variations. Blood of a blood vessel can be calculated by observing or comparing the frequency of the upstream flow and the frequency of the downstream flow the difference between the two frequencies are considered as true volume flow. This sensor is placed non-invasively on the person's wrist the sensor is based on the Doppler. The Doppler shift wave can be observed in a cathode ray oscilloscope by properly connecting the output of the speaker to CRO. There are some probes to the device by using those probes we can adjust the time period and the offset. After getting an exact wave we can take it as output otherwise we can try by adjusting the probes. The sound of blood flow in arteries and the veins can be listened if the output is connected to the speaker.

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Conflict of Interest

Author declares there is no conflict of interest.

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