

Physics of Medical Devices

Nineth Lecture

Pacemaker

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Fourth Stage

Al-Mustaqbal University

2023-2024

Pacemaker

Pacemaker parts

It consists of two main parts :

Alarm Generator: It is a small metal box containing the operating battery in addition to many complex electrical circuits that monitor the number of heart beats as well as the electrical stimulation strength of the heart router and integrated electronic circuits to generate oscillations that simulate the oscillations generated by the SA node.

Electrical conduction: It is a flexible, insulating wire that connects the pacemaker to the right ventricle and transmits electrical impulses to and from the heart.



شكل (٢.٢) منظم ضربات القلب

2- Battery

The pacemaker battery has special specifications in terms of size, power, and battery life. The energy required by the pacemaker for one pulse is in the range of 25 microjoule, which is a very small value if compared with the energy of the defibrillator, which ranges from 15 to 300 joule.

The specifications of the lithium pacemaker battery are:

- the open circuit voltage 2.8 Volt
- The low voltage of the control circuit 2.2 Volt
- The current value is equal 10 μA
- The internal resistance of the battery is equal to 10 K Ohms
- Discharging time is 1.5–5 ms
- Battery life is more than ten years (probability of 99.6%)
- Battery size and weight: Approximately half of the regulator's size is occupied by the battery
 - Weight of 12.5 – 15.5 gram
 - Volume: 5-8 cm^3