Health problem addressed

Monitors that measure a patient’s temperature during surgery, postoperative care, critical care, sepsis and infections, shock, fertility and ovulation assessment, treatment of hypothermia and hyperthermia, or other cases that require body temperature to be continuously monitored.

Product description

Devices are stand-alone, electronic, and continuously monitor temperature. Many electronic monitors accept a wide range of specialized monitoring probes (e.g., esophageal, rectal, myocardial, skin, ingestible capsule), and may be reusable or disposable. The probe contains either a thermistor or a thermocouple. Probes for rectal, esophageal, and nasopharyngeal measurements come in various sizes and have flexible tips. Some esophageal probes contain an audio-sensitive cuff and can be used to monitor heart and lung sounds. The sensor of a urinary bladder probe is located on the tip of a Foley catheter. Thermal well probes for use with blood gas oxygenators and myocardial probes are available.

Principles of operation

Thermistors are composed of metal oxides sintered into wires or fused into rods or beads. The resistance of these metal oxides decreases as the temperature increases and vice versa; probe resistance can thus be converted to a temperature reading. Thermistors have rapid response times and are highly sensitive to temperature changes. Thermocouple sensors consist of two dissimilar metals joined at a junction. The thermocouple generates a voltage that is proportional to the difference in temperature between the thermocouple junction (sensor) and the junction formed at the connection to the monitor. The monitor compensates for the temperature of this second junction so that it can display the temperature of the sensor, which is placed in or on the patient. Thermocouple monitoring probes respond rapidly to temperature changes.

Operating steps

- Turn the monitor on.
- Insert or attach monitoring probe to the patient.
- Medical staff should monitor the patient’s temperature.

Reported problems

The measurement range of some electronic temperature monitors may be inadequate for the intended application. Battery depletion can cause the unit to stop functioning altogether or result in erroneous readings. Due to cross-contamination, temperature monitors may also become contaminated with various pathogens (e.g., blood, urine).

Use and maintenance

User(s): Physicians, nurses, other medical staff
Maintenance: Biomedical engineering staff and/or service contract with the manufacturer or third-party organization
Training: Initial training by manufacturer, operator’s manuals, user’s guide

Environment of use

Settings of use: Hospital
Requirements: Battery, uninterruptible power source (for recharging batteries)

Product specifications

Approx. dimensions (mm): 115 x 200 x 65
Approx. weight (kg): 1.8
Consumables: Probes, probe covers, batteries
Price range (USD): 500-2,750 (1,500 typical), 2.50-5 for 100 probe covers; price covers all types and variations
Typical product life time: 8 years
Shelf life (consumables): Variable

Types and variations

- Bedside temperature monitoring