Health problem addressed
Apnea monitors detect the cessation of breathing (apnea) in infants and adults who are at risk of respiratory failure and alert the parent or attendant to the condition. Some prolonged respiratory pauses result in low oxygen concentration levels in the body, which can lead to irreversible brain damage and, if prolonged, death.

Product description
The components of apnea monitors depend specifically on the type. However, in general they are composed of a set of sensors which obtain the information of different physiological parameters. This information is passed to a micro computer system, which analyses the sensors’ information and determines if apnea is occurring.

Principles of operation
Monitors that use impedance pneumography detect small changes in electrical impedance as air enters and leaves the lungs and as the blood volume changes in the thoracic cavity. Mattress-type motion sensors typically monitor changes in the capacitance or resistance of a mattress transducer. Pneumatic abdominal sensors also detect breaths as changes in pressure. More direct methods of respiration detection monitor the airflow into and out of the lungs; these include thermistors, proximal airway pressure sensors, and carbon dioxide (CO2) sensors.

Operating steps
The apnea monitor is attached to the patient using appropriate sensor for the measurement technique (e.g., mattress motion sensor, pneumatic abdominal sensors, thermistors, proximal airway pressure sensors, carbon dioxide (CO2) sensors, cannula). Once connected, as the patient breathes, the unit monitors different body parameters. If an alarm sounds, the operator must attend the patient immediately.

Reported problems
Apnea monitors may fail to alarm during an episode because they sense artifact (artifacts include vibrations, heart activity, patient movement). Electromagnetic emissions from electronic devices (other electronics or equipment) can also cause interference, possibly leading to false breath and heartbeat detection. Impedance pneumographs are more subject to cardiovascular artifact. Misinterpreting impedance changes because of heartbeats perceived as breaths frequent when instrument sensitivity is not adjusted.

Use and maintenance
User(s): Nurse, medical staff, home care providers
Maintenance: Biomedical or clinical engineer/technician, medical staff, manufacturer/servicer
Training: Initial training by manufacturer, operator’s manuals, user’s guide

Environment of use
Settings of use: Hospital, home, ambulatory care center, nursery
Requirements: Uninterruptible power source, battery backup

Product specifications
Approx. dimensions (mm): 150 x 120 x 120
Approx. weight (kg): 0.75
Consumables: Batteries, cables, electrodes/sensors
Price range (USD): 200 - 5,000
Typical product life time (years): 8
Shelf life (consumables): NA

Types and variations
Stand-alone, modular