Health problem addressed

Transport ventilators provide ventilatory support for patients who cannot breathe on their own or who require assistance maintaining adequate ventilation because of illness, trauma, congenital defects, or the effects of drugs (e.g., anesthetics). Transport ventilators are designed to take the place of manual ventilation or "bagging" during emergency or transport situations.

Product description

Ventilators designed for interhospital, intrahospital, or prehospital emergency transport. These units typically consist of a flexible breathing circuit, a control system, monitors, and alarms. Power is typically supplied by one or more internal batteries, an external battery, or an alternating current line.

Principles of operation

Common operating modes available on these units include control mode, assist/control mode, and SIMV mode. Some may have additional operating modes such as CPAP and pressure support to facilitate patients with more complex oxygenation and ventilation requirements. Most monitor airway pressure and have adjustable high-pressure and low-pressure alarms. Airway pressures are normally measured at the patient connection of the breathing circuit, producing measurements that are more reliable than those taken at other points in the breathing circuit. A high-pressure alarm warns of inspiratory pressure increases that are caused by decreases in lung compliance, breathing circuit occlusion, or increases in airway resistance. A low-pressure alarm can warn of breathing circuit disconnection, leakage, or failure to deliver a breath. Some may have an adjustable high-pressure-relief valve that opens when the pressure is above a set pressure-limiting value.

Operating steps

- Users first check that the unit is ready for use (e.g., run performance and calibration checks).
- They then make sure that settings (including alarms) are correct and appropriate for the patient type and condition.
- Patient is connected to the ventilator.
- Users ensure that the patient is being properly ventilated.
- Caregivers are responsible for monitoring/evaluating the patient during ventilation, and for promptly responding to alarms.

Reported problems

Problems are associated with general patient transport (e.g., disconnection of the breathing circuit, accidental extubation) and emergency vehicle transport (e.g., vehicle noise, vibration). Other problems are related to user error, poor maintenance, use of poor-quality breathing circuits, and extreme environmental conditions. Critical changes in patient conditions can be missed if alarms are not set properly or are not noted by clinical staff.

Use and maintenance

User(s): Physicians; nurses; respiratory therapist; 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, inter- and intra-hospital transport; prehospital emergency transport
Requirements: Battery, uninterruptible power source (for recharging batteries), proper tubing/masks, humidification equipment, oxygen tank

Product specifications

Approx. dimensions (mm): 250 x 230 x 150
Approx. weight (kg): 5
Consumables: Batteries; tubing; masks; filters
Price range (USD): 3,200-60,000 (10,000 typical); price covers all types and variations
Typical product life time: 8 years
Shelf life (consumables): Variable

Types and variations

- Transport ventilation