



Compressing the Air at 85,000 rpm

The TurboVent2 (second generation) ventilator is a component of the Zeus Infinity Empowered anesthesia system from Dräger. The ventilator module is plugged into the Zeus housing [1] by 18 spring contacts (coding pins) [2], which ensure that it cannot be incorrectly connected. The central element of the radial fan is the gas-tight encapsulated, brushless DC electric motor [3] which is mounted using a low-vibration silicone membrane [4]. It is operated in sync with the physiological breathing frequency and reaches a speed of up to 85,000 revolutions per minute. The motor is designed for minimum inertia with maximum torque, and manufactured with the smallest imbalance possible. It accelerates from 0 to 20,000 rpm within 100 milliseconds and is thus capable of tracking spontaneous breathing efforts.

The impeller [5] is made from extremely stable polyether ether ketone (PEEK). It is pressed onto the motor and sucks in a gas mixture of oxygen, anesthetic and breathing gas from the connector [6], compressing it to a pressure of up to 100 millibars in a chamber [7], the contours of which designed for an optimum flow. Among other advantages, this ensures a lower airway resistance for a further-improved free breathing. The connector [8] carries the compressed air onward. Both connectors are mounted on bellows [9] for minimum vibration. This design effectively reduces possible coupling of vibration to the anesthesia system. A fan [10] mounted in the Zeus housing [1] cools the corrosion-resistant module, which can be sterilized as a unit in a steam autoclave—a feature which is almost certainly unmatched worldwide.