



Brushless DC motors for Respiration therapy.

maxon Brushless DC motors are the driving force at the core of respiration therapy devices.

There is a multitude of sleep related disorders and correspondingly there is also a multitude of available therapies. Respirators, whether used in the hospital or at home typically have one thing in common – maxon brushless DC motors.

Of all the motorised medical device applications, respiration therapy is becoming more and more important. Correct breathing has been proven to improve the blood circulation and augment the oxygen delivery. Typically respiration therapy is associated with disorders and diseases of the lungs and respiratory tract. Home respiration is a niche application area of intensive care where patients are mechanically ventilated for the treatment of temporary or permanent failure of the nervous system or respiratory muscles which can continue after discharge from the hospital. There is a differentiation between invasive and non-invasive ventilation. Pressure-controlled or volume-controlled ventilation methods can be used, or in some cases only assisted ventilation treatment is given.

Motor driven medical respirators and therapy devices are also commonly used for sleep related respiratory disorders. These medical devices provide a positive pressure keeping the airways open whilst the person is sleeping. The pressure is applied through a ventilation mask (nasal, nasal cushion or full-face mask). This mask is equipped with an exhalation valve in order to ensure that the exhaled air is diverted

away. The majority of treatments use mono-level therapies, also described as Continuous Positive Airway Pressure (CPAP) and self-regulating devices (auto CPAP), where the pressure is programmed to fluctuate within previously defined patient specific pressure levels and current conditions.

Brushless DC motors provide the correct airway pressure.

Combined treatment technologies are also available for patient groups that have more specific needs. For more than 20 years, HOFFRICHTER GmbH has manufactured various respiration therapy devices. The motorised devices are very quiet and deliver high pressure stability. A maxon brushless DC motor supplies precise control over the system pressure. The DC motor drives the impellor or turbine of the equipment. The motor and turbine are mounted in a special enclosure and together they provide the required treatment pressure.



Figure 1: Brushless motor driven respiration device. © 2013 Hoffrichter

The motors must conform with strict specifications and stringent requirements because the respiration devices are often life critical devices. It is absolutely crucial that the Brushless DC motors meet very high quality standards and achieve long lifespans. In addition, the brushless DC motors must fulfill many other important medical criteria. The motor must have very dynamic acceleration capabilities to meet the required respiration rate of the user. The motor speed is constantly adjusted in order to give the ideal patient experience. Naturally, the motors must be as small as possible as the space within the respirator is minimal. As the motor is often used at night it must have the lowest possible noise levels and maxon motor are proficient at the producing motors with special balancing procedures to keep resonance levels to a minimum within the entire device.



Figure 2: The brushless 22mm DC motor © 2013 maxon motor

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