A breath of fresh air for Medical Equipment

As we face escalating environmental challenges, with power consumption an increasingly critical cost factor, electrically driven systems must become more energy efficient.

The huge environmental impact and ongoing cost increases for power consumption are forcing designers of electrically driven systems across all industries to seek increasingly efficient solutions - from industrial applications and agricultural machines to medical devices in healthcare.

Many medical devices which require electric energy for air power still rely on compressed air feeds or motor driven blowers utilizing relatively low speed technology, both of which are power hungry and inefficient when comparing electrical input power with the working airpower delivered. For this reason, medical system designers are turning towards the benefits provided by high speed electronically commutated (EC) blowers. Combining the superior device efficiency with relatively compact dimensions and lower weight allows the designer to locate the air source close to the point of use within the medical devices, with further benefit of minimise piping losses for system efficiency gains. The net result can save several kW per device, which considering kW/hr rates can contribute a level of operational cost saving not be overlooked.

This article introduces some examples of medical devices which have successfully adopted high speed EC blowers.

Cleaning & Disinfection Chamber

A so-called cleaning or disinfection chamber is an indispensable device in each hospital. After the cleaning process, the blower is used to provide mixed pressure/flow within the system to clear any remaining water and debris from orifices in the medical devices, and to evacuate steam after drying to minimize cycle time. The blower features an on-board controller which

provides the correct speed for the required system pressure and flow of each machine program setting. The blowers' compact weight and dimensions enable it to be mounted directly within the system. Additional sound reduction is achieved by mounting the blower within an acoustic chamber, which enables strict sound limits to be met for whisper quiet device operation. The EC blower construction is suitable to provide end users with several years of maintenance free operation even in the most demanding high duty applications.

Cryo-Therapy Systems

Many clinicians prefer to utilize non-invasive treatments methods to freeze & anesthetize skin prior to laser therapy – which are often used for scar tissue treatment or removal of unwanted skin markings or tattoos. In this application the system requires a controllable stream of air with the blower located upstream to push air through the cryo-temp system, outlet hose and nozzle to the point of use on the patient. The blower can be embedded into the machine, with acoustic attenuation, to provide a comfortable quite solution, where the user and patient will hear only the sound of the working air exiting the nozzle. Meanwhile the on-board blower controller, with input from the system setting, can adjust speed to ensure the desired pressure and flow is achieved independent of the different resistances which result from the selected hose, nozzle, and system setting. The net result of the achievable close control being optimize system operation time, patient comfort and wound recovery.

Surgical Smoke Evacuation

Hygiene is nowhere more paramount than in surgical environments, which must be free of all contaminants. Considering the carbon dust released by brushed forms of motor commutation and the application need for speed control, this necessitates the use of EC blowers in surgical smoke evacuation systems. The contactless commutation allows the system to be a powerful

source of air suction for filter collection of surgical smoke, which may also contain carcinogenic airborne contaminants. Here the blowers' on-board speed control interfaces with the medical suction device to provide fine control in conjunction with use of the surgical tools, providing both patients and clinicians with safe breathable quality air. The relatively small package size of the blower enables it to be designed into the suction device with appropriate sound attenuation for optimized patient and operative comfort.

Biopsy analysis device

Lab biopsy requires tissue to be finely sliced in preparation for micro-optical analysis. As the tissue is sliced it is imperative to ensure no air-borne contaminants are released from the sample material. This process requires the device to utilize an embedded suction device to collect, filter and store the airborne tissue and contaminants. EC blowers are ideally deployed in such devices. Their long life, speed control and compact dimensions enable fitment close to point of contaminant release, without introducing additional airborne contaminants, such as carbon dust, which may interfere with the sample analysis.

High speed EC blowers – energy efficient solutions for healthcare applications

Many requirements are common across the field of healthcare applications. Very low device downtime is paramount, combined with long duty cycles. In this respect the EC blowers offered by MAE, a brand of AMETEK, are a perfect fit, offering long service-free life. Special consideration is also given to acoustic performance when operating in the healthcare environment, to ensure the comfort and safety of both patients and clinicians. Thanks to the compact dimensions and weight of MAE's EC blowers they can be mounted within the acoustic chamber of the system to ensure compliance with the defined noise limitations.

The onboard speed control featured on each EC blower model ensures the rotational speed, and therefore power consumption, can be set to precisely deliver the required pressure or vacuum and air-flow rate necessary for the process and no more, for optimized efficiency.

MAE EC blowers are available for universal single phase mains input, 100-240V 50/60Hz, and 24 or 48VDC, covering flowrate demands up to 2000 m3/h and working pressures up to 40 KPa.

If you are seeking a low-weight and compact device to precisely deliver air power for your system, where operating uptime and power efficiency combine as critical factors to the cost of ownership of your solution in the field, then please reach out to us.

The MAE experts look forward to proposing an EC blower to fit perfectly with your application, combining energy-efficiency and reliability with optimized running costs.

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