Dental Endodontic Obturation Device Incorporates an Electric Motor for Precision and Tactile Control

The latest technologies and designs of motion components help to make advancements in the dental device field last longer and operate more efficiently. Electric motors also help to provide a device’s ease of maintenance and operation, which is a major benefit when working with specialty procedures like root canal obturation.

Aseptico (Woodinville, WA) is an innovator, designer, and manufacturer of endodontic, implant, and portable dental equipment. The company performs all its design and manufacturing in-house. As with other medically oriented equipment, component quality and long life are important.

As Aseptico approached its latest project, it did so with the company’s usual care and research. The project involved a device that would provide a controlled application of dental material with minimal physical effort. In essence, they wanted a machine that would deliver root canal filling material easily, accurately, and quickly. The company also faced issues of compactness, ease of use, and programming flexibility. The end product was to be used by dentists when providing endodontic filling techniques. The design had to provide a great deal of control and output power for extrusion of the highly viscous material while still being lightweight, fitting into one hand, and easily used.

Aseptico's latest Endodontic System, Model AEU-35, was designed and fabricated in-house. The system features an ergonomically designed pen-like hand-piece with a 360 degree easy-touch activation cuff. This component, along with variable temperature settings and a filling material indicator, allows the user to easily control the flow rate of the filling material into the canal.

The system also offers two programmable preset buttons for storing the speed and temperature settings in memory. These presets allow the user to easily recall technique specific preferences.

The user settings are displayed on a large, easy to read LED display, and the console is designed with an integrated combination hand-piece/motor holder. Upgradeable software provides flexibility to the customer so that they get a great return on their initial investment.
**Motor and Gearhead Selection**

The dispensing system of the hand-piece required that Aseptico provide a highly accurate and efficient motor that can be speed controlled. The motor also had to be small enough to fit into the hand-piece without adding an excessive amount of weight where the user might become uncomfortable. Further, the motor was an essential part of the user interface that featured adjustable hand-piece speed, temperature, and flow settings. As with any medical device, longevity is a key issue, and Aseptico needed to know that the motor not only met their specifications, but would provide long life as well.

When it came to the dispenser motor, the company turned to Maxon Precision Motor as a supplier. The dispenser uses a Maxon A-max 16mm DC motor and 16mm 370:1 reduction planetary gearhead. The Maxon motor provides the most available torque for its package size, and uses sintered metal gears in the gearhead to give good reliability even under heavy loads.

The A-max line uses a patented rhombic moving coil design that provides for the long life of the motor, as well as its low electrical noise, fast acceleration, and high efficiency. These motors' ironless rotors allow for zero cogging and simple, accurate control. Several different windings are available to match desired speed with available voltage.

Maxon planetary gearheads are provided in sub-miniature packages just for applications like the AEU-7000-70V. Efficiency of the gearheads is up to 90 percent. They are available to mount on Maxon’s brushed and brushless motors. These gearheads are ideal for handheld devices in a variety of industries.

The application had specific characteristics, which were necessary for the design. The Maxon motors met or exceeded those specifications offering Aseptico output speeds from the gearbox of 15-30 RPM depending on input, overall system speed accuracy of +/- 4 percent, and output torque from the gearbox of 16 inch-ounces maximum, current-limited.

**Conclusion**

According to Shane Hohnstein, VP of Operations for Aseptico, “Implementation of the motor and gearhead combination was virtually immediate — plug-and-play. There was no accommodation to the product design necessary to use the motor. Minor adjustments to the production processes for soldering leads were relatively fast and easy. Aseptico manufactures its dental products in strict compliance and conformity to quality control regulations around the world. They are certified for designing, manufacturing, and final inspection of dental products in accordance with ISO 13485:2003 and Directive 93/42/EEC concerning medical devices. The AEU-35 is FDA, UL, and CE compliant.
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