CASE STUDY

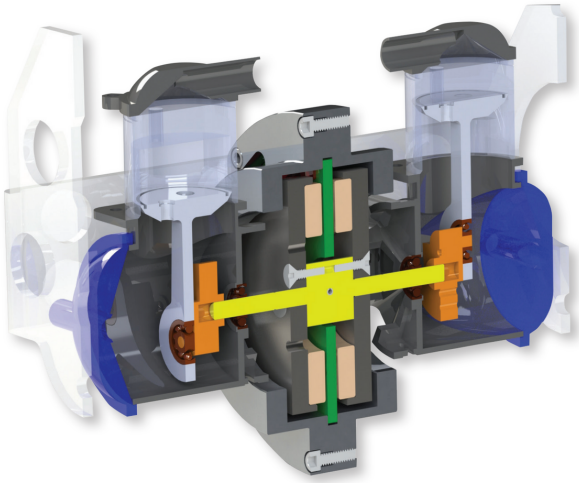
ECM establishes the value of PCB Stator Technology in next generation Medical devices

Overview

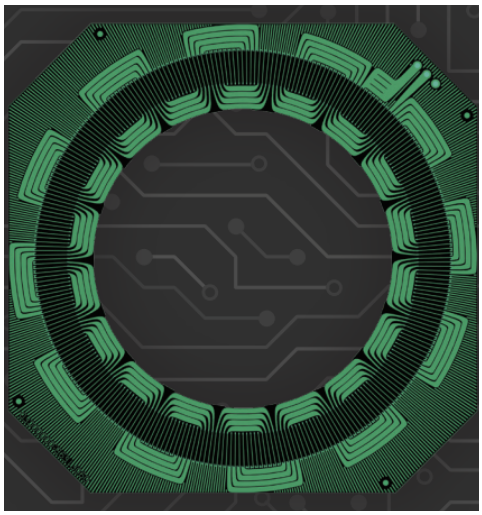
ECM has integrated its printed circuit board (PCB) stator technology into several cutting-edge medical devices. Recently, ECM prototyped motors for two very different medical applications. The first, built for a medical robotics company, actuates the elbow joint of an orthosis. The second, designed with an international medical device OEM, shows the advantages of integrating an ECM motor into their portable oxygen concentrator.

Benefits

The planar form factor and minimal axial thickness of ECM technology allows for small, lightweight motors for portable systems. ECM's increased efficiency reduces energy cost and, for portable systems, extends battery life. ECM's flexible form factor enables compact integration with a variety of torque multipliers, creating systems with high torque density. Reduced raw materials and PrintStator's utilization of well-established PCB manufacturing processes lowers cost and environmental impact.



Form factor flexibility, increased efficiency, low noise and reduced cost are just a few of the many benefits of a motor solution built with an ECM PCB stator, making PrintStator's design capabilities valuable for almost any application.



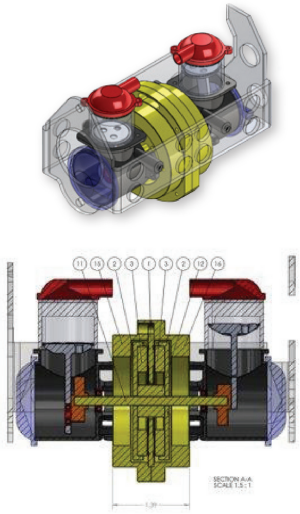
Gerber file produced by PrintStator, ECM's PCB stator design and optimization software PrintStator transforms customer specifications into a Gerber file that explicitly defines the manufacture of a unique PCB stator.

Results

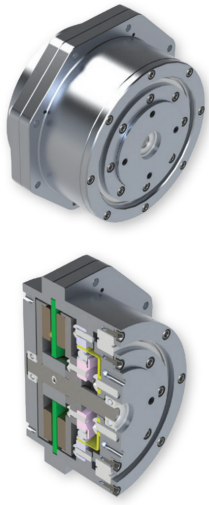
Orthotic Joint Motor
The 40W motor, which ECM designed and prototyped with PCB stator technology to actuate the elbow joint of an adult orthosis, reduced system size and increased capability. The concise combination of a harmonic drive and ECM's axially thin motor created a low volume system with high torque density, enabling patients to lift heavier items and wear a long sleeve shirt over the brace. ECM is currently collaborating with this medical robotic company to finalize system design and further benefit the patient.

Oxygen Concentrator
ECM's oxygen concentrator prototype reduced motor axial thickness by 60% and significantly decreased system noise. When compared to the current concentrator package, this compact solution required less raw materials, which in turn reduced manufacturing costs. ECM is currently working with this OEM to optimize the design to capitalize on ECM's motor advantages and further improve portability, reduce noise and minimize the cost responsibility of the patient.

> **"ECM's PCB stator technology can significantly improve the performance of mobile medical applications and enhance the comfort of users."**
>
> Chris Fielding
> ECM, Vice President of Applications



ECM's integrated 40W motor solution for an adult elbow joint orthosis. Section view displaying the compact integration of a harmonic drive and ECM's PCB stator in green.



Preliminary designs of the integrated oxygen concentrator solution with ECM's PCB stator motor in yellow.

Next Steps

ECM is in the process of introducing its PrintStator software and PCB stator technology for a wide range of medical applications. Form factor flexibility, increased efficiency, low noise and reduced cost are just a few of the many benefits of a motor solution built with an ECM PCB stator, making PrintStator's design capabilities valuable for almost any application.

To discuss integrating ECM's PCB stator technology into your product line, please email info@pcbstator.com or visit pcbstator.com/design-your-own to learn more about our 5-step integration process.

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