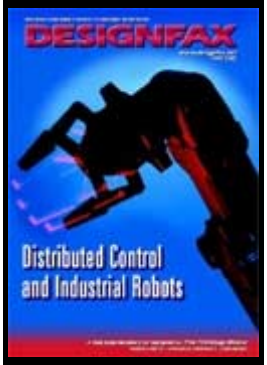

DESIGNFAX ONLINE

FIVE STAR: PRODUCT OF THE MONTH

Thinking Thin

And getting your flux in a row

There was a handbook on programming Fortran, some two decades ago, that bore a quote on the frontispiece, “Just what the world needs…another Fortran book.” Technology and advances in design today might allow us to paraphrase that with “…another motor company.”

But the ThinGap product line from G&G Technology, Santa Barbara, CA, has taken an interesting tack. Gone are the traditional armature and stator windings of copper wire — instead, the motor coils are made with machined copper sheet stock, laid out like miniature formed buss bars, separated by a polyamide insulation. The immediate result from this design is a higher packing density for the copper and a higher ratio of copper to total volume, placing more copper in the magnetic field. Sheet stock also reduces the chances for “throwing a winding,” and the rugged construction makes motors capable of surviving an autoclave. Motor efficiencies above 90% are realized for the ThinGap motors, with lower heat generation, lower electrical resistance, and zero cogging or ripple torque. Doing away with an iron lamination stack eliminates iron losses and lamination ringing. The application of square or rectangular conductors additionally creates a winding mass that is consistently flat all around the outside circumference. This, in turn, permits minimization of the air gap between the magnet return structure and the permanent magnet, maximizing the magnetic flux density of the motor and producing greater torque

The company, which already produces three styles of brushed DC motors, most recently introduced the TG3600 Series slotless, brushless PM motor. The combination of the thin stator wall with high-energy neodymium-iron-boron magnets produces a high power density and efficiency over a speed range of 4000 rpm to one revolution per day, without a gearbox. Maximum continuous torque of 115 oz-in. is achieved at 2400 rpm, with an input of 24 VDC and 15.6A from the specified PWM servo amplifier. Armature inductance measures below 10 µH, and line-to-line resistance is 0.31W at 25ºC. The motor measures 2.180-in. long, with a 2.375-in. dia.

—RM