

## *News from*



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### **Introducing ARKTIC 142 ECM for Commercial Refrigeration: Tenth-Generation Technology Uses 15% Less Power than Conventional Motors**

**2008 National Restaurant Association Show—Chicago IL**—Morrill Motors has unveiled the ARKTIC 142 fractional-horsepower commercial-refrigeration motor, the tenth-generation electronically commutated motor (ECM) that uses 15% less power at rated speed than a conventional PSC motor.

Ideally suited for use in walk-in coolers and freezers, parallel racks, and condenser units, ARKTIC 142 is the high-efficiency solution for refrigeration applications that require a 3/4, 1/2, 1/3 or 1/5 horsepower motor.

“ARKTIC 142 offers manufacturers the highest-efficiency solution available for compliance with demanding new appliance regulations,” said Tim Neal, Director of Marketing for Morrill Motors Inc. “With an emphasis on quick integration into existing equipment designs, the 142 makes our reliable, field-proven ECM technology a high-efficiency alternative for heavy-duty-refrigeration applications.”

#### **A New Industry Standard**

With growing public concerns about fuel prices, energy dependence, pollution, and sustainability, government mandates for higher-efficiency-refrigeration equipment are quickly becoming a driving force within the foodservice industry.

Fan motors are leading this regulatory charge towards decreased power use. Beginning in 2008, California Title 20 appliance regulations require that evaporator boxes in all new walk-in coolers and freezer use high-efficiency motors. The Title 20 standard goes nationwide beginning 2009.

“The efficiency issue isn’t going away any time soon, and businesses should expect more regulations in the future,” said Neal. “Consider: energy costs are increasing the cost of doing business; the public is intently focused on corporate commitments to green technologies; states have limitations on their ability to invest in new power plants and make expensive upgrades to the power grid. Going forward, conservation is going to be a key issue in foodservice. Motors are the heart of what runs refrigeration equipment, so they have become a prime target for cutting consumption.”

## **The ECM Advantage**

Built on over 20 years of proven ECM technology, the new 142 offers flexibility and efficiency to manufacturers and product designers.

Compared to conventional motors that only achieve peak performance when running at design speed, the ARKTIC 142 is efficient across a range of speeds, decreasing power use by 15% or more. This superior performance is due in part to the 142's brushless DC design, which is inherently more efficient over a wide speed range than a PSC design.

The other key is 142's permanent-magnet rotor, which, unlike a PSC with its conventional rotor, does not require current to be induced across the air gap between the rotor and stator – a characteristic that causes efficiency losses in the form of heat.

“In refrigeration, PSC motors create a double inefficiency because their heat losses actively fight the cooling process,” noted Neal. “For every unit of cooling a PSC motor creates, it contributes a half-unit of heat back into the system. Extra heat forces a longer cooling cycle, which means higher electric bills, and more wear and tear on every component in the system.”

## **Follow the Speed Limit**

The ARKTIC 142 advantage becomes even more pronounced when equipment runs at lower speeds, because an ECM decreases power use and heat dramatically as the motor speed slows. The ARKTIC 142 is capable of running at one, two, or three pre-set speeds.

In applications such as a parallel rack unit that is used to keep refrigeration compressors from overheating, one method for improving performance is to implement variable-capacity operation. In variable-capacity equipment, coolant flow and operating temperatures can be raised or lowered to match the exact needs of the refrigeration system.

Variable-capacity is achieved by wiring several multiple-speed fans in a series, so that some of the fans only operate under heavy load conditions. The minimal operation uses less power overall, and decreases heat contribution from the fans.

For example, when a grocery store is closed, equipment can run more slowly to keep appropriate food temperatures without over-cooling. In addition to cutting power use, reduced cooling helps avoid the need for a defrost cycle, and keeps temperature and humidity more constant, which yields fresher, longer lasting food.

In contrast, a PSC motor is a liability in variable-capacity equipment because the motor's efficiency drops and creates even more heat than when running at design conditions. Heat and electricity losses in multiple-speed PSCs can offset the overall equipment gains completely.

Another drawback, a PSC motor has hard-wired speeds, making it much more difficult to work with in product development. Hard-wired settings require close coordination with a third-party manufacturer to create motor specifications. There is also added wait time to get a correct part from the supplier to the design team.

If the first specification is off, or the product design is changed, the whole process must repeat for every new iteration. The back-and-forth adds development expense, and encourages equipment that operates within a tolerable range of efficiency, as opposed to optimally dialed-in performance.

With the ARKTIC 142, development for both single-speed and multiple-speed equipment becomes much simpler, thanks to the programmability of ECM technology. Speed settings are determined by commands that are saved inside of the ECM, and design engineers can modify motor settings in-house using a special Morrill Motors tool called the ECM Toolbox.

The ECM Toolbox software makes product development easy, giving manufacturers a familiar, easy-to-use Windows-PC programming interface for modifying motor settings. Programmability means instant gratification instead of the motor manufacturer specification process, and precise performance for every equipment application. The ECM Toolbox also decreases inventory, because the same motor can be reprogrammed for a variety of system configurations or be installed in different equipment altogether.

Alongside ECM programmability, the ARKTIC 142 also features BlaKBox™ Diagnostics, a built-in data recorder that provides an unprecedented amount of feedback from equipment in the field. Like a flight recorder on an airplane, BlaKBox provides information that is key to diagnosing existing equipment, improving product reliability, and developing future refrigeration technologies.

### **Proven Technology**

The ARKTIC 142 comes from the combined proven technologies of GE ECM and Morrill Motors. Its brushless-DC, permanent-magnet design was derived from more than 20 years of success with millions of commercial refrigeration and residential HVAC installations worldwide. For more information and other ECM product support, contractors can go to: [www.theDealerToolbox.com](http://www.theDealerToolbox.com).

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