

Feature Focus

High Efficiency Motors Unit Coolers with ECM Motors

ECM Motor Technology

The electronically commutated motor (ECM) was developed in 1969. The term "commutate" means to convert alternating electric current to direct current or vice versa. This conversion is what allows the ECM motor to be efficient by having an electronically controlled inverter moving a magnetic field.

There are many advantages to using an ECM motor over a permanent split capacitor (PSC) motor. The one advantage most often cited is efficiency, especially during turndown or partial loads. Many ECM motors can reach efficiencies as high as 82%.

Regulations

Refrigeration efficiency is a hot button as government regulatory agencies draft and enforce new energy efficiency standards and end users want more powerful, less energy consuming equipment. As a result, designers of refrigeration products are increasingly eyeing electronically commutated motors as a key path to increased efficiency.

In today's regulatory environment, we have to be concerned about meeting regulations at the state and federal level, both in the near and longer term. The U.S. Department of Energy (DOE) is working on a whole range of energy conservation standards for refrigeration appliances.

At the state level, the most pressing regulatory action is occurring in California. California Energy Commission - 2007 Title 20 Appliance Efficiency Standards for walk-in coolers and freezers, as well as the 2008 Title 24 Building Efficiency Standards for Refrigerated Warehouses requires the use ECM motors (fractional horsepower at less than 460 volt). With many states looking at similar requirements in their own efficiency rulings, this new standard will quickly become the law of the land.



Efficiency

In a studies by GE that compared motors, the ECM had a higher electrical efficiency (70 percent efficient) than PSC (49 percent efficient) or shaded-pole (32 percent efficient). Watt-for-watt, ECM can use up to a third as much energy when running at rated speed. ECM also maintains its efficiency across its speed range, whereas an induction motor's efficiency plummets when its rated speed is altered. In addition to the direct benefits, there are a number of indirect benefits including "cooler" motor operation which creates less heat load on the conditioned space when used with evaporator coils.



The ability to replace traditional shaded-pole motors with more efficient ECM motors was confirmed by researchers at the Food Service Technology Center (FSTC) in testing for Pacific Gas & Electric Co. The testers installed and monitored two GE ECM motors in a walk-in freezer. The motor utilized a permanent magnet, three-phase, brushless DC motor combined with a built-in electronic AC inverter that was used to drive it. The freezer evaporator unit originally came equipped with two shaded-pole 1/15 HP fan motors, but was retrofitted. The initial measurement of the original shaded-pole motors' input power was 271 watts with the two fans combined. Following the retrofit, the power was 88 watts for two fans combined. Overall, the ECM equipped fans used 67 percent less energy.

Century Refrigeration is making a world of difference with the addition of the optional ECM motor technology, Century's complete line of unit coolers have now become more efficient and quiet. Utilizing industrial grade construction and state of the art components we specialize in providing creative solutions for your refrigeration application. Century Refrigeration offers our customers a host of specialty options and flexibility in design.

Century Unit Cooler	Standard Motor			ECM Motor		
	Motor Size	Motor Amperage	Sound Data	Motor Size	Motor Amperage	Sound Data
FH Series	16 Watt	1.0A @120V	62 DBA @ 10"	16 Watt	.2 A @ 120V	60 DBA @ 10"
FV Series	50 Watt	1.0A @120V	65 DBA @ 10"	38 Watt	.3 A @120V	62 DBA @ 10"
IBR Series	1/6 HP	.9 A @230V	73 DBA @ 10"	1/3 HP	.7 A @ 230V	73 DBA @ 10"
A Series	¼ HP	2.0 @ 230V	69 DBA @ 10'	1/3 HP	1.2 A @ 230V	69 DBA @ 10'



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