Introducing EC Motors and the Frigitek® ECMotor Controller

EC motors are a dramatic improvement over the older shaded pole motors commonly used in refrigeration systems. They are actually DC motors with an electronic commutation control to make them turn. ("EC" = "Electronically Commutated") They typically can save about 50% of the energy used by the shaded-pole motors they replace. Because of their improved efficiency, some states have mandated their use in new equipment.

The addition of the Frigitek ECMotor Controller to an evaporator using the EC motors can almost double the savings provided by the motors alone.

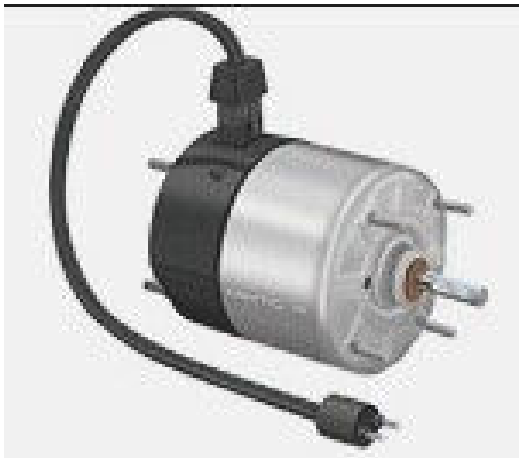

Figure 1 - The EC Motor

The Frigitek ECMotor Controller functions by sensing the operational status of the cooling system, and controlling the speed of the evaporator fans. It is a fact that all of the electrical power which is used by the fan motors ends up as heat inside the refrigerated space. By operating the fans at a low speed when no cooling is called for, and at high speed only when the system is actively cooling the refrigerator, much less heat is introduced into the refrigerator. Although this results in an additional saving in evaporator fan motor power, the reduction in fan motor heat generated causes a significant reduction in refrigeration operation, saving enough energy at the compressor to almost double the savings provided by the EC motors alone.

The Frigitek ECMotor Controller is designed to be easily installed when upgrading to EC motors, or to be retrofit into existing units. Installation typically takes about a half hour (as does each EC motor), and can be done by any competent electrician or refrigeration technician. The ECMotor Controller is usually mounted inside the evaporator case, in the compartment with the electrical connections.

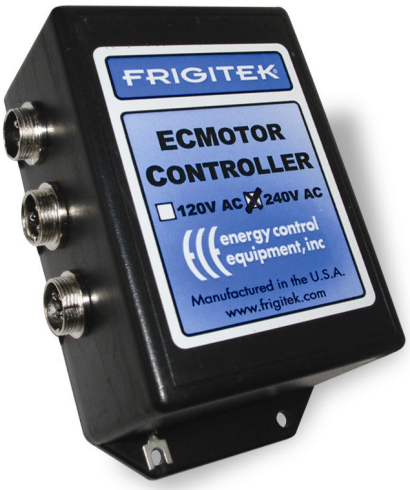

Figure 2 - The ECMotor Controller

In addition to its energy saving qualities, the Frigitek ECMotor Controller also provides some intrinsic advantages. The low speed of the fans results in lower evaporation from sensitive stored foods, and the lower noise levels contribute to worker efficiency, and a more pleasant workspace.

The Frigitek ECMotor Controller is patent pending.

Energy Control Equipment, Inc. 316 Locust St., Watsonville, CA. 95076 831-768-8848

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Frigitek® ECMotor Controller Technical Description

The Frigitek® ECMotor Controller consists of three major components: a Speed Controller, Temperature Differential Sensors, and an Ice Sensor.

The ECMotor Controller is normally mounted inside the evaporator, inside the wiring compartment. Three cables connect the Controller into the evaporator system. One cable is wired to the power connections, one to the Differential Temperature Sensors, and one to the Ice Sensor.

The **Temperature Differential Sensors** (TDS) monitor the temperature difference across the evaporator expansion valve. This difference in temperature indicates whether or not refrigerant is flowing through the evaporator. The Controller commands the fans into high speed when refrigerant is flowing, and into low speed when it is not. The TDS circuitry is contained inside the Controller, and the two sensors are mounted in the piping compartment on the opposite end of the evaporator from the Controller. A low-voltage cable connects the TDS sensors to the Controller.

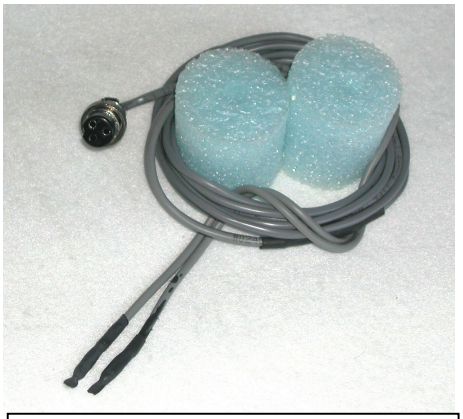

Figure 3 - The TDS Sensors

The **Ice Sensor** is used to determine if the evaporator has developed an ice buildup. If ice is detected, the fans are operated at high speed until the ice is dissipated. The ice sensor is not used for freezer installations.

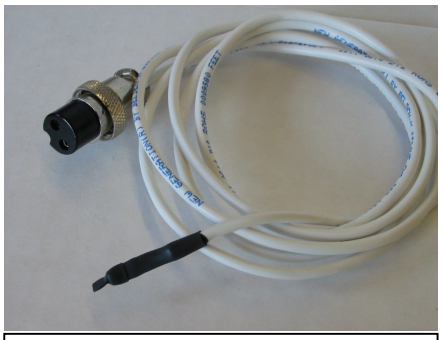

Figure 4 - The Ice Sensor

The "TDS" Sensor and the Ice Sensor interconnect cables are low-voltage cables, and require no conduit. The highest voltage in these cables is 12 volts.

The low speed for the EC motor is typically 500 RPM, a speed which ECE has determined to provide the best balance between savings and air flow.

The complete manual for the installation of retrofit EC motors and the Frigitek® ECMotor Controller is available for download at our website - www.frigitek.com.

For more information, please contact Energy Control Equipment, Inc, at 877-522-6924 (toll free), or visit our Web site, at www.frigitek.com. International customers, call +831-768-8848.

Frigitek® ECMotor Controller Specifications

Controller Unit
Voltage – 115 VAC or 208-240 VAC, set at the factory
Current – .15A
Motor Control current - .15mA / motor
Size – 5.5” x 3.25” x 2.0”
Weight – 10.8 Oz
Mounting – Inside evaporator case
Connections - Plug-in connections for Power, TDS Sensor and Ice Sensor.
Factory-wired cables are provided for these connections.

"TDS" Sensors
Sensor Power – 12 VDC (supplied by Controller)
Sensor Current – .01 mA
Size – .2" x .5"
Weight – 1 Oz
Mounting – On expansion valve
Cabling – 3-wire, low voltage

Ice Sensor
Sensor Power – 12 VDC (supplied by Controller)
Sensor Current – .01 mA
Size – .2" x .5"
Weight – 1 Oz
Mounting – Attached to evaporator fins
Cabling – 2-wire, low voltage

Options
No options are available.

Agency Approvals
Agency approvals are in the process of being obtained.