

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 significantly increase the savings provided by the motors alone.

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. In addition to the direct saving in evaporator fan motor power, the reduction in fan motor heat also causes a significant reduction in refrigeration system 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.

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.



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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 Temperature Differential 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.

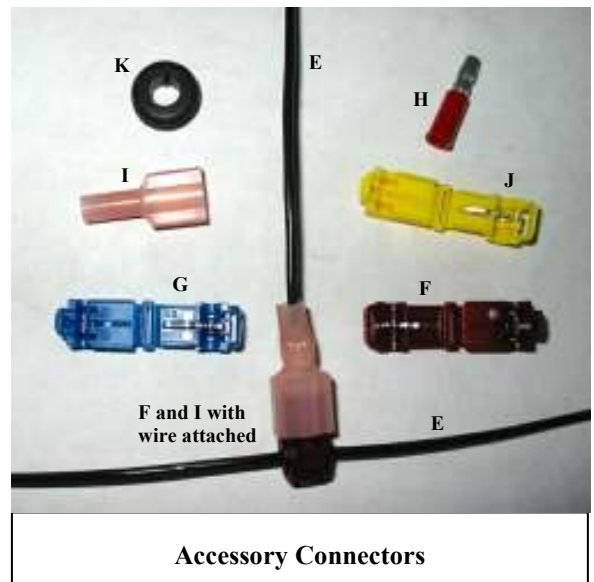
The **Ice Sensor** is used to determine if the evaporator has developed an ice buildup. If ice is detected, the fans are operated at high speed until the ice is dissipated. The ice sensor is not used for freezer installations.

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 ECMotor Controller package includes an accessory kit of connectors and wire so that the installer will have all the parts necessary to make the installation. The Accessory Kit contains:

- A) Four-pin power source wire assembly (2 feet)
- B) Three-pin TDS wire assembly (15 feet)
- C) Split foam spools (2 each)
- D) Two-pin Ice Sensor wire assembly
- E) 18 gauge black wire (15 feet)
- F) Tee Taps - Maroon (18-22 AWG)
- G) Tee Taps - Blue (14-16 AWG)
- H) Male bullet connector (1)
- I) Male disconnects
- J) Tee Taps - Yellow (10-12 AWG)
- K) Rubber grommets (1/4" x 3/8")
- L) Decal for outside of evaporator case (1)



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.

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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.

ECMotor Controller Power Cable

A two-foot Power Cable Assembly with “faston” connectors on one end, and a four-pin connector on the other. The four-pin connector matches the power connector on the ECMotor Controller case.



ECMotor Controller Power Cable

"TDS" Sensors

Sensor Power – 12 VDC (supplied by Controller)

Sensor Current – .1 mA

Size – .2" x .5" (Sensor Tip)

Weight – 1 Oz

Mounting – On expansion valve

Cabling – 3-wire, low voltage



The TDS Sensors

Ice Sensor

Sensor Power – 12 VDC (supplied by Controller)

Sensor Current – .1 mA

Size – .2" x .5" (Sensor Tip)

Weight – 1 Oz

Mounting – Attached to evaporator fins

Cabling – 2-wire, low voltage



The Ice Sensor

Options

No options are available.

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, please call +1-831-768-8848.

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