

Cooling Technology

Isotherm Smart Energy Control - Intelligent Refrigeration for Enhanced Energy Efficiency

A new leap forward in energy saving technology

The Isotherm Smart Energy Control offers a unique opportunity to dramatically reduce on board battery power consumption for refrigeration appliances.

Isotherm Smart Energy Control (ISEC): a simple-to-install kit

The ISEC kit consists of three parts: control module, temperature sensor, and potentiometer. The kit can be easily retrofitted to most refrigerator or freezer units that use a Danfoss/Secop compressor (BD35 &50) with DC-only electronics. Isotherm's new CRUISE Elegance line provides a preformed location in the cabinet for the temperature sensor which facilitates upgrade with the Smart Energy Control kit.

How does it work?

The sophisticated processor-based Isotherm Smart Energy Control technology achieves significant power consumption savings by continuously scanning a set of key environmental factors to determine, through advanced proprietary algorithms, the most relevant compressor speed to maximize the performance/battery drain ratio (COP - Coefficient of Performance).

Configuration parameters for refrigerator or freezer and temperature offsets are set via dip switches on the module and include battery protection level, volume, and offset values.



The Processor-Based Module is mounted on a Danfoss/Secop DC electronics module and is customized to the specific operating conditions for each refrigerator or freezer by setting the dip switches according to the manual.



A potentiometer adjusts operating temperature range for the Isotherm Smart Energy Control module. The potentiometer replaces your old mechanical thermostat and can use the old thermostat's housing or use the housing that comes with the ISEC kit.



A dedicated air temperature sensor continuously measures cabinet air temperature. This sensor replaces the mechanical probe fixed to the evaporator on your old system.



Low battery consumption is important to pontoon, sail, and small boat owners. Isotherm specializes in energy-efficient refrigerators and systems

The Isotherm Smart Energy Control kit (ISEC) not only makes your fridge intelligent but also allows the storage of a significant amount of cold energy in the loaded food and drinks. The Smart Energy Control reduces the cabinet temperature more than a conventional fridge without freezing the food. The temperature is continuously monitored via an air sensor in the cabinet. Cold energy is quickly generated by running the compressor at the highest rate of speed when a power surplus is available - such as when an engine is running or when connected to a charging system. The cold that is stored in the food and beverages acts like a holding plate, keeping fridge temperatures lower for a longer period of time, causing the compressor to run less. When the ISEC microprocessor senses the fridge is running on battery alone, it runs the compressor at the slowest rate of speed to maintain proper temperatures. The combination of stored energy and variable compressor speeds results in a significant energy savings.

External factors

- Cabinet air temperature
- Temperature set point
- Battery charge status
- Battery voltage

Configuration Parameters

- Cabinet size
- Offset values

Available potential of DC fridges

- Energy storage potential of loaded food/drinks
- Variable speed capability of DC compressors



Energy Savings

- Maximized performance/battery drain ratio (COP)
- Reuse of energy stored in food/drinks
- Speed modulation: Soft start up and boost mode

Multiple benefits from a simple kit:

- Up to 35 % savings due to a more efficient use of the compressor
- Up to 50 % savings with combined effects of stored cooling energy in food and drinks
- No need for eutectic plates/special storage devices
- Easy to retrofit
- Quick cooling in boost mode
- Soft start option to avoid starting surges



Can your fridge be upgraded?

Most Isotherm refrigeration products and other brands that use Danfoss/Secop compressors with DC-only electronics can be upgraded with the Isotherm Smart Energy Control. Please contact Indel Webasto Marine USA to request more information.