

The ESM™

Improving the
Energy Efficiency
of Your Cooling
Systems

Energy Efficiency Through Cycle Optimization

Smartcool's ESM™ can save an average of 15% (kWh) usage & 10% (kW) peak demand on compressor operation

Intelligent cycle optimization dynamically adjusts the control parameters relating to each operating cycle in order to have the air conditioning or refrigeration (HVAC-R) compressor function more often at a higher, more energy efficient suction pressure.

- On starting, any cooling system will produce a large temperature drop using relatively little energy.
- As the temperature drops closer and closer to its lowest set point, it uses more and more energy to elicit that temperature drop.
- Once installed, the ESM™ is configured to intercept signals from the primary controller to each compressor.
- The ESM™ then studies the controller output and determines when and for how long a compressor will need to run to optimise its operating cycle to its most efficient state.
- By helping the compressor run in this more efficient state, the total run time of the compressor is reduced by the ESM™ thereby reducing the total electrical consumption of the compressor.

Using intelligent cycle optimization, the ESM™ has proven successful at improving the energy efficiency of systems such as:

- Refrigeration racks or packs
- Complex process cooling systems
- Single and multi-compressor air conditioning systems
- Systems with any load profile
- Systems with any energy management system routine

Energy Efficiency Through Load Modulation

Smartcool's technology works within existing control methodologies to modulate load for periods of time during the cooling cycle.

- The ESM™ is installed to provide a modulated input into the existing control system.
- The ESM™ collects data based on the operating profile of the equipment and then uses the installed interface to dynamically vary the compressor capacity.
- The capacity variation is precisely calculated to maximise the duration compressor operates at it most efficient (peak profile). The level of control is constantly adjusted to suit varying load conditions.
- By helping the compressor run more efficiently, the ESM™ creates an overall reduction in the electrical consumption of the whole cooling system.

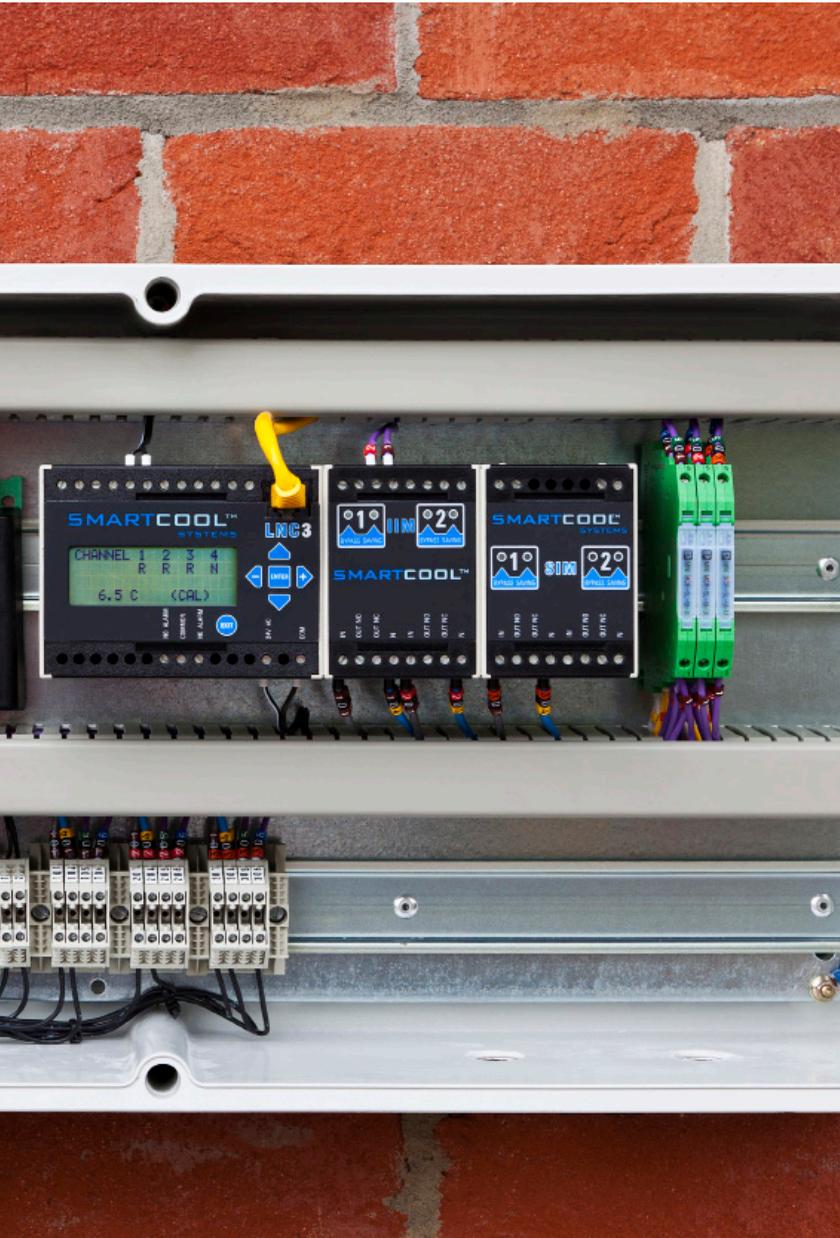
Using load modulation, the ESM™ has proven successful at improving the energy efficiency of systems such as:

- Modern liquid chillers with centrifugal or screw compressors
- Variable screw compressors for refrigeration
- Chillers with screw, scroll, and reciprocating compressors
- Facilities with multiple chillers on a common system
- Systems with any load profile
- Systems with any energy management system routine



Even on the most modern equipment with intelligent controls, or where other energy saving processes are already installed, the ESM™ can provide energy efficiency gains.

Safe Energy Savings



Smartcool's ESM™ provides improved energy efficiency with no risk to temperature or humidity conditions or existing equipment.

Smartcool's technology has undergone rigorous independent third party testing by industry leaders such as Oak Ridge National Laboratories (part of the US Department of Energy), demonstrating its effectiveness and reliability.

Features of the ESM™:

- Display screen shows savings performance, measured medium, modulation level, current status across the entire controlled load.
- Remote performance monitoring available.
- Customized solution to suit any operating profile and equipment.
- Does not allow compressors to short cycle.
- Will fail to safe through automatic override, removing itself from the circuit.
- Can be easily manually bypassed for service and maintenance.

The ESM™ interfaces with existing controls and equipment and installation can be completed without any system interruption or impact on controlled space conditions.

Cut Costs & Start Saving

Smartcool can provide you with an energy review of your air conditioning, refrigeration and heat pump usage at no cost and no obligation.

- The energy review identifies where you can achieve energy savings with Smartcool technology, and the period of return on your investment.
- The energy review is the first step to becoming more energy efficient, cutting your energy bill and reduce your carbon footprint.

Once the ESM™ has been installed on your HVAC-R system, you can see immediate savings logged on the display screen of the product. By doing a simple test with the ESM™ active in the circuit and with it manually bypassed, you can easily get a comparison of your system's performance.

The ability to compare energy savings performance at any time is a key factor in qualifying for government and utility energy efficiency incentives.

Contact us to learn more about our solutions, or book your complimentary energy review today.

Here are just a few sample results from energy efficiency projects Smartcool has completed for clients with various cooling equipment and needs.

Large-Scale Retail Refrigeration

Annual Energy Savings:

150,380 kWh

Annual GHG Savings:

92,006 kg



Mission Critical A/C

Annual Energy Savings:

270,000 kWh

Annual GHG Savings:

165,196 kg



Large-Scale Comfort Cooling

Annual Energy Savings:

187,089 kWh

Annual GHG Savings:

110,185 kg



Process Cooling

Annual Energy Savings:

166,413 kWh

Annual GHG Savings:

101,817 kg





Smartcool is a global clean technology company helping some of the world's largest organizations enhance their profitability, while lowering their carbon footprint.

Publicly listed on Canada's TSX Venture Exchange (TSX-V: SSC), Smartcool has been recognized for excellence within the clean technology industry.

Specifications

Operating Voltage	24VAC, 350mA
Input Voltage	24VAC to 240VAC
Enclosure	IP20
Dimensions	75mm x 110mm Modular width varies
Environmental	-30° to 50° C
Contact Rating	240VAC, 360VA, B300

Standards

North America: UL 916 - USA, FCC Part 15
CSA C22.2 No 205, CS-03

European Union: 73/23/EEC

Australia: EN 61326



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