ESM & ECO3 FAQ

Q. What Makes ESM & ECO3 better than other energy saving product in market ?

- Reduce compressor run time by 15% - 50% resulting in a decrease in both operating and capital budgets.
- Restricts "short cycling" and ensures warranty compliance by controlling the stops and starts of the compressor.
- No discernable impact on temperature or humidity in the controlled space.
- An accurate evaluation of product performance can be measured by switching the product off and comparing the kWh consumption with a similar period with the product operating. This is possible because the products interface with, rather than replace, the existing controller. It is also a critical step in qualifying for any of government or utility rebate programs.
- Products are retrofit applications
- Limited to no downtime of the existing equipment during installation

Q. What does it cost and are there any ongoing fees?

The cost relates to the size of your facility and equipment as well as the complexity of the installation. The pay back period for a Smartcool installation is usually from 2 to 3 years; this may be shortened by applying for Energy Rebates, carbon off-set credits or other financial incentives. Smartcool determines the cost of an installation by conducting an Energy Audit and presenting you with an Energy Saving Proposal.

Q. Do the ESM™ or ECO³™ provide any "soft" benefits?

In addition to the energy savings and related cost reduction achieved by a Smartcool installation, clients also receive several other benefits:

- Reduced compressor run hours and starts
- Balanced compressor run hours and starts
- Extended cooling system life and reduced maintenance costs'
- Reduced greenhouse gas emissions

Q. How does the customer know if Smartcool's products are performing as projected?

Both the ESM™ and ECO³™ have LCD display screens where the energy savings achieved can easily be tracked. The ESM™ also has alarm contacts for optional set up of BMS alerts as well as having communication software for remote (computer based) monitoring.

Q. How reliable are ESM & ECO3 products?

Smartcool's technology has proven extremely reliable in thousands of installations. There are no moving parts that are susceptible to wear or breakage.

Q. Once installed, how is the continued operation of Smartcool products guaranteed?

Every ESM™ and ECO³™ is sold with a standard one year product warranty. Extended support and warranty is also available.

Q. How are the ESM™ and ECO³™ powered?

The products use virtually no power (less than 1amp) and are powered with a 24 Volt AC transformer.

Q. What is a demand charge, and how does Smartcool's technology reduce these charges?

The main part of an electric bill is the charge for the energy actually used (kWh). For many commercial customers there is also a demand charge for the energy that the customer has the capacity to use and the electricity company must have available. This additional fee is based on the peak demand, or highest amount of electricity used during the billing period.

Smartcool's products are set to reduce run time as much as 30%, and thus reduce the base load or demand of a facility. Smartcool customers therefore reduce their demand charges by installing the ESM™ or ECO³™ and save money beyond the reduction in usage (kWh) fees.

Q. Can Smartcool products still achieve any energy savings on new, highly efficient air conditioning systems?

Improvements in the efficiency of air conditioning units have come from the improvements in scroll compressor design, variable speed motors on fans, and some improvements to the control of the fans. What has not changed is the way that these units control the compressor(s). As such, the ESM™ and ECO³™ compressor optimization algorithms are still able to run the compressors less while affecting the same level of cooling. Although the unit already uses less energy than older units, the Smartcool products will still reduce the energy consumption.

Q. Will the ESM™ or ECO³™ affect my compressor warranty?

Smartcool's products interface after all protection controls and do not cause short-cycling, therefore having no adverse effect on the equipment.

26,000 Smartcool products have been installed worldwide without affecting warranties. Smartcool can provide correspondence from many major compressor manufacturers indicating that the technology will not affect warranties.

Q. Will the ESM™ or ECO³™ affect product or case temperatures?

No. Smartcool products will maintain average suction conditions or temperature equal to those of the existing control device. There will be NO effect to product / case temperatures.

Q. Does the ESM™ or ECO³™ replace my existing controls?

No. The ESM™ and ECO³™ are installed in series with and after the existing control device. They require the presence of a primary control device. The existing control remains the primary controller for the plant with the ESM™ or ECO³™ optimizing its performance.

Q. What is ESM ?

ESM is microprocessor based energy saving device for Air conditioning System & Refrigeration System

Q. How ESM Works

- Conventional controls, including the most sophisticated Building & Energy Management Systems (BEMS) and state-of-art refrigeration controls, operate only on reaching pre-programmed static values to switch compressor off and on or adjust capacity.
- When the measured medium is within the dead band, the BEMS and controllers remain idle until a set value is reached.
- They do nothing to dynamically measure the heat load and adjust the control differential in proportion to the cooling demand or to dynamically control the cycle rate of the compressor.
- The ESM is microcomputer that records the absolute switching values of the primary controller and also measures the 'rate of change' of both the rise and fall of temperatures during the operating cycle of the compressor.
- With this data the ESM computes a reference heat load to match the cooling capacity and then calculates variable operating parameters.

- This calculation is used to minimise compressor operation within the absolute switching values, with a resultant reduction in refrigeration and air conditioning compressor run time , reduced electricity consumption (Kwh) and maximum demand (Kw/KVA). This is achieved while maintaining the original operating temperature.
- ESM increases the efficiency of the compressors by causing the A/C system to operate at a higher suction pressure.
- The ESM reduces the total run time of the compressor resulting in a reduction of electricity use.
- Because the compressors are operating more efficiently pre-set controlled space temperature performance is maintained with fewer operating hours & less electricity use.

Q. How ESM utilizes the compressor optimisation to reduce the run time of compressor?

The ESM will optimize a compressor by either reducing its loading, removing a stage of cooling, or turning off a compressor. The time that this happens changes. If there is high load, the time reduces, and if there is low load, the time increases.

Q. How ESM reduces the run time of compressor?

This removal is what reduces compressor run time. We do not always stop a compressor. If it is a screw compressor with a slide valve, or a centrifugal compressor, we simply reduce the load on it. If it is a multi stage reciprocating, we can just remove the stage. All actions will increase optimisation.

Q. The TIME Difference between compressor run time without ESM & with ESM?

The difference of run time depends on many things, including refrigeration capacity, heat load, reliability, compressor type.....each site will be different.

Q. After which stage of Chillier Control unit our ESM will install ?

The ESM is NOT a controller. As such, it will be installed in series with and after any existing controller. We will not change how the existing controller works, and we do not change any safety features or warranties

Q. How & What our ESM communicates with Chillier Control Unit ?

If it is a chillier, we can communicate in 2 ways, indirectly, using a manufacturer supplied analogue input of either 4-20mA or 0-10Vdc, or directly, which involves being installed as per answer 4 above.

Q. Is there any alternate technology available in the market to reduce the run time compressor as ESM does ?

The ESM is unique, because saving will increase or decrease depending on the heat load...it is not simply a switch, and cannot be duplicated by a PLC, for example, because our software recognises heat load and will dynamically alter the saving algorithm in real time to match heat load.

- **Proven technology with over 25,000 installations worldwide**
- **No Penalty System**

1. No change to pre-existing operating criteria
2. Compatible with all known control systems
3. No impact on conditioned space or chilled water temperatures
4. No impact on case, cold room & product temperatures
5. Retro -fittable product with minimal filed wiring or plant down time
6. Remote communications and control
7. Integration with BMS & 3d party software successfully completed in past
8. Low voltage product with a fuse to protect existing equipment
9. 12 month manufacturing warranty.