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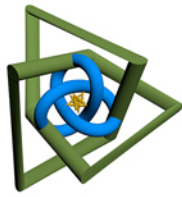
Lighting | Energy | Decontamination

Understanding ACES

Technically speaking



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Air conditioning can be amongst the biggest consumers of energy, putting considerable demands on the energy supply during the hottest days of the year.

Often AC units will run continuously at full power until the room thermostat is satisfied. When the room temperature rises above a pre-set threshold the AC will turn on again and the cycle repeats - using either full power or no power - there's nothing in between.

By design, most AC systems are oversized and the heat exchanger quickly becomes 'fully charged' with cooling energy (thermodynamic saturation). At this point trying to add more coolant to the heat exchanger is like trying to add more water to an already saturated sponge.

With no intelligence the heat exchanger cannot see it is already 'full' and the compressor continues to supply cooling energy even though this will not increase the cooling effect. Obviously, running the compressor beyond the point of thermodynamic saturation can waste lots of energy.

Packaged & Window mounted



IMPROVED COMFORT



ENERGY SAVING



REDUCED MAINTENANCE



DESIGNED & MADE IN THE UK



PROLONGS EQUIPMENT LIFE



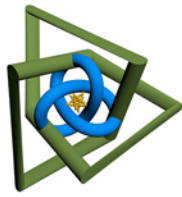
Did you know?

Reduces energy consumption by up to 35%

Simple to install on existing equipment and requires zero maintenance

Improves comfort levels

Extends equipment life and reduces need for maintenance



Give your air conditioning a brain...

Installing ACES in your air conditioning will transform it into an intelligent system that can reduce your energy costs by up to 35%. It achieves this by adding highly accurate temperature sensing along with self-learning software algorithms designed to detect when thermodynamic saturation is reached.

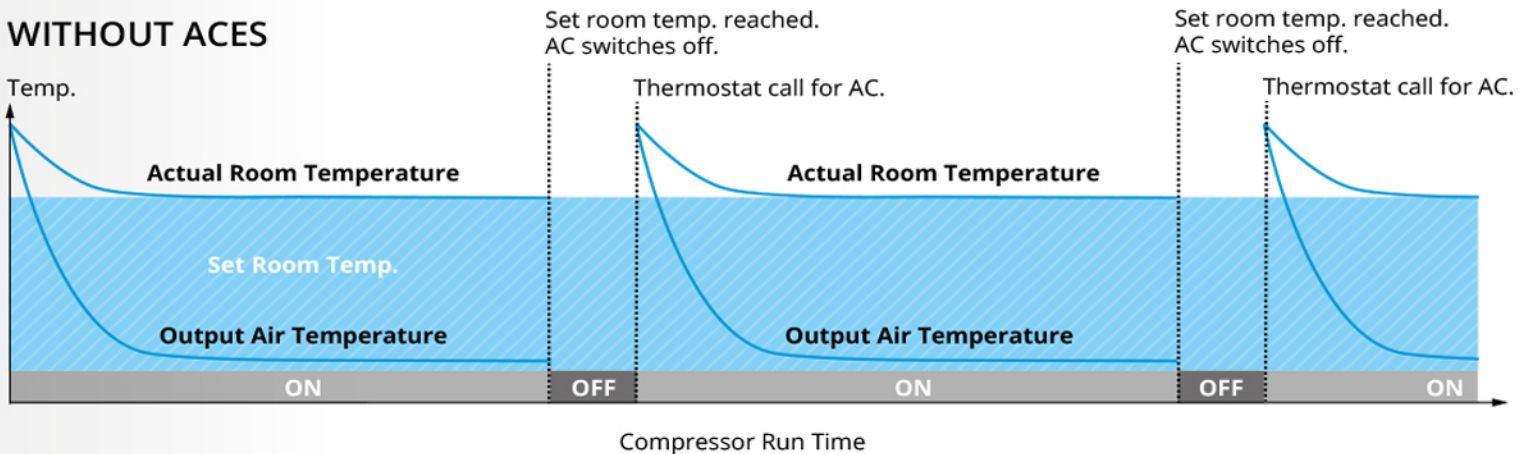
When this over-capacity is detected ACES will switch off the compressor to prevent energy wastage. However, it will also keep the fan running (which only uses about 20% of an AC's energy consumption) in order to extract all of the latent 'free' cooling that has been stored up in the heat exchanger.

ACES will then calculate the best time to switch the compressor back on so that it can work efficiently again. ACES constantly monitors your air conditioning and adapts to changes in conditions to ensure maximum efficiency and comfort at all times.

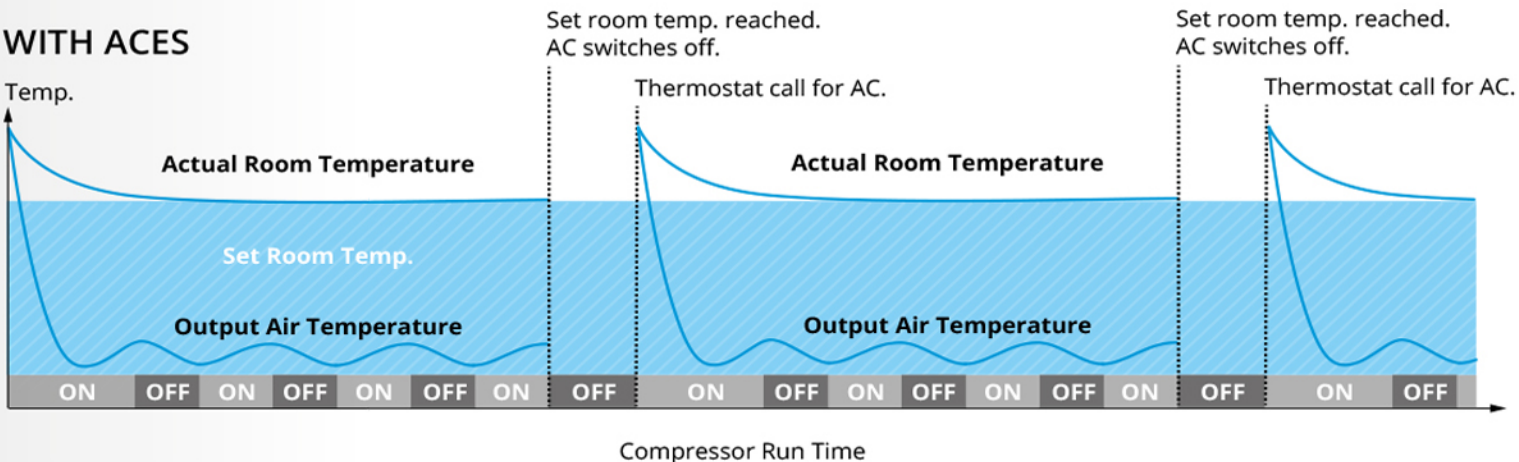
The benefits of ACES are not limited to energy saving:

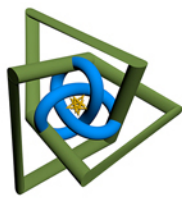
- Improved Comfort - By intelligently moderating the cooling cycle, ACES reduces the blasts of cold air for which oversized air conditioners are notorious
- Reduced Maintenance - Minimising the short cycling of the compressor in uncontrolled systems
- Energy Savings - Typical saving of 10-15% with up to 35% possible on some applications

WITHOUT ACES



WITH ACES





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There are literally thousands of incumbent AC units, which are needlessly wasting energy. ACES is suitable for most residential and light commercial DX (direct expansion) AC systems. These could be in the form of; wall-mounted, window units, single split systems, packaged systems, small central air conditioning systems and some rooftop units.

ACES can also be deployed in some ducted systems, but it is essential that the ACES temperature sensor be positioned in the main air stream BEFORE the air is split through the different ducts. It is also possible to use ACES on multi evaporator units employing a central chiller, in this case ACES is connected in series with the refrigerant flow valve actuator circuit contained within each evaporator. ACES simply then takes over control of the valve rather than being connected in the compressor circuit.

If you wish to use ACES on industrial units or on different applications, please contact BEST or your local BEST partner for more details.

The standard ACES unit is not suitable for chilled water, evaporative cooling, inverter controlled, multi-split, digital or satellite systems.

While variables like run-time and cost per unit of electricity will be significant factors, ACES can often pay for itself inside 2 years, thus providing a very attractive 50% ROI.



An ACES installation in a brand new Burger King outlet, with a new energy-efficient air conditioning system, delivered an energy saving of 10%. This install proved how well ACES works when retrofitted even in up to date equipment in a new building.

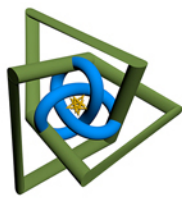
The Eniscope energy use data displayed here is from early April 2015. It shows the amount of energy consumed before ACES was installed and active.

We see a drop in energy consumption once ACES is installed in mid April 2015, revealing the drop in energy use even for the new air conditioning system.

The the red graph shows the higher energy use during the earlier period without ACES, while the blue line shows the consumption drop once ACES is installed.

Burger King were particularly keen to see if ACES could provide savings in a brand new outlet, with up to date air conditioning systems - ACES delivered.





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Mexican clothing manufacturer and retailer Almacenes Garcia looked to reduce their electricity consumption, and their electricity bills. Air conditioning was targeted for improvement.

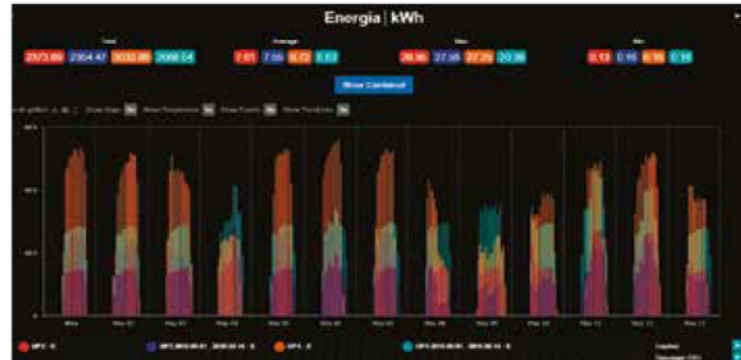
With many of their facilities and outlets in some of the hottest areas of Mexico, air conditioning makes up a significant percentage of Garcia's energy use. Utilising ACES promised good savings, while maintaining a comfortable environment for their customers and staff.

The electricity bills shown here reveal the energy use over April and May 2015 in a facility in Jojutla, south of Mexico City, when the average air temperature in Jojutla is 34° Celsius (93.2° Fahrenheit). The bills, along with the historical energy use data via Eniscope, from before and after the ACES installation, demonstrate the extent of financial and energy savings.

The ACES was installed on a dual compressor air conditioning system on April 23 2015. Even over those last few days of April the Eniscope data displays how dramatically the power usage dropped - instant savings from install onwards.

The value of the electric bill for April's consumption was 68,488 Pesos, but note the ACES was installed on April 23, providing some reduction that month in electricity demand. Then in May, with a whole month of ACES use, the bill dropped by over 20,000 Pesos (48,312 Pesos), almost a 30% saving.

This level of saving was what Garcia were hoping to achieve. All through the relatively simple installation of ACES into their existing air conditioning systems.



CFE Comisión Federal de Electricidad

Número de Servicio: 299 100 332 045
Total a pagar: \$68,488.00

Fecha límite de pago: 14 MAY 15

Período: 31 MAR 16 A 30 ABR 15

Factura y periodo	Lectura actual	Lectura anterior	Diferencia	Tarifa
sin cambio	4,932			
sin cambio	26,408	1,372		
sin cambio	123			
sin cambio	142			
sin cambio	145			
sin cambio	18,711			

Concepto	Tarifa	Proceso anterior	Min	Demanda anterior kW	Max	Demanda actual kW	%	% C	Proceso actual
Energía en base kWh	4.932	0.7000	60	4,984	88.29	42	1.8000		1,8000
Energía en potencia kWh	0.8790	0.8790	60	89,889	88.47	36	1.8000		1,8000
Energía en punta kWh	1.6372	1.6372	60	91,985	88.45	36	1.8000		1,8000
			60	91,985	88.19	33	1.8000		1,8000
			60	92,895	88.09	33	1.8000		1,8000
			60	92,895	87.58	28	1.8000		1,8000
			60	92,895	87.32	30	1.8000		1,8000
			60	92,895	86.36	27	1.8000		1,8000
			60	92,895	86.30	30	1.8000		1,8000
			60	92,895	86.10	28	1.8000		1,8000
			60	92,895	84.85	29	1.8000		1,8000
			60	92,895	84.28	28	1.8000		1,8000
			60	92,895	83.22	33	1.8000		1,8000

Total a pagar: \$68,488.00

CFE Comisión Federal de Electricidad

Número de Servicio: 299 100 332 045
Total a pagar: \$48,312.00

Fecha límite de pago: 12 JUN 15

Período: 01 MAY 15 A 31 MAY 15

Concepto	Tarifa	Proceso anterior	Min	Demanda anterior kW	Max	Demanda actual kW	%	% C	Proceso actual
Energía en base kWh	4.932	0.7000	60	4,984	88.29	42	1.8000		1,8000
Energía en potencia kWh	0.8790	0.8790	60	89,889	88.47	36	1.8000		1,8000
Energía en punta kWh	1.6372	1.6372	60	91,985	88.45	36	1.8000		1,8000
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			60	92,895	86.36	27	1.8000		1,8000
			60	92,895	86.30	30	1.8000		1,8000
			60	92,895	86.10	28	1.8000		1,8000
			60	92,895	84.85	29	1.8000		1,8000
			60	92,895	84.28	28	1.8000		1,8000
			60	92,895	83.22	33	1.8000		1,8000

Total a pagar: \$48,312.00



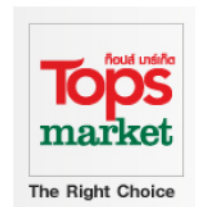
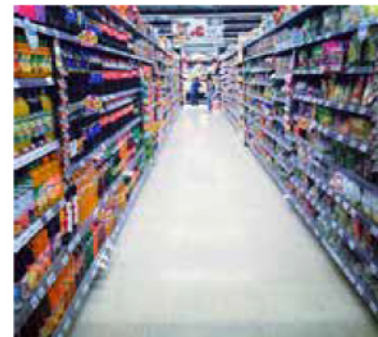
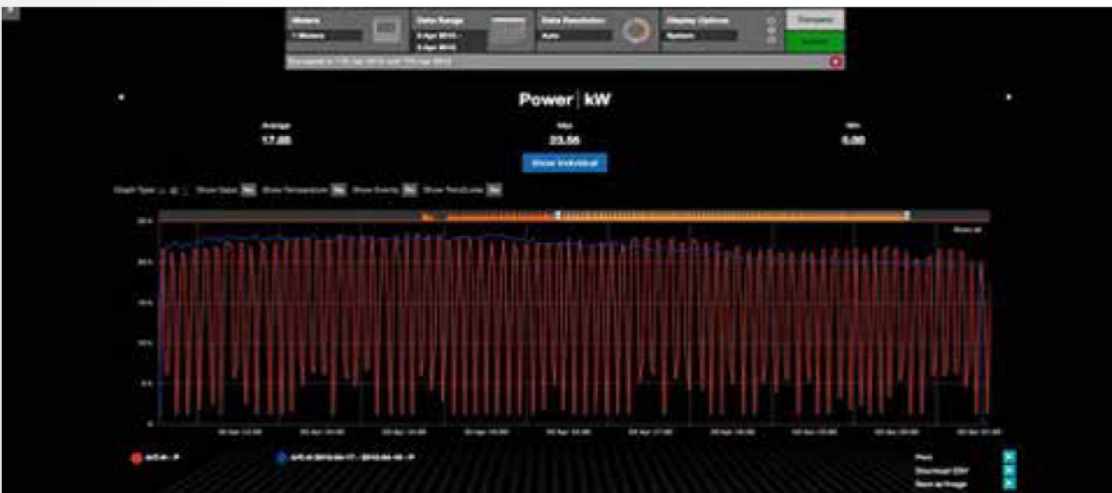
As a responsible company Thailand's largest supermarket chain Tops Market, with 147 branches nationwide, are rightly concerned with energy conservation, cost savings, environmental and sustainability issues.

In April 2015 they installed ACES into the air conditioning system in one of their stores, with a record of the effect ACES was having on electricity consumption.

ACES was used on the system in the first half of April, they then took ACES out of operation between April 17-23. Notice the Eniscope energy consumption data to the right and the savings achieved with ACES operative.

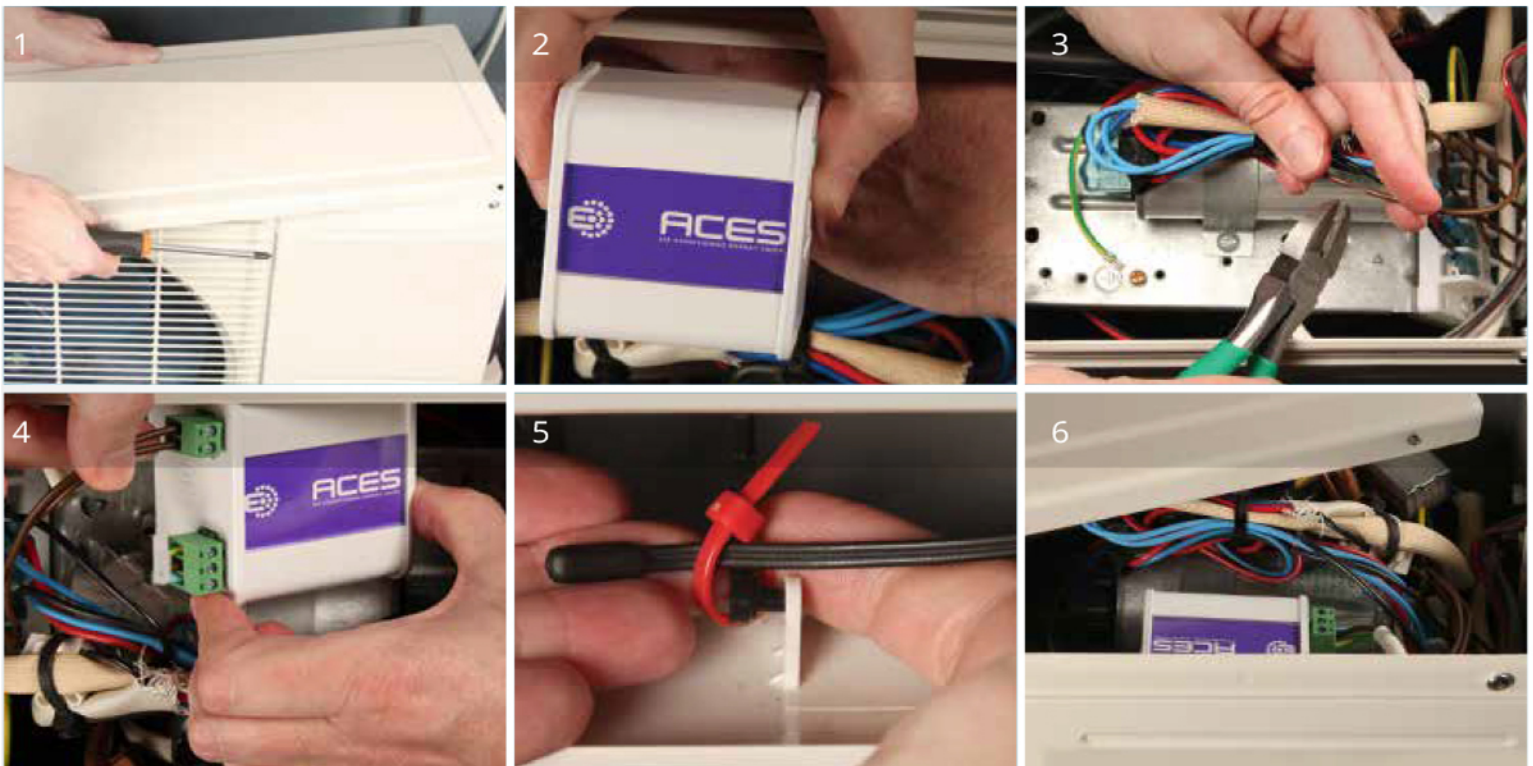
The first Eniscope graph shows the amount of energy being consumed without ACES over a typical 10 hour period, spiking regularly at well over 20kWh.

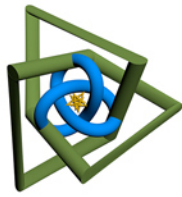
The second graph shows a comparison with and without ACES. The blue bars displays the period without ACES, averaging over 20kWh, the red bars show the impact ACES had on the air con system, with now an average kWh use of around 15kWh - approximately a 25% drop in electricity consumption.



Installing ACES is a reasonably simple task for a HVAC engineer - with a typical install taking about 15 minutes to complete. The fitting will vary depending on the sort of air conditioning unit/system being used. The method is similar in most cases.

1. Remove the Cover and locate the Wiring Schematic/Diagram.
2. Locate a suitable space where the ACES can be mounted.
3. Using the wiring diagram, if available, identify the connection between the thermostat and compressor or the thermostat and the compressor control circuit - then connect this in series using the green WAGO adaptor. Switched loads should not exceed 12A.
4. Locate suitable connections for the mains supply from within the compressor unit, this must not be a switched live supply, once located make those connections using the green WAGO connector of the ACES unit.
5. Position the sensor in the chilled air stream (in the output head) using a cable tie, cables need to be routed to the ACES unit (Sensor wiring can be extended up to 9M using mains rated cables if required). Connect the sensor cable in the green connector plug of the ACES unit. Take care to route avoiding mains voltages.
6. You can now switch the AC unit back the ACES will then start to flash different light sequences (for more information please see the ACES manual). Ensure that the Condenser unit cover is replaced. For full wiring schematic and further information please see the ACES installation guide.

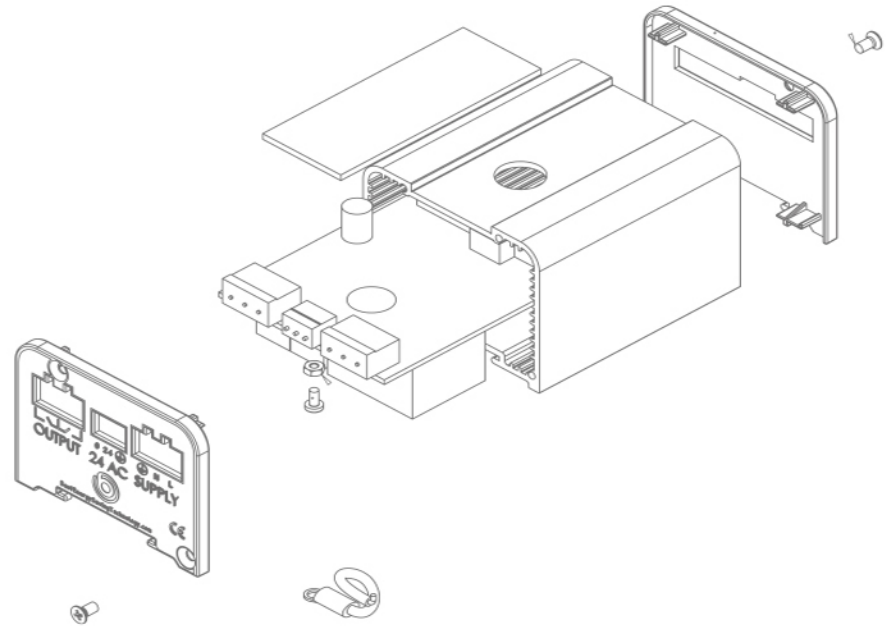




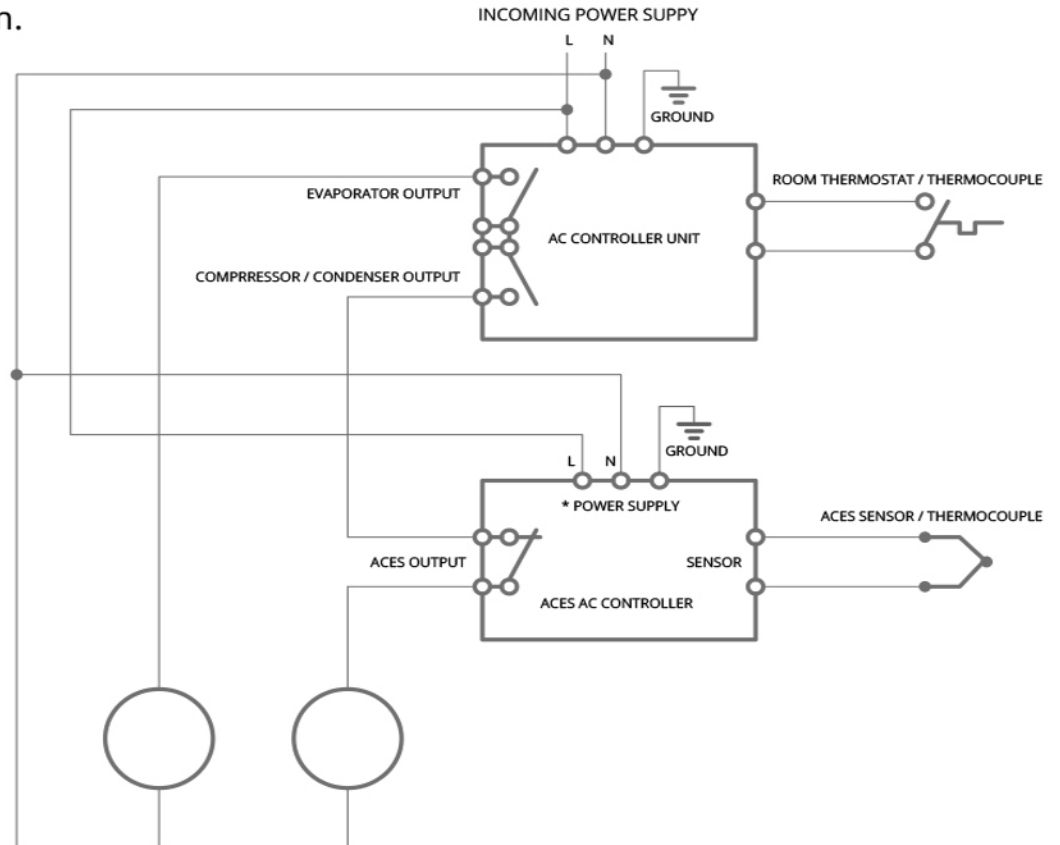
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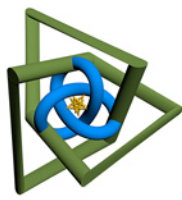
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Exploded line drawing.



Schematic connection diagram.

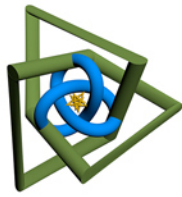




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Supply Voltage:	120Vac or 230Vac or 24Vac nominal.	Storage & Transport:	Storage temperature min. -25°C, max. 85°C Relative humidity min. 10%, max. 95%, non condensing.
Switching Voltage:	24V AC – 230V AC.	MTBF:	Predicted survival rate of 89.5% after 10 years.
Control Load:	8A continuous, 12A max.	Humidity:	Min 10% - max 95%, non condensing.
Contact Function:	Normally Closed.	IP Rating:	IP20.
Sensor Function:	Encapsulated thermistor +/- 0.5C.	Environmental:	Complies with RoHS and WEEE.
Connectors:	External easy fit plug-in sockets.	Warranty:	BEST guarantees to the purchaser that this product is free of defects in material and workmanship for twelve months, commencing from the date of purchase. ACES is warranted only in normal use. It does not cover failures caused by improper installation, abuse, misuse, modification or alteration of electrical circuitry or physical construction and events beyond our control.
Anti-short Cycle Protection:	2 Minutes following switching.	Patent Protection:	ACES technology is incorporated in BEST UK patent application number is 91001GB.
Operating Temperature:	0 – 60 degrees centigrade.	EMC Directive:	ACES conforms to the requirements of the standards in respect of the European EMC directive, 2004/108/EC.
Enclosure:	Bespoke aluminium powder coated extrusion suitable for DIN rail mounting with acrylic faceplate and moulded ABS end caps.	Low Voltage Directive:	ACES conforms to the standards in respect of the low voltage directive, 2006/95/EC. IEC60335-1:2010, EN60335-12012 Household and similar electrical appliances.
Display Technology:	Multi functional LED displaying full operational control and savings mode.		
Dimensions in mm:	L 62 x H 68 x D 50.		
Control:	Atmel AVR 841.		
Embedded Software:	BEST bespoke self-learning and adaptive control algorithms.		
Shipping Weight:	0.325 Kg.		



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Contact us

