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## MOST COMMONLY ASKED QUESTIONS ABOUT Eco-AirSaver

### **1. What is the Eco-AirSaver**

The Eco-AirSaver is an after-market retrofit electronic control unit that adds state-of-the-art intelligence to existing air conditioning systems and improves their efficiency and reduces costs by 15% to 25%.

### **2. What types of air conditioning systems does the Eco-AirSaver work on?**

The Eco-AirSaver can be installed and will reduce energy costs on Package Units, Single Split Systems, PACT's, Wall Units, and Window Units up to 10 tons capacity. The Eco-AirSaver does not work on chiller systems, evaporative cooling systems or variable speed compressors type systems.

### **3. How does the Eco-AirSaver work?**

The Eco-AirSaver uses sensor-driven software algorithms to detect thermodynamic saturation and optimize compressor run times. When the Eco-AirSaver detects that a system has reached thermodynamic saturation (i.e., "overcapacity"), it switches the compressor off and, thereby, avoids inefficient overcooling. While the system is in this "saver mode," the fan keeps running so that the system makes maximum use of the stored cooling energy in the heat exchanger. Once the stored energy is used up, the Eco-AirSaver switches the compressor back on so that it can work efficiently again.

### **4. What is thermodynamic saturation?**

Thermodynamic saturation is the point at which the maximum amount of cooling energy is stored in the heat exchanger. Running the compressor past this point is inefficient since additional cooling energy cannot be stored and is thereby wasted.

### **5. How does the Eco-AirSaver detect thermodynamic saturation?**

The Eco-AirSaver's sensor is on the evaporator. The unit determines thermodynamic saturation indirectly by sensing stable evaporator temperature.

**6. Isn't the Eco-AirSaver function similar to a factory-installed "economizer" cycle?**

The term "economizer" can have several meanings, the most common of which is when an A/C is fitted with an outside air damper. The "economizer" turns the compressor off and pulls air from the outside when the temperature and relative humidity are at specified levels. Economizers are factory-installed and are worth the money if you need A/C year round due to the generation of inside heat. On the other hand, economizers are generally used at times when outside air temperature is low enough to use for cooling, a situation that is less and less prevalent the further south you are.

**7. Won't shortening the compressor run time have a negative effect on humidity level?**

There are many factors that contribute to lowering humidity. Oversized units typically do a bad job of lowering humidity. These units are the Eco-AirSaver targets. When installed on such units, the Eco-AirSaver can actually do a better job of lowering humidity, but most of the time, it is about the same. Remember, when the Eco-AirSaver turns the compressor off, the evaporator is still cold and the blower is still running. In addition, the Eco-AirSaver V4.1 has specific algorithms to prevent humidity from being compromised.

**8. Won't shortening compressor run time increase the time it takes to reach the set point?**

Yes, but only slightly. For example, if a system takes an hour to reach the set point without the Eco-AirSaver installed, it might take about an hour and five minutes (i.e., 5% longer) to reach the set point with the Eco-AirSaver installed. However, the tradeoff is significant since the compressor and condenser fan account for about 90% of the cost of system operation with the blower accounting for the other 10%. For the additional 5% in time that it takes the system to reach the set point, the compressor and condenser will be off about 25% of the total time.

**9. Does the Eco-AirSaver come with a warranty?**

The manufacturer guarantees the Eco-AirSaver to be free of defects in material and workmanship for at least two years from the date of purchase.

**10. How does the Eco-AirSaver affect system life?**

The Eco-AirSaver can actually increase system life by reducing equipment operating temperature and preventing evaporator freeze over by properly cycling the compressor. The increased inrush of current due to additional compressor starts is minimal when compared to the savings from compressor off time. Moreover, the additional compressor starts/stops are offset by the lowering of the compressor and condenser operating temperatures (i.e., the #1 "killer" of motors is heat) and the fact that these additional starts are not "cold dead" starts.

**11. How is the Eco-AirSaver affected by inside demand and outside weather conditions?**

There is no affect on the Eco-AirSaver due to changes in inside demand conditions or outside weather conditions since the Eco-AirSaver automatically and continually adapts to changes in these parameters.

**12. Could the Eco-AirSaver function be replicated with an "approach set point" or variable speed compressor?**

Some manufacturers incorporate various aspects of the Eco-AirSaver technology in their upper end systems. The "approach set point" is one of these concepts. Variable speed compressors also perform similar function to the Eco-AirSaver. However, most A/C systems will not have these technologies, particularly systems manufactured before 2008. Standard systems (without these technologies) are the Eco-AirSaver target market. Typically, A/C manufacturers will not endorse the Eco-AirSaver because they are adding these technologies to their high-end units. The bottom line is that they would rather sell you a new, expensive unit that saves 20% to 30% over the old unit instead of having you pay a fraction of the cost of that new unit to achieve the same savings.

**13. Will the Eco-AirSaver save as much money on high efficiency A/C units?**

The higher the efficiency the A/C unit, the lower the total dollar savings, but the saving percentages would be the same. Example: two perfect condition 5-ton units where one is a 12 SEER and one is a 15 SEER. The baseline dollars (before Eco-AirSaver) to operate the 12 SEER would be greater than the 15 SEER. Since the Eco-AirSaver works on the principle of thermal saturation, each would produce 20-30% savings but the dollar savings would be less on the 15 SEER. This only affects the R.O.I., not the guaranteed savings of the Eco-AirSaver.

**14. Will the Eco-AirSaver cause system short-cycling?**

The Eco-AirSaver has anti-short-cycling protection built into its algorithms and actually provides protection for the A/C system to eliminate short-cycling problems. The Eco-AirSaver provides for mandatory compressor off-time after it has reached thermal saturation / set point or with any power loss. Compressor manufacturers rate compressors to cycle no more than 10 times per hour. The Eco-AirSaver will never allow the compressor to cycle more than 5 times per hour.

According to Copeland, who manufactures more compressors than anyone, a compressor has a 20 year life span. During this lifetime, it is not as critical how many times it starts and stops in 24 hours but rather how long it is OFF before it has to re-start. The more extreme the conditions are, the hotter the compressor will be along with high head pressure. The longer it is off, the more the pressure dissipates and cools down, making it less stressful to re-start.

**15 How long does it take to install the Eco-AirSaver?**

A trained HVAC technician can typically install the Eco-AirSaver in 20 to 45 minutes.

**16 What are typical return-on-investment periods for the Eco-AirSaver?**

Typical ROI's for the Eco-AirSaver range from 6 months to 2 years. The more you have to pay for KWh the shorter your ROI.

**17. What are the purchase options for the Eco-AirSaver?**

The Eco-AirSaver can be purchased outright or through a lease-to-own option.

**18. What certifications and approvals apply to the Eco-AirSaver?**

The Eco-AirSaver is UL and CE compliant. The Eco-AirSaver is approved and listed as a qualified device for energy rebates in California (San Diego Gas & Electric, Pacific Gas & Electric, SC Edison), Arizona (Arizona Public Service), Nevada, Oklahoma, and Hawaii (Hawaii Electric) with approvals forthcoming in South Carolina and Florida.

**19. Will installing the Eco-AirSaver void my warranty**

Officially it falls under the Magnuson-Moss Act passed by congress that states manufacturers cannot void warranties on their equipment when aftermarket product are added, provided they are approved by the governing body that approves such products. If it is electrical, it must be approved by UL or ETL, which the Eco-AirSaver is. I personally never liked saying "the government says we can do it", so here is the analogy I always use. A standard thermostat turns an A.C. on and off based on reaching the desired set point. A PROGRAMMABLE thermostat does the same thing PLUS allows you to set a time table for on and off operation, in addition to, and/or regardless of, reaching the desired set point. The Eco-AirSaver works much the same way as a programmable thermostat but is based on the time it takes to fill the evaporator with refrigerant. These timed amounts will vary based on the hotter it is, the longer it takes to fill up and get as cold as possible. The Eco-AirSaver only intercepts the 24 volt signal from the thermostat to compressor and does not interfere with cooling ability, or modify the mechanics of the system in any way. When the evaporator is full, the Eco-AirSaver shuts down the compressor and allows the fan to continue to pull cold air into the plenum that feeds the ductwork. If set point is still not reached during this time, the Eco-AirSaver releases the compressor based on readings from the temperature sensor.