



Frequently Asked Questions

What is DrivePak™?

DrivePak is an energy-saving upgrade package for existing standard rooftop air conditioning units, found in quantity on nearly all retail, grocery, entertainment and dining facilities.

What does “upgrade” mean?

It means that any standard rooftop unit with years of remaining usable life can be upgraded to the newest variable flow, load-matching technology now being offered by major manufacturers in their newest designs.

Wasn't my unit sized properly to begin with?

Yes and no. A rooftop air conditioning unit's capacity is selected to produce a comfortable environment during the most extreme conditions of heating and cooling for the geographic area. There is only a very small fraction of the time during the year when these extreme conditions actually exist.

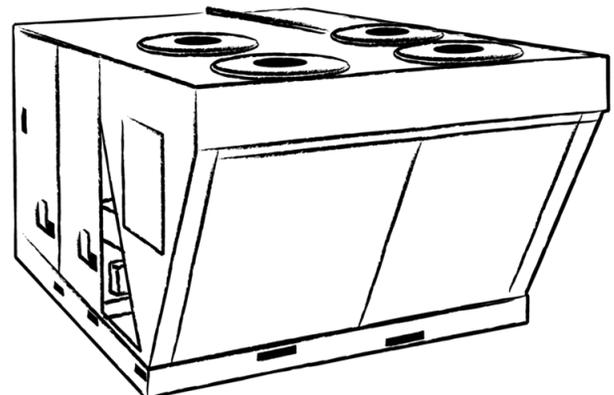
Engineers typically use ASHRAE guideline design data at “98%”, which means the design conditions only exist 2% of the time or less. Add into the design process a situation where the estimated capacity needed falls “in between” sizes offered by the preferred manufacturer, the larger size is often selected by the design engineer erring on the side of caution.



Standard rooftop unit blower fans have only one speed (100%) and that is the speed required to meet that extreme “design” condition. So in effect, even a properly sized unit is “oversized” most of the time.

What happens exactly?

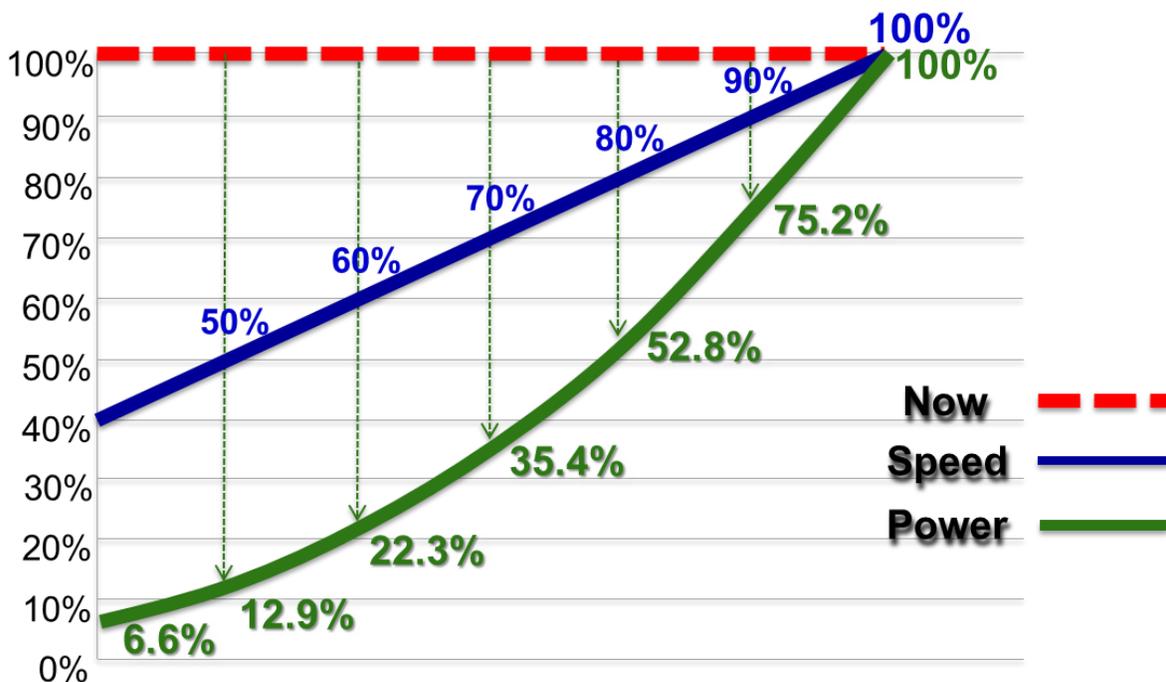
A variable speed drive is installed, along with a control interface board which reduces the speed of the rooftop unit's blower fan. This standalone control logic “matches” the speed to the actual heating or cooling load as indicated by the “calls” for heating and cooling sent by the EMS system or thermostat.



How can slowing the fan save enough money to make sense?

Physics! Reduced fan speed dramatically reduces the power consumption of the motor. For a fan, 20% reduction in speed equals 44% reduction in power used, and a 50% reduction in speed results in a power reduction of approximately 83%.

In a real world, retail store example with seven rooftop units (4@7.5HP, 1@5HP and 2@3HP) and occupancy schedule of 9am-9pm Monday through Saturday, Sunday 11am-7pm with electricity cost of \$0.10/kWh, this speed reduction calculates to a reduction of over 75% of the fan energy. This is equivalent to a reduction over 100,000 kWh used and over \$10,000 in cost savings.



What problems can this “over-sizing” cause?

The performance of most standard rooftop units suffers under these commonly occurring “part-load” conditions. In cooling mode, the large capacity of the unit cools the space to setpoint quickly and the runtime for each cooling cycle is short. This produces a couple of negative results.

One is that short cycling shortens compressor life. Another common side-effect is higher than desired humidity levels in the space.

Some retailers have experienced this to the degree that they have resorted to replacing perfectly good rooftop units with smaller capacity units. Others have resorted to even more expensive units having special dehumidification capabilities... a tough way to spend valuable capital dollars, plus these units almost always use more energy!

How does reducing fan speed help improve the relative humidity?

In cooling mode, especially in stage one, the air moves more slowly across the cooling coil removing more moisture from the air. The runtime of the compressors is also slightly extended, so that more efficient moisture removal takes place longer for each cooling cycle.

What other effects will DrivePak™ have on the comfort of my stores?

With continuous (but reduced) airflow when the cooling or heating is cycled on and off, the space temperature is also smoother and more consistent - improving customer comfort.

Won't slowing the fan damage my compressor or freeze my coils?

Done incorrectly, this is certainly a possible result.... all the more reason to choose DrivePak. Our installation teams combine technicians having HVAC testing and balancing expertise with those having controls and electrical experience. They follow detailed installation procedures that include taking temperature, RPM and air flow measurements. Speed settings for each mode are then determined and custom-applied to each unit to prevent potential damage.

Wouldn't it be cheaper to switch to "AUTO" fan mode when not heating or cooling?

No. Aside from the potential IAQ issues with turning the fan off when no heating or cooling is taking place, the cost is higher to operate the fan at 100% speed even at the reduced annual hours of operation in most cases. Multiple example calculations have shown that the annual operating cost of the fan with DrivePak can be less than half that of simply using AUTO mode and leaving the constant speed operation in place. A case can also be made that set points will have to be adjusted to avoid customer discomfort during the "off" cycles of the fan, using more energy.

Are all the savings due to reduced consumption?

There should be a positive impact on the demand component of your electric bill as well. There is normally a demand spike when starting constant-speed motors. With DrivePak, that spike is removed due to the "soft start" of a VFD.

Additionally, in almost every case we will be reducing the maximum speed of each fan motor by at least 5%. Thus each unit's starting current will be reduced, as well as the overall total demand of the rooftop unit fan motors equipped with DrivePak.

My units are within 5 years of replacement. Why should I retrofit them with DrivePak™?

Not reaping the benefits of the savings and ROI over those five years is a big reason. Another is portability. When replacement of an RTU becomes necessary, the DrivePak can be removed and re-installed on the new unit very easily – protecting your investment.

Does installing DrivePak™ improve my building's power factor?

Yes. A VFD has a power factor of .96 to .98, while a constant speed motor is typically from .75 to .85. Each VFD installed improves the overall power factor. If you are in a situation where you are paying a penalty to your utility because your power factor is too low, your power factor penalty payment should be reduced, or possibly eliminated.

Will installing DrivePak™ cause my units to wear out faster?

No. In fact, longer equipment life can be expected. Starting "softly", reduced vibration, and running at a lower speed will cause less wear and tear on mechanical equipment, such as bearings and belts.

What other benefits result from installing the DrivePak™ technology?

Quieter operation: Both mechanical and airflow noise will be reduced significantly. This can be especially important in some entertainment and retail facilities.

DrivePak™ savings example with results from a nationwide retailer.

VFD Retrofit Results	
Energy Savings	47,800,000 kWh spread over 131 locations, a 22% reduction from before the VFD retrofit
Utility Savings	As much as \$5 million in annual utility costs
Simple Payback	Less than one year
Maintenance	VFDs perform a "soft start" on electric motors, extending motor and belt life.
Overall Performance	Additional energy savings were achieved with no compromise to customer comfort.



601 Development Drive

Plano, Texas 75074

Tel: (972) 578-0505

Info@NexRev.com

www.NexRev.com