

AIRSYS

WHITE PAPER

Fine-tuning Direct Outside Air with Two Layers of Protection: Intelligent Free Cooling and the AIRSYS Air Filter Protection Device

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Introduction

1.1 Intelligent Free Cooling

Intelligent Free cooling is an energy efficient process incorporated within contemporary HVAC systems that uses low external air temperatures to assist in lowering the internal air temperature in a building, or data center, by using naturally cool air or water instead of a mechanical cooling process.

While intelligent free cooling with direct outside air is extremely efficient for cooling remote cell sites and small equipment rooms, care must be taken in locations where air contamination is an issue.

1.2 Air Filter Protection Device (AFPD)

The patented AIRSYS AFPD (Air Filter Protection Device) is field proven and engineered to protect air filters from dust and debris. In many locations, the AFPD will optimize free cooling during periods when the air is clean, thereby extending the life of the primary air filter.

Why Do I Need Intelligent Free Cooling and an Air Filter Protection Device?

Due to the risk of clogged filters causing diminished cooling capacity and high temperature alarms, free cooling is often manually disabled for these locations by technicians to reduce costly service calls. On an average telecom shelter site or small data center with a 10kW load, approximately \$2,000/yr. on an average is lost when relying solely on compressors for cooling. Not to mention the wear and tear that occurs by the overuse of compressors causing more service calls.

This issue can be resolved by setting up Intelligent Free Cooling (IFC), a 2-layer approach to maximize energy saving while protecting the building from air contaminants.

Intelligent Free Cooling (IFC) and AFPD, a two-layer approach:



Air Filter Protection Device

This AIRSYS patented AFPD device is field installed and communicates airborne contaminate density to the AIRSYS Lead/Lag controller. The controller immediately shuts the outdoor air damper when the contaminate density exceeds the predefined threshold.

Air Pressure Switch

An air pressure switch comes standard on all AIRSYS units and allows the user to set maximum primary air filter dirtiness. If this threshold is exceeded, Free Cooling (FC) is disabled until the filters are replaced. Even in worst-case scenarios, mechanical cooling capacity will be maintained.

Note: Software upgrades to AIRSYS Lead/lag Controller may be required for compatibility. Have your maintenance contractor contact us for more information.

Benefits of Intelligent Free Cooling

2.1 Unlocking Energy Savings

Compared to relying solely on compressors for cooling, enabling IFC can easily save \$1,000-\$2,000/yr. for each medium sized (10kW) site. The ROI is less than 6 months from utility cost savings alone.

2.2 Reducing Long Term Operational Expenditures (OPEX)

Depending on the climate, IFC can offset compressor run times and turn-ons by 40-90% throughout the year. This eases the wear and tear on the compressor and related components such as switches, contactors, and condenser fan motors. This significantly extends the life expectancy of the system and reduces overall maintenance costs.

2.3 Added Cooling Redundancy

Having another form of cooling provides a safety layer in temperature control on remote sites. IFC can help offset the entire heat load during colder months and cooler nights while providing emergency ventilation during the hotter times of the year.

Conclusion

The added two-layer approach of both IFC and AFPD will provide added reliability for HVAC equipment in the harshest environmental conditions. Our AIRSYS UNICOOL system incorporates both technologies in unison to enhance energy efficiency as well even in the most challenging outdoor environments across the globe. Contact our team of trained field service technicians, sales engineers and customer service representatives to learn more about how we can assist you in deploying one of our AIRSYS systems in your next project!



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