

Meeting High-Density Challenges in Air-Cooled Environments Requires a Flexible, Customized Cooling Strategy



A Vertiv Application Brief

Overview

Modular Indoor Chiller for High Density Pods in Air Cooled Data Centers

- **Pumped Refrigerant Economization (PRE)**
Easily introduce liquid cooling to air-cooled environments to efficiently and reliably cool pods of high-density racks with no need for chilled water onsite
- **Standard footprint** Easily swap in liquid cooling units for air chillers where needed, mixing and matching liquid and air units to create a custom cooling strategy for IT environments with mixed rack densities
- **Variable speed pumps**
Automatically vary the flow of PRE based on load demand, increasing efficiency and saving energy dollars
- **Modular design** Liquid cooling units function independently or in teamwork mode to add just the right cooling capacity and protection to support availability, efficiency, and redundancy goals
- **iCOM controls** An integrated touch screen HMI display provides local and remote visibility and control over the data center environment with setpoints, and alarm notifications for managing the space, and automatic maintenance schedule reminders
- **Integrated Liqui-Tect zone sensors** In the unlikely event of a liquid leak, automatic alerts immediately notify data center personnel

Problem

With More Companies Relying on Processor-Intensive Applications, Air-Only Cooling Strategies Are No Longer Effective or Efficient

Data centers with air cooled architecture have long enjoyed the efficiency, scalability, and flexibility inherent in their cooling strategies. However, the Internet of things (IoT), artificial intelligence (AI), and other data-intensive technologies like virtual reality are requiring data centers and colocation environments to deploy servers with ever-higher power and cooling requirements. As a result, average data center rack power requirements are regularly increasing towards 20 kilowatts (kW), some even approaching 70 to 80 kW per rack. At such high densities, the racks can no longer be efficiently cooled with air.

This presents a formidable challenge. While liquid cooling solutions deliver the robust thermal transfer properties needed to address high-density pods, the solutions can be challenging to implement in existing facilities that lack access to chilled water on site. Reengineering the data center to introduce liquid cooling is expensive and time consuming. And data center managers need solutions right now.

Solution

A Hybrid Cooling Approach Where Liquid and Air Systems Work Together to Cool Environments with Mixed Rack Densities

Data center managers want to optimize their investment in their existing infrastructure. Since most data centers have a mix of higher and lower densities in their racks, air cooling is still perfectly effective in some areas. Having the flexibility to swap in advanced cooling technologies only where they are needed gives managers a way to quickly and cost-effectively address pods of high density in targeted areas of the data center.

Such a solution, however, must check several boxes. First, because these facilities often have no chilled water onsite, something else needs to stand in for the liquid. Second, to make the addition of liquid cooling infrastructure seamless, the liquid and air systems must be interchangeable and easy to mix and match. Finally, there must be a way to expel the heat that works in conjunction with the existing infrastructure.

The new Vertiv™ Liebert® XDM split indoor chiller meets all of these requirements. It integrates pumped refrigerant economization (PRE) to eliminate the need for on-site chilled water . It has a standard footprint, allowing it to be easily swapped in for air-cooled Liebert® DSE™ units. And it works with Liebert® DCD chilled water rear door heat exchanger to expel heated air. Variable speed pumps, Vertiv™ Liebert® iCOM™ controls, and teamwork capabilities complete the solution, giving data center managers everything they need to customize a hybrid cooling solution that meets reliability, availability, and efficiency goals.

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Easily and efficiently cool pods of high-density racks in your air-cooled data center.

In air chilled data centers that need high-density cooling in targeted areas, the Vertiv™ Liebert® XDM split indoor chiller with integrated PRE offers the ideal solution for cost-effectively and seamlessly introducing advanced liquid cooling technologies. By swapping out a Liebert® DSE for a Liebert® XDM where needed, data center managers can quickly solve high density challenges with no need to reengineer the entire data center environment.

Benefit

Vertiv™ Liebert® XDM Split Indoor Chiller gives IT managers the flexibility to put advanced liquid cooling right where it is needed.

Easily and cost-effectively incorporate liquid cooling in an air-chilled environment. Address concentrated pods of high-density equipment by replacing Liebert DSE units with Liebert XDM units in targeted areas. Both units have the same standard footprint, and the equal building blocks make it easy to mix and match units throughout the data center for a customized cooling approach.

Avoid the need to introduce water into the sensitive data center environment. In the Liebert XDM, PRE stands in for chilled water, creating a fluid cooling loop that enables heat transfer while limiting the amount of fluid introduced in the data center environment. There is no need to reengineer the data center to bring chilled water onsite, and data center managers can limit the potential for leaks. In the unlikely event that a leak does occur, integrated Liqui-Tect zone sensors provide alerts, allowing data center employees to address the issue immediately.

Optimize your investment in your existing infrastructure. Data center managers can continue taking advantage of the all the benefits of their existing air-cooled architecture while introducing liquid cooling only where it is necessary. The XDM works in tandem with the Vertiv™ Liebert® DCD chilled water rear door heat exchanger to further leverage existing infrastructure assets.

Handle high heat output from high-density racks reliably and efficiently. The Liebert XDM use variable speed pumps to deliver the right amount of cooling at the right time, optimizing efficiency. XDM modules can be deployed separately or paired together to function in teamwork mode, further improving energy efficiency.

Gain total visibility and control over the data center environment. The XDM utilizes Vertiv Liebert iCOM™ with an integrated touch screen HMI display for system controls, monitoring, and setpoints with alarm notifications. Data center managers enjoy complete visibility into unit status and operating conditions, which can be monitored remotely. Set flow rates and receive alerts if operational parameters are outside of boundary conditions or if the unit ever requires to switch to a backup unit.

Add flexibility and redundancy to your cooling strategy. Each XDM module operates independently even when paired with other modules to increase cooling capacity. This ensures complete redundancy of cooling applications, letting data center managers add capacity and protection where needed most, while also reducing system wear and tear and maximizing the useful life of the equipment.

Future proof the planning and design of new data centers. With the standard footprint and modular design, combined with front and top service access for increased installation flexibility, the Liebert XDM can grow with a data center and easily respond to changes in facility and IT demand. Retrofits are simple with no need to leave room for service clearance, optimizing available floor space and giving data center managers confidence to meet cooling challenges as they evolve in the future.

Lower your total cost of ownership. The Liebert XDM offers an easy-to-deploy, efficient, and highly flexible high-density cooling solution that preserves investment in air-cooled infrastructure, optimizes efficiency, and provides a long-lasting cooling solution.

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