

Transitioning to Liquid Cooling Requires Innovative Cooling Distribution Technology and Consistent Water Supply



A Vertiv Application Brief

Overview

Next Generation Liquid Coolant Distribution Unit (CDU) for Managing High-Density Thermal Loads.

- **Higher KW capability:** Efficiently manages power-dense hot spots at the rack or row level with a variety of power capacities up to 450 kW or 1,368 kW
- **Safe and reliable liquid cooling distribution:** Distributes liquids to racks or immersion tanks with industry-leading infrastructure that supports rear door heat exchange or direct contact liquid cooling and includes integrated leak detection for peace of mind
- **Innovative stainless-steel design and hygienic couplings:** The highest quality materials ensure compatibility with the whitespace liquid loop to strictly control water quality, maintain essential separation of facility water, and ensure Secondary Fluid Network integrity
- **Smart temperature, flow rate, and pressure controls:** Ensures the right amount of cooling with secondary water temperature control within $\pm 1^{\circ}\text{C}$ to maintain cooling stability and eliminate the risk of thermal shock
- **Built-in redundancy:** Redundant pumps and dual power feeds optimize reliable operation for mission critical applications
- **Teaming capabilities:** Fleet control optimizes efficiency and reliability
- **Centralized management capabilities:** Real time visibility and advanced remote monitoring for complete control over operating parameters
- **Full alarm monitoring:** Provides visibility into the real-time status of IT equipment and the local environment with advanced notifications of potential problems
- **Compact footprint:** End of row or perimeter placement options for easier installation

Problem

Liquid Cooling Efficiently Handles Power-Dense Hot Spots. However, Implementation Is Not Always Easy.

With global demand for ever faster data processing on the rise, rack power densities are increasing exponentially. Efficiently managing power dense hot spots is becoming a significant burden for the data center team. Data center managers must evolve their thermal management strategies, and fast.

Liquid cooling is beginning to become a necessity in these environments, and dedicated cold plate liquid cooled servers are starting to saturate the market, fueling the transition to the new cooling strategy. However, adopting these technologies comes with an entirely new set of challenges that data center managers must address.

In order to introduce the new technologies in the data center environment, data center teams require solutions for reliably and safely distributing the liquid to the racks or immersion tanks. This introduces new concerns around water quality and properties, potential leaks, flow rate control, and the overall management of the liquid loop in the whitespace. In other words, the success of a liquid cooling strategy depends on quality liquid cooling distribution infrastructure that data center managers can trust to work around their extremely valuable and mission critical IT equipment. The choice is not one data center managers can afford to take lightly, as getting it wrong could prove disastrous to data center operations.

Solution

An Industry-Leading Coolant Distribution Unit Design that Streamlines the Transition to Liquid Cooling.

With the new Vertiv™ XDU 450 & 1350 liquid coolant distribution units, data center teams can more confidently enter the world of liquid cooling. The technology makes it efficient to manage power-dense hot spots up to 450 kW or 1,368 kW in just about any data center environment or application. The Vertiv XDU is just as ideal for hyperscale and colocation environments as it is for edge applications, and it offers the flexibility to support rear door heat exchange or direct contact liquid cooling with a variety of power dissipation capacities to cool row level or larger pods of racks.

The thoughtful and innovative design of the Vertiv XDU ensures the strictest control of fluid properties with quality materials selected specifically for compatibility with the whitespace liquid loop. Built-in redundancy; smart settings and teaming options for precise temperature, flow rate, and pressure control; and minimal out of cycle maintenance requirements combine to ensure sustained, efficient, and cost-effective long-term operation of the data center.

In demanding data center environments where consistent water supply is an absolute must for facilitating liquid cooling, the Vertiv XDU provides the liquid cooling distribution infrastructure data center managers can trust. Built for streamlined implementation, operation, and maintenance, the Vertiv XDU helps data center managers make the transition to liquid cooling faster and more efficiently and empowers them to take control of their thermal management challenges today and into the future.

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The Power to Manage High-Density Thermal Loads With Confidence.

The new Vertiv™ XDU 450 & 1350 liquid coolant distribution units give data center managers the confidence to put liquid cooling to work in all their critical IT environments. Built with water quality, reliability, and ease of implementation and operation in mind, it offers the proven infrastructure data center teams need to take their cooling strategies to the next level of efficiency and performance.

Benefits

Vertiv XDU Next-Generation Liquid Coolant Distribution Unit Gives IT Managers Everything They Need to Take the Heat.

Seamlessly transition to advanced liquid technologies to take control of high-density thermal loads.

The Vertiv XDU supports a seamless transition to high-efficiency liquid cooling with the power to manage power-dense hot spots up to 1,368 kW while ensuring efficient heat exchange. It offers the flexibility to support a rear-door heat exchanger or direct contact liquid cooling in a variety of IT environments including hyperscale, colocation, and edge deployments. With the option of in-row or perimeter placement, a compact footprint, and top and/or bottom connections, installation and deployment are quick and easy. Industry-leading service and support are available to further streamline installation.

Confidently introduce liquids with the strictest control over water quality.

The Vertiv XDU manages the entire liquid loop with an innovative contaminant-free design that ensures the highest water quality while providing essential separation of the primary facility water from the ITE heat load. The stainless-steel unit eliminates corrosion concerns while an optional built-in 50-micron filtration unit works around the clock to keep the secondary fluid network free from debris and contaminants that could hinder performance of cold plates and rear doors.

Minimize the risk of thermal shock.

The Vertiv XDU ensures precise temperature control to eliminate the chance of thermal shock for server CPU and GPUs. Secondary water temperature is controlled within $\pm 1^{\circ}\text{C}$ to ensure cooling stability with variable heat loads.

Protect mission critical IT equipment and reduce the chance of downtime.

With built-in redundancy features including multiple pumps and dual power feeds, the Vertiv XDU performs reliably and consistently to manage the high heat output of today's high-performance computing technologies. Smart settings and teaming options continuously maintain precise temperature, flow rate, and pressure to cool the IT environment as effectively and efficiently as possible.

Gain complete visibility and control over operational parameters with no need for operators to enter the white space.

State-of-the-art controls and remote monitoring capabilities give complete real-time visibility into operating conditions including pressure, temperature, and flow rate, as well as unit status, all from a centralized location. Integrated alarm features and leak detection provide advanced notification of problems, ensuring quick response before issues escalate or cause downtime.

Simplify maintenance and reduce operating expenses.

The unit's integrated 50-micron filter option is designed for concurrent maintenance without system shutdown, limiting out-of-cycle maintenance and reducing operational expenses for long-term savings. Easily accessible fill port and drain locations further streamline and simplify maintenance. Same-day maintenance support is also available for quick correction of system issues.

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