VCDU 300 Cooling Distribution Unit

DCX direct liquid cooling system

Next Gen Liquid Cooling

OVERVIEW

VCDU 300 (Vacuum CDU) is a main DDLC (dcx direct liquid cooling) system components that provides ultimate safety and high availability features, delivering coolant under negative pressure. VCDU300 has been designed specifically to be fault tolerant and to eliminate potential risks associated with liquid cooling, while keeping maintenance deployment and operating costs low. VCDU system mitigates risk with its patented leak-proof design, protects sensitive and costly electronic equipment and provides uptime required for high performance or dense cloud infrastructures.

VCDU300 offers all the well-known benefits of liquid cooling without the cost, complexity and risk. The coolant is delivered to the servers and manifolds under negative pressure on both the supply and return so coolant cannot leak out; only air can leak into the system. The VCDU300 is a negative pressure system that uses liquid to cool up to 300kW of server heat. The Vacuum Cooling Distribution Unit (VCDU) can use coolant incomming from drycooler at 15- 30°C (59-86°F) to remove up to 300 kW of server heat (15°C Rise). Its innovative design and energy efficiency allow for effective cooling of servers in high density applications.

DESIGN REQUIREMENTS	
Model	VCDU300
Cooling Capacity	Up to 300kW of Server Heat Removed at 15°C DeltaT
CDU approach temperature	Delivery at 7°C above facility water temperature at 300 kW
System Flow Rate	300 lpm @ 0.5 bar Pressure Differential
System Power	208V 15A Service nominal 2400 Watts at full flow
System ΔP (Vacuum)	Max-22in. Hg.; Min-10in Hg.
Manifold to Pump Tubing	Length-30 feet long; ID: 1in; 6 circuits. 36 racks or more
Microcontroller	Pump controller and web based touchscreen control
Operating Software	Linux, web page provided with system status. Optional SNMP interface or custom software to interface with customer BMS

LEAK PROOF VCDU300 uses negative pressure on both supply and return loops, so in an unlikely event of leak, air will flow into the system, instead of coolant leaking out. This guarantees 100% safety for DLC applications.

FAULT TOLERANT SYSTEM - VCDU300 incorporates high available and fault tolerant architecture. All critical components: pumps, heat exchangers, PDUs are redundant. The system will work even if cooling loop on cooled device would be broken, without stopping whole system or rack, as coolant simply cannot leak out.

MAINTENANCE FREE - State of the art VCDU300 automatically fills and drains the system, monitors the coolant and adds or drains coolant if required. Air purging is automatic to reduce setup time and maintenance effort. Coolant reservoir adds anti corrosion and anti bacterial additives automatically whereas in other simpler system coolant quality check and additives control must be done manually.

FULL LOCAL & REMOTE MONITORING - Web based software allows for complete control and monitor from anywhere. Web page interface can be operated with any computer equipped with an Ethernet connection. System has also touchscreen controls giving local ability to monitors coolant temperature and quality, fills, drains, data logging of key performance parameters and tests.

INTELIGENT CDU SYSTEM - monitors coolant temperature to the servers, which is maintained at a temperature above the dew point in the data center based on a temperature and humidity sensor included in the CDU. System measures and records heat removed and facility water flow, vacuum, pressure, temperature (pump and facility side), dew point, primary and secondary loop coolant levels

FACILITY INTERFACE SPECIFICATIONS	
Cooling Water:	2°C to 45°C at 92 gpm (350 lpm) ASHRAE W4 15 psi (1 bar) differential
Tap Water:	2 GPM (7.5 lpm) 20-100 psi (1-6 bar)
Drain Connection	4 GPM; 2in (50 mm)

CHILLDYNE CDU SPECIFICATIONS CF-CDU300	
Dimensions	61x92x183 cm (24x36x72 in)
Weight	550 kg (1200 lbs) dry
Frame Details	Constructed out of steel welded for maximum strength. The units come equipped with casters and leveling feet to allow ease of installation and stabilization
Panel Details	Removable panels for full service access
Power	208 or 380-480 3 phase 10/5 amps
Pumps and Piping	The water temperature to the servers is maintained at a temperature above the dew point in the data center based on a temperature and humidity sensor included in the CDU. The temperature in the fluid supply reservoir controlled by a PWM modulated HX pump. Units equipped with a water filtration system with 100 micron filters.
Heat Exchanger	The unit is equipped with two, stainless steel brazed plate liquid/liquid heat exchangers. Facility cooling water flows in a second loop within the CDU through these heat exchangers. The heat exchangers are connected in series to minimize the processor temperature. The facility side of the HXs are connected using 5 cm (2”) diameter, stainless steel sanitary or copper water pipe.
Controller	The unit includes a microprocessor controller touch screen display mounted on the front of the unit for user interface accessibility without removing exterior panels. The unit automatically controls the flow through the servers, test the system for leaks, fill, drain and maintain coolant levels. The unit monitors the vacuum, pressure, temperature (pump and facility side), total dissolved solids (TDS), dew point, water levels, and coolant levels.
Environmental	Unit is designed to operate in ambient conditions 5-40°C (40-105°F), 0-95%RH (non-condensing), 0-2000m (0-6000ft) elevation.

OEM system manufactured for DCX by Chilldyne