Liquid Cooling for Data Centers

CF-CDU300

LIQUID COOLING SOLUTIONS

The Chilldyne *Cool-Flo*® System is a direct-to-chip liquid cooling system that delivers coolant under negative pressure *in both directions*. Chilldyne's technologies were designed specifically to eliminate the risks associated with liquid cooling while keeping deployment and operating costs low. The Chilldyne system mitigates risk with its patented leak-proof design.

ABOUT THE COOLING DISTRIBUTION UNIT

The Chilldyne Cooling Distribution Unit (CDU) is a negative pressure system that uses liquid to cool up to 300kW of server heat. The Cooling Distribution Unit (CDU) can use cooling tower water at 1-55°C (34-131°F) to remove up to 300 kW of server heat (10°C rise). Its innovative design and energy efficiency allow for effective cooling of servers in high density applications.

Key Features

- Pumps liquid with up to 10 lpm air leak with no reduction in performance.
- Touchscreen Controls
- Data logging of key performance parameters
- Remote monitoring via webpage or SNMP
- 4-6 cooling loops for easy hose routing
- 300 lpm cooling flow at .5 bar
- Monitors water temperature and quality, fills, drains, and tests for leaks
- Measures heat removed and facility water flow
- Automatic control of anti-corrosion fluid

Low Risk

The Cool-Flo System uses a proprietary, negative pressure main pump combined with standard heat sinks modified for liquid cooling to provide a leak-free system.

High Reliability

The Cool-Flo System pistonless pump works with pneumatic ejector technology. This type of pump has very low maintenance and is failure tolerant.

Cost Effective

The Cool-Flo system takes advantage of the negative pressure to utilize inexpensive hardware components, leading to cost-effective implementation.

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CDU COMPONENTS

1. Pump Chamber

The Chamber is where coolant is stored, supplied to the servers and received from the servers. The system cycles through the main and auxiliary chambers allowing for a steady flow.

2. Heat Exchanger (2x)

Transfers the heat created by the servers to the cooling tower or chiller. The HX are connected in series to minimize the processor temperature on hot humid days with warm cooling tower or dry cooler water.

3. Liquid Ring Pump (LRP)

LRP uses water as a seal to provide the required vacuum necessary to propel the coolant. The water seal does not wear out. Redundant pumps optional.

4. Microprocessor Control

The temperature in the fluid reservoir is controlled to maintain the coolant temperature above the dew point in the data center.

5. Water Quality Control

The water quality is monitored and controlled to maintain corrosion and bacterial protection. Automatic fill, drain, air purge and leak test are included and coolant additive is stored onboard.

6. Coolant Handling Manifold

Standard 4-6 cooling loops exiting bottom of CDU. Optional single feed coolant supply for rear door HX applications at either bottom or top.

LIQUID COOLING POWER SAVINGS

Liquid Cooling Power Savings

Chilldyne's Cool-Flo System is an efficient and low cost liquid cooling system that reduces data center power consumption 3 ways:

- 75-100% reduction in HVAC power
- 75% reduction in server fan power
- 5-10% reduction in CPU power

This example shows a legacy data center power reduction of 45% with the Cool-Flo System. Any data center can bring their Power Usage Efficiency (PUE) down to 1.2 or less plus additional power savings at the server.