Data Center Cooling Distribution Unit Dual-Pump Redundancy Logic - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

The Data Center Cooling Distribution Unit (CDU) with Dual-Pump Redundancy Logic represents a paradigm shift in thermal management for high-density compute environments. Engineered for mission-critical facilities, this unit ensures continuous coolant circulation through an active-active pump architecture, eliminating single points of failure in the liquid cooling loop. The dual-pump redundancy logic provides automatic failover within milliseconds, maintaining optimal flow rates and pressure differentials even during pump maintenance or unexpected component failure. Designed to support next-generation AI accelerators and high-TDP processors, the CDU delivers precise temperature control, energy efficiency, and unparalleled reliability for hyperscale, colocation, and enterprise data centers.



ARCHITECTURE & CHASSIS DESIGN

The CDU is housed in a rugged 2RU chassis constructed from corrosion-resistant stainless steel, designed for rack-mount installation in standard 19-inch enclosures. The internal layout separates the primary and secondary pump loops, each equipped with variable-speed EC motors and integrated differential pressure sensors. The dual-pump redundancy logic is governed by a dedicated microcontroller unit (MCU) that continuously monitors pump performance, flow rate, and pressure. In the event of a pump fault, the MCU seamlessly transitions to the standby pump within 50 milliseconds, ensuring uninterrupted coolant flow. The chassis features front-to-back airflow with hot-swappable fan trays and tool-less filter access for simplified maintenance. All wetted components are compatible with glycol-water mixtures and dielectric fluids, ensuring broad compatibility with

facility cooling systems.

HARDWARE FEATURES

- Dual variable-speed centrifugal pumps with active-active redundancy
- Automatic failover and fault detection within 50 ms
- Integrated pressure, temperature, and flow sensors
- Hot-swappable pump modules and fan trays
- Local LCD display and web-based management interface
- SNMP v3, Modbus TCP, and Redfish API support
- Dual redundant power supplies (1+1 AC/DC)
- Leak detection and alarm relay outputs
- Precision flow control via PID algorithms
- Energy-efficient EC motors with IE5 efficiency rating

COMPLIANCE & STANDARDS

The CDU complies with the following standards: IEC 60950-1 (Safety), EN 55032 (EMC), IEC 61000-4 (Immunity), and RoHS 3. It is designed to meet CE, UL, and FCC certification requirements. The unit is also compliant with ASHRAE TC 9.9 guidelines for liquid cooling in data centers.

TECHNICAL SPECIFICATIONS

Parameter	Specification
Form Factor	2RU rack-mount chassis (19-inch)
Pump Configuration	Dual variable-speed centrifugal pumps, active-active redundancy
Redundancy Logic	Automatic failover < 50 ms, hot-swappable pump modules
Flow Rate	Up to 120 L/min per pump
Pressure Differential	Up to 3.5 bar
Coolant Compatibility	Glycol-water mixtures, dielectric fluids
Power Supply	1+1 redundant AC (100-240 V) or DC (-48 V)
Management Interfaces	SNMP v3, Modbus TCP, Redfish API, web GUI, LCD display
Operating Temperature	5°C to 45°C (ambient)
Certifications	CE, UL, FCC, RoHS 3, IEC 60950-1

ORDERING OPTIONS

- CDU-DP-2RU-AC: Dual-pump CDU with AC power supplies, 2RU chassis

- CDU-DP-2RU-DC: Dual-pump CDU with DC power supplies, 2RU chassis

- CDU-DP-2RU-AC-F: Dual-pump CDU with AC power supplies and integrated filtration

- CDU-DP-2RU-DC-F: Dual-pump CDU with DC power supplies and integrated filtration

