

Cooling Distribution Unit Solution

Description

The Cooling Distribution Unit (CDU) acts as the core heat exchange and distribution hub of liquid cooling systems. Widely applied to liquid-cooled cabinets in intelligent computing centers, vehicle thermal management systems for new energy vehicles, high-power charging equipment and other applications.

This solution leverages the high-performance real-time i.MX RT1189 MCU as the master controller to handle system logic computation and closed-loop algorithm scheduling, while exchanging data with external platforms through standard Modbus RTU/TCP interfaces. NXP's dedicated analog front-end (AFE) chips NAFE13388 and NAFE33352 are integrated for analog signal sampling and actuator control. Specifically, the NAFE13388 provides real-time monitoring of full-circuit physical parameters and open-circuit fault diagnosis for sensors; the NAFE33352 precisely stabilizes secondary coolant temperature and pipeline differential pressure to prevent condensation on servers and power components.

Advantages

This liquid cooling CDU delivers high-precision, highly reliable and fully intelligent cold & heat distribution as well as integrated thermal management.

Features

- High-performance real-time main controller with fast control response and high stability
- Dual-AFE professional analog signal chain featuring high-precision acquisition and high integration
- Standardized Modbus external communication for convenient maintenance and strong scalability

Core Chips

- MCU: **NXP** i.MX RT1189
- Perception Layer: **NXP** NAFE13388
- Execution Control Layer: **NXP** NAFE33352
- Isolator: **DIODES** API7721/2
- Bridge Controller: **DIODES** PI7C9X760/2
- Level Shifter: **DIODES** PI3CLS9606

Applications

- Data Center Liquid Cooling
- Industrial Liquid Cooling

Block Diagram

