



Coolant Distribution Unit (CDU)

400kW–2MW+ Liquid-Liquid Heat Exchanger for Liquid Cooled & Hybrid Data Center Architectures



The Global Critical Cooling Specialist



Global Locations:

- **Leeds, UK**
Chillers, R&D, Test Labs, Training Center
- **Bradford, UK**
CDUs, CRACs, CRAHs, Fan Walls, R&D
- **Consett, UK**
Air Handling Units, R&D
- **Guadalajara, ES**
CDUs, CRACs, CRAHs, Fan Walls, Test Labs
- **Chennai, India**
CRAHs, Fan Walls, R&D
- **Calgary, CN**
Air Handling Units, R&D
- **Allen, TX, US**
Immersion Cooling, R&D
- **Rockbridge, VA, US**
CDUs, Chillers, Test Lab, R&D
- **Grenada, MS, US**
CDUs, CRAHs, Fan Walls, Coolers, Chillers, Test Lab, R&D
- **Dubai, UAE**
Sales Office

Airedale by Modine is the critical cooling specialist, with the technology and expertise to meet the specific operational demands of data centers worldwide. We take a partnership approach, delivering customized solutions at scale to colocation and hyperscale data center clients whose network of global facilities demand a more bespoke solution. Our hybrid cooling solutions encompass high efficiency air and liquid cooling systems, intelligent controls software and comprehensive aftersales support.

Renowned for the expertise of our people, with world class products and plants, Airedale by Modine is proud of its R&D ethos being firmly rooted in sustainability and quality. We are committed to deliver best-in-class technical design, energy performance, project delivery and ongoing lifecycle optimisation; all of which comes together to support our clients in meeting their performance, efficiency and sustainability goals.

With a global network of facilities, encompassing R&D laboratories, test chambers, production, training and sales offices.

Airedale by Modine is part of Modine (NYSE:MOD), a diversified global leader in thermal management technology and solutions. Together we aim to engineer a cleaner, healthier world™.

Coolant Distribution Unit (CDU)

Engineered to accelerate digital transformation and meet the needs of next-generation CPUs and GPUs, Airedale by Modine's CDUs enable liquid cooling in high-density IT applications.

Airedale by Modine's CDUs are designed for direct-to-chip and hybrid cooling environments, including rear door heat exchanger (RDHx) applications that facilitate simplistic, modular, efficient and performance-driven deployments.

Key Features, Proven Benefits:

- Engineered to perform, resilient and reliable with in-built redundant pumps, filtration and intuitive system controls to support load fluctuations with precise coolant delivery.
- Configuration flexibility with option to select standard model or work with us to develop custom configurations.
- Modular and global design, with ability to apply and deliver wherever your projects are.
- Seamless integration into in-rack server profiles or facility rooms, Airedale by Modine's CDU is compatible with your existing infrastructure to create a dynamic, end-to-end, future-proof thermal management system.



Up to 2MW+ Capacity

Compact footprint and maximized power density for liquid/hybrid enablement

Engineered to order options >2MW



Filtration

Extra large filter bodies to maximize filtration area, minimizing risk of contamination.

Standard filtration of 25 μ



Redundancy

N+1 pumps, drives and filters allow for the isolation of redundant leg for service/maintenance during operation



Access

Front accessible components (control panel, VSDs, expansion tanks, filter cartridges)

System Configuration

Airedale by Modine's CDU, designed in consultation with industry professionals, provides a technology (secondary) fluid cooling loop to achieve heat exchange between the facility (primary) water system (FWS) and the fluid circuits serving the IT equipment (ITE). The loop enables control and separation, allowing the CDU to monitor and regulate fluid flow and temperature to facilitate the adoption of liquid cooling systems, including direct-to-chip cooling and rear-door heat exchangers (RDHxs).

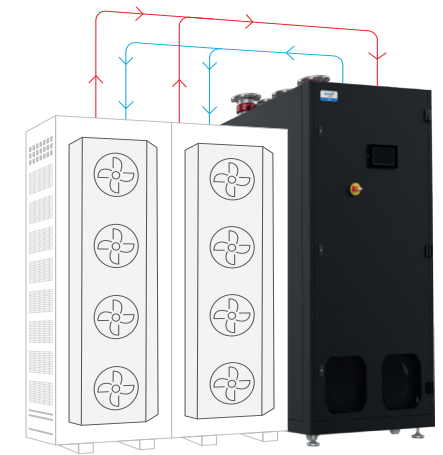
Integrated pumps drive the technology loop flow to the ITE and can adjust the coolant flow and temperature.

Optimized for space claim, serviceability, efficiency and performance, the CDU can deliver up to 2MW of capacity and be positioned in the server rows, at the facilities perimeter, outside the white space, or in the facility room – via slab or raised floor.

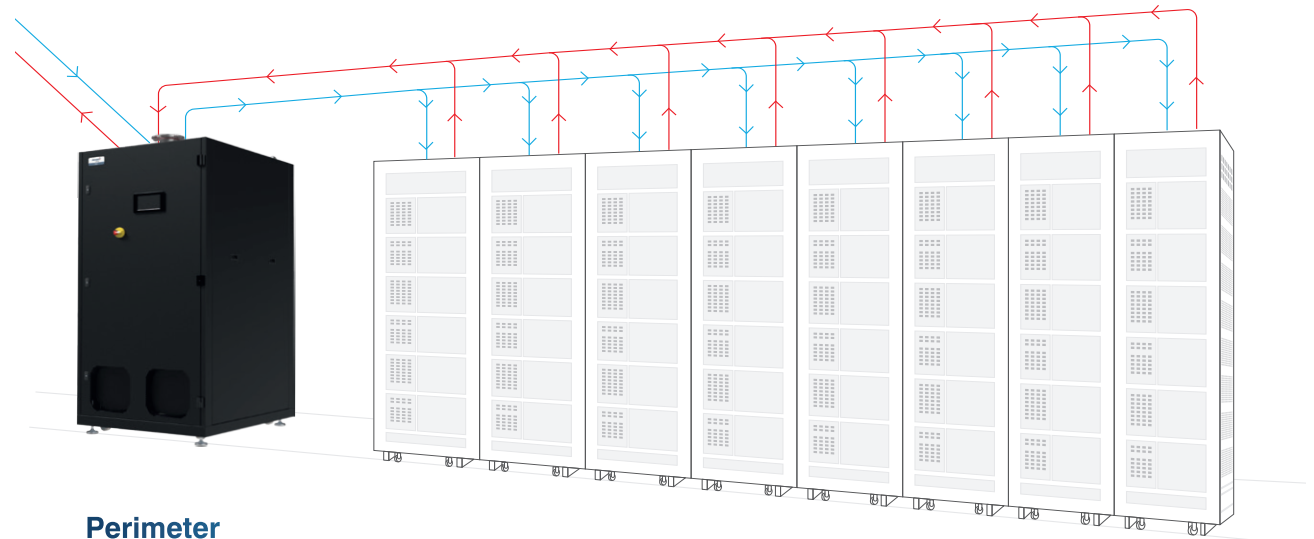
For large scale orders that demand capacities greater than 2MW, we can customize and engineer the CDU for a bespoke solution.



Row Level Configuration



Row level CDU + RDHX for hybrid Direct-to-Chip Cooling



Perimeter Configuration

Key Features

1 Vu™ Touch Screen HMI

A 7" colour TFT touch screen display, providing a graphical representation of the system process, unit status and diagnosing specific faults including leak detection.

2 Pumps (N+1)

Redundant circulated pumps including higher efficiency options. Operating either simultaneously or in a run/standby configuration.

3 Stainless Steel Pipework

Stainless 304 SCH10 pipework, with Stainless 316 SCH10 selectable as an option. Complete stainless steel pipelines, including pumps, to eliminate particle generation.

4 Controller & Control Panel

Offering an intuitive user interface. Controller is responsible for ensuring precise control and managing uptime. Able to network up to 8 CDUs. Easy integration to any BMS including Airedale by Modine's ACIS™ and Cooling System Optimizer™.

5 Plate Heat Exchanger (PHX)

Compact PHX customizable to optimize for application. Stainless steel/copper brazed PHX (standard). Fusion bonded stainless steel PHX (option).

6 Variable Speed Drives (N+1)

Integrated, redundant variable speed drives for precise fluid delivery performance.

7 Pipework Connections

Top connections (standard), bottom connections (option). Hygienic flanged and grooved options. Isolation valves for supply and return.

8 Filters

Keeps the coolant fluid free from contaminants, protecting the integrity of the cold plate and maintaining cooling performance. Standard filtration of 25µ (50µ option).

9 Motorized Isolation Valves

Optional motorized isolation valves can be configured to isolate the CDU from the servers upon remote authorization by the plant operator.

10 Active Harmonic Filter (AHF)

Active harmonic filter integrated to compensate for unwanted harmonics. The AHF improves the system efficiency while reducing harmonic pollution. The AHF device is in compliance with IEEE 519 standard.



Liquid Courage

Introducing fluid close to critical IT equipment is a risk many data center operators are wary of. Airedale by Modine's CDU has integrated safety features that protect, detect, and mitigate fluid leaks, ensuring unrivaled peace of mind and an efficient, reliant, and resilient safe supply to critical IT equipment.



1. Prevent

The Airedale Quality Management System (AQMS) ensures adherence to highest possible build standards and robust testing protocols in our global manufacturing plants.

Fully welded internal pipework (option).

Externally fitted actuated isolation valves (option). In the event of a leak, the optional motorized isolation valves can be configured to isolate the CDU from the servers upon remote authorization by the plant operator, or carry out an immediate emergency shutdown and isolation.



2. Detect

Onboard-integrated leak detection as standard. The stainless steel unit drip tray includes a leak detection sensor.

Braided cables detect the presence of water anywhere along the length of the cable. They are connected to an alarm unit, which can locate the spatial position of the leak. The BMS communicates this to implement a mitigation strategy.

Optional point leak detectors can be applied where cables are unsuitable.



3. Mitigate

Facility mapping for accurate spatial location of leak points. All sensors communicate to the BMS, which will shut off the source and can be implemented at a localized scale (rack/zone isolation).

If leak detection is activated, the CDU can be configured to shutdown and close the supply/return isolation. This will protect the IT equipment following a remote 'handshake' from the plant operator once a safe shutdown procedure has been completed.

Fully welded, stainless steel drip tray supplied, to confine a leak and direct it towards a drain point.

Other Features

- Standard
- Optional

Electrical/Controls

- TCS temperature control
- TCS differential pressure or flow control
- Pump operation
 - 1: Simultaneous operation
 - 2: Run/standby only
- Dew point offset
- Manual override

Sensors

- Filter change
- FWS inlet/outlet pressure
- TCS inlet/outlet pressure (optional N+1 redundancy)
- TCS supply temperature (optional N+1 redundancy)
- TCS return temperature
- TCS flow meter
- FWS supply temperature
- FWS return temperature
- FWS flow meter
- Leak detection – up to 3 rope style sensors supported

Pipework connections

- Top – flanged and grooved
- Bottom – flanged and grooved

Filtration

- 25 micron
- 50 micron

Valves

- Energy valve – FWS side
- PIC valve – FWS side
- Supply actuated isolation valve – FWS
- Externally fitted actuated isolation valves – TCS

Power

- Single power supply:
 - 1: 400V/3Ph/50Hz
 - 2: 380V/3Ph/60Hz
 - 3: 460V/3Ph/60Hz
- Additional power supply:
 - 1: Dual power supply
 - 2: Active harmonic filtration
- Mains isolation switch
- Upgraded SCCR (65kA) (60Hz)

Features

- High efficiency brazed plate heat exchanger
- Full stainless steel fusion bonded plate heat exchanger
- Castors
- Antivibration feet
- Seismic stabilization feet



Nominal Design Conditions



	ASHRAE W2 Facility Water Temperature				ASHRAE W3 Facility Water Temperature			
	NA	Global	NA	Global	NA	Global	NA	Global
Technology System	Water		25% Prop. Glycol		Water		25% Prop. Glycol	
Supply Temperature	88°F	31°C	88°F	31°C	97°F	36°C	97°F	36°C
Return Temperature	106°F	41°C	106°F	41°C	115°F	46°C	115°F	46°C
Flowrate	394gpm	24.8/s	394gpm	24.8/s	394gpm	24.9/s	394gpm	24.9/s
l/m/kW Metric	1.5l/m/kW		1.5l/m/kW		1.5l/m/kW		1.5l/m/kW	
External Head	49psi	340kPa	49psi	345kPa	49psi	340kPa	49psi	345kPa
Facility Water System	Water		25% Prop. Glycol		Water		25% Prop. Glycol	
Supply Temperature	81°F	27°C	81°F	27°C	90°F	32°C	90°F	32°C
Return Temperature	99°F	37°C	99°F	37°C	108°F	42°C	108°F	42°C
Flowrate	392gpm	24.7/s	391gpm	24.7/s	392gpm	24.7/s	391gpm	24.7/s
Total								
Cooling Capacity	1028kW		1000kW		1027kW		1000kW	
Approach	7.2°R	4K	7.2°R	4K	7.2°R	4K	7.2°R	4K

Dimensions	NA	Global
Height*	78.7in	2000mm
Width	38.5in	978mm
Depth	47.2in	1200mm

*Overall height including flanges and top connections 2150mm (84.6in).

Above data based on a 1MW unit. Additional data is available.



IQity™ is Airedale's IoT-enabled technology framework, revolutionizing how cooling is connected, controlled and automated in critical facilities at a product, system and site level.

SYSTEM

- CW System Optimizer
- CRAH Energy Optimizer
- Chiller Sequencer
- HVAC Controls Suite

Optimizer

SITE

- ACIS Facility Management
 - BMS
 - PMS
 - BEMS
- ACIS Edge
- ACIS Telecoms

ACIS™

PRODUCT

- Precision Controls
- Chiller Controls
- Optimized Head
- Pressure Control
- Chiller Fast Start
- Energy Manager
- Refrigerant Manager
- Compressor Manager

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