



KAORI Brazed Plate Heat Exchangers for Data Center Cooling



ASME
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Data Center Cooling

Data Center is a facility that stores, processes, and delivers data, it is the core of the IT operation and related equipment. There are different types and models of data center, for example, enterprise (privately owned) data center, publicly owned cloud data center, management data center, and shared facilities. Different data center offers different service and functions, and satisfies the demand and work load of different organizations. For example, data center takes care of company resource, capability programming, and electronic business by storing, managing, backing up and restoring the data. Data center also backs up AI, AIoT, Edge Computing, big data, and machine self learning.

As more attentions are paid to climate change and environmental protection, the sustainability of data centers has become a major trend. Data center consumes considerably amount of energy for its operation, therefore to increase its energy efficiency, reduce carbon emission and water consumption has become challenge and opportunity. A normal indicator of energy efficiency in data center is PUE (Power Usage Effectiveness), it indicates the ratio between IT equipment and energy consumption. Data center is more energy efficient as PUE approaches 1. According to statistics, global PUE value is 1.55.

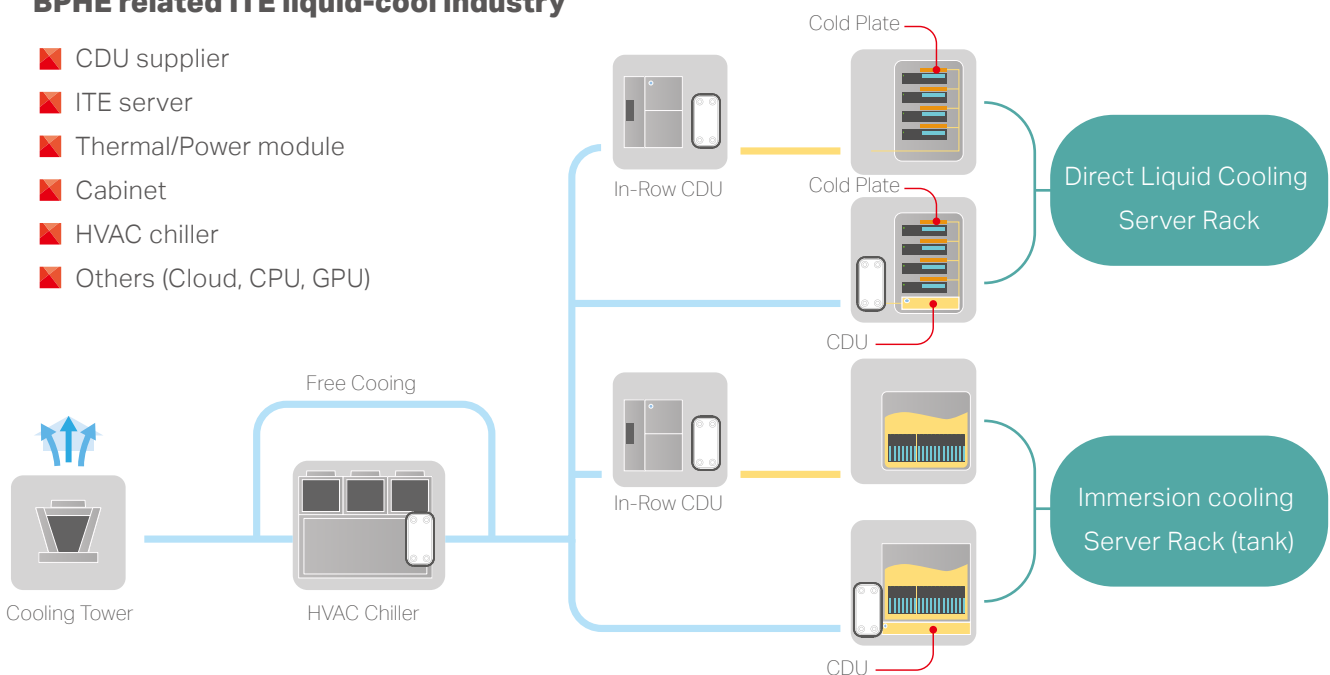
Kaori's BPHE in Data Center

Conventional cooling for server is to use direct air (CRAC) or water (cold plates), these normally result in higher PUE value between 1.5-2.0. In recent years, new technology called Immersion cooling has been introduced to the industry. Immersion cooling is to soak server and related equipment into non conductive liquid, taking advantage of higher thermal conductivity in liquid. The advantages of immersion cooling include high efficiency, low carbon foot print, low power, water and space consumptions.

Regardless of precise air conditioning or immersion cooling, Kaori offers complete heat exchanger solution. Kaori's professional research team and long history of success in the market have been renowned by customers.

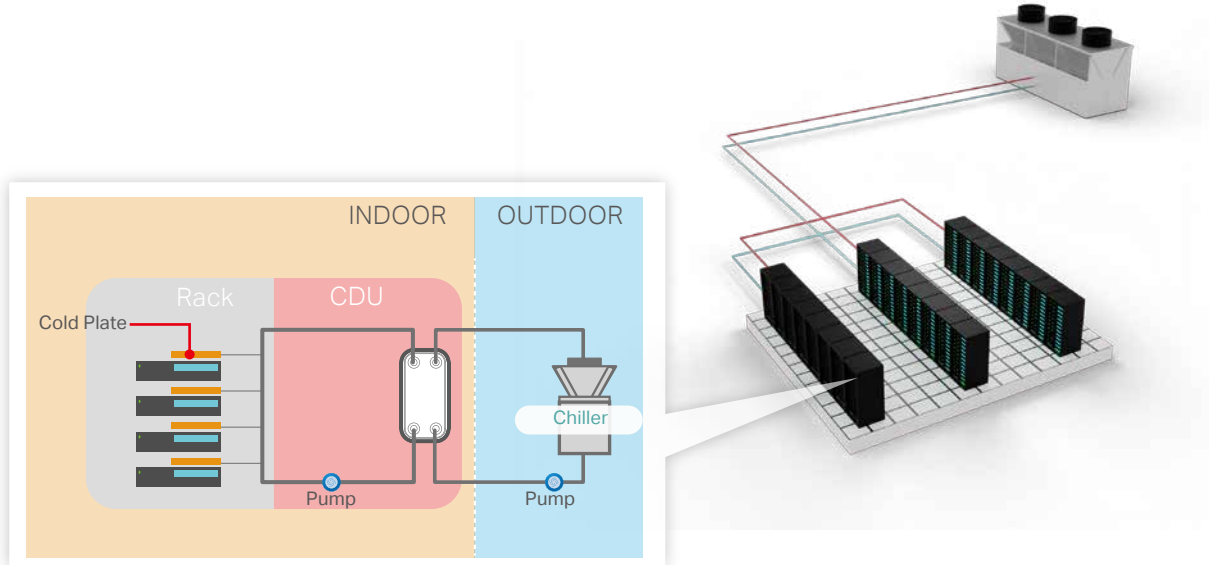
BPHE related ITE liquid-cool industry

- CDU supplier
- ITE server
- Thermal/Power module
- Cabinet
- HVAC chiller
- Others (Cloud, CPU, GPU)

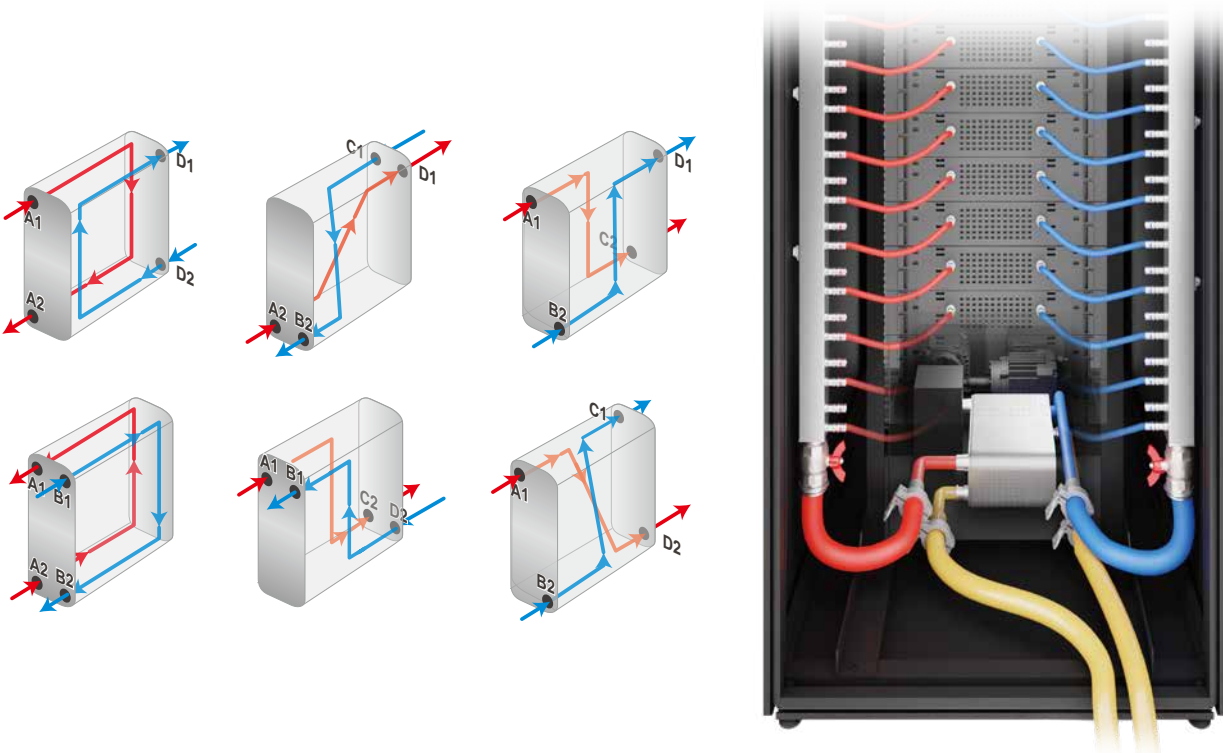


Kaori's BPHE for In-Rack CDU

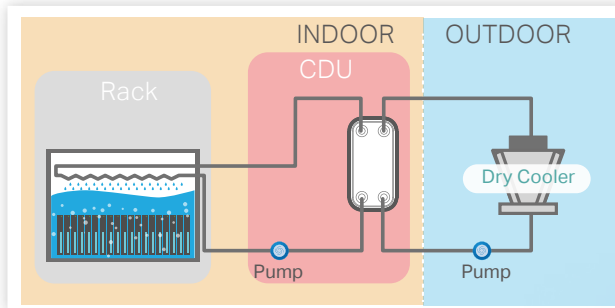
High server density from the most powerful to the most compact. KAORI BPHE enables the in-rack CDU a compact dimension and heat being removed efficiently for liquid cooling on demand.



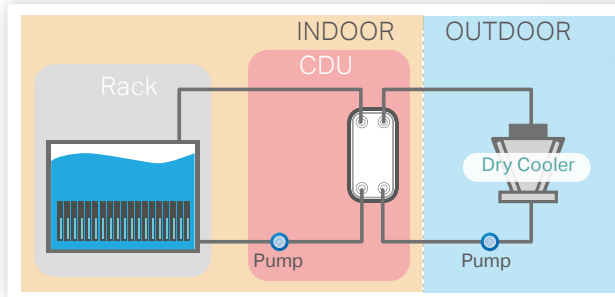
For In-Rack CDUs, Kaori offers high-quality parallel flow and diagonal flow heat exchangers, with customization options for same-side or different-side inlet and outlet designs, providing greater flexibility in cabinet design.



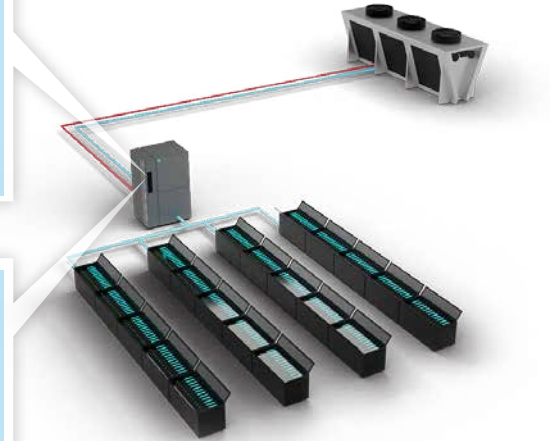
Kaori's BPHE for CDU for Immersion Cooling



Two Phase Cooling



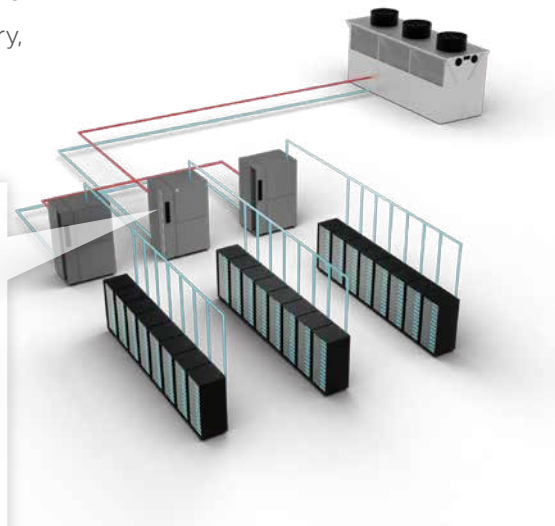
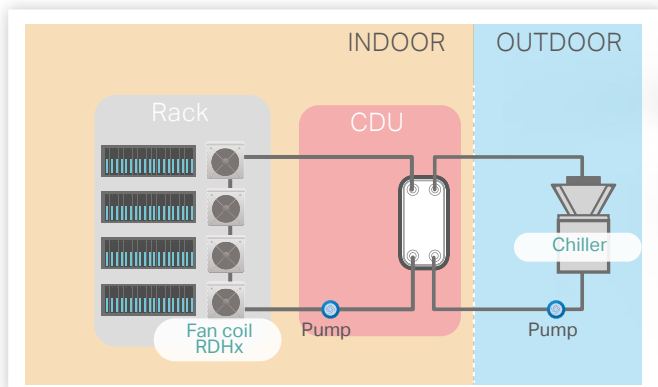
Single Phase Cooling



Kaori's BPHE for In-Row CDU

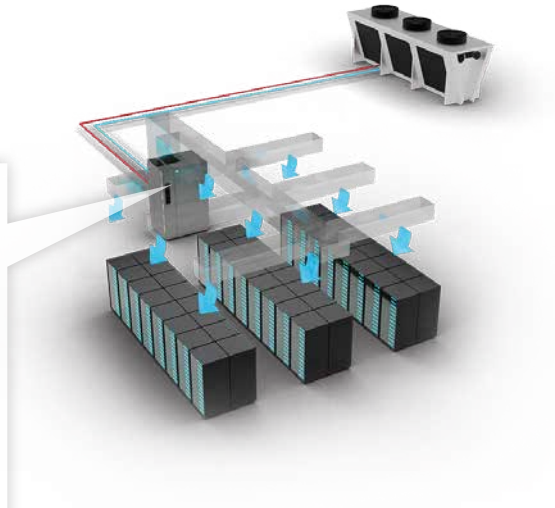
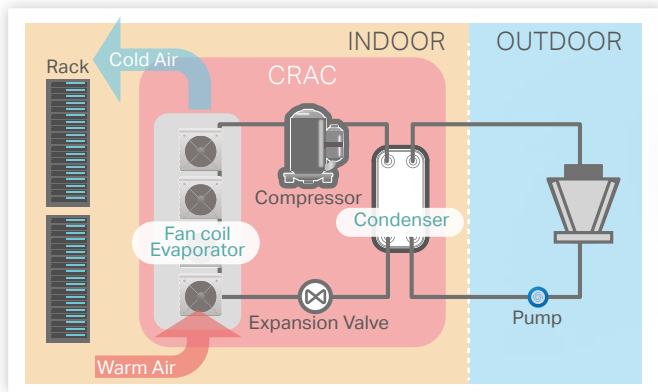
The Coolant Distribution Unit (CDU) provides close controlled cooling water for a fan coil such as the rear door heat exchangers (RDHx). The CDU built-in a KAORI BPHE creates an isolated secondary loop, separated from the chilled water.

※The BPHE also can be applied in the water chiller as the evaporator, economizer or condenser for heat recovery, etc.



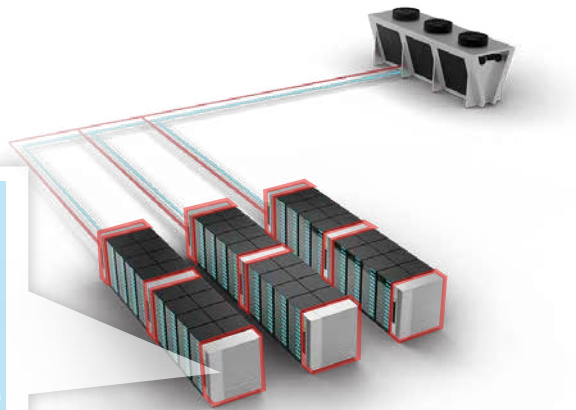
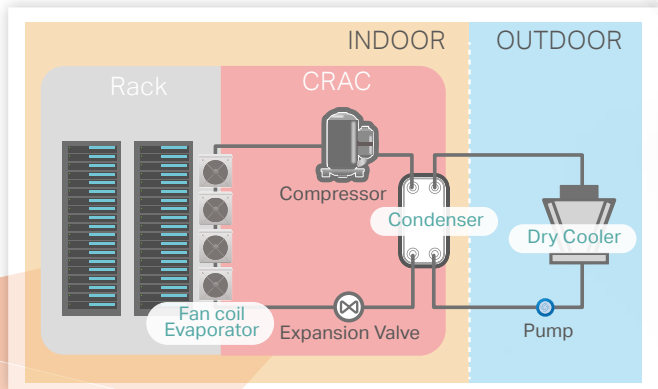
Kaori's BPHE for In-Room CRAC

KAORI manufactures brazed plate heat exchangers (BPHE) as the condenser for computer room air conditioners (CRAC), which typically use a refrigerant in a traditional dry expansion (DX) system.



Kaori's BPHE for In-Row CRAC

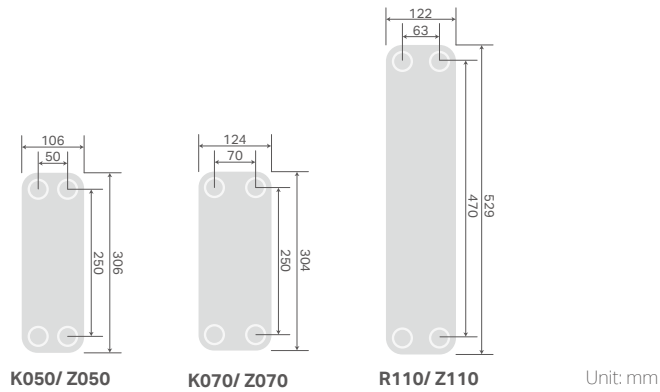
Most of the cooling capacity will be focused on the racks where actual source of heat is. In-row CRAC systems with KAORI BPHE are recommended to be used in combination with cold & hot aisle containment to achieve the best and energy efficient cooling performance.



BPHE Models for In-Rack CDU

Flow Direction	Counter Flow	Diagonal Flow
Model	K050, K070, R110	Z050, Z070, Z110
Connections	Stainless Steel	Stainless Steel
Plates	Stainless Steel	Stainless Steel
Brazing Material	99.9% Pure Copper	99.9% Pure Copper
Max. working pressure (bar)	30	30
Max. working temperature (°C)	200	200

* For other working pressure or temperature request, please contact Kaori representative.



BPHE Models for In-Row CDU

Flow Direction	Diagonal Flow	
Model	Z400	Z600
Connections	Stainless Steel	Stainless Steel
Plates	Stainless Steel	Stainless Steel
Brazing Material	99.9% Pure Copper	99.9% Pure Copper
Max. working pressure (bar)	30	30
Max. working temperature (°C)	200	200

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