Indirect Evaporative Cooling Solution

FusionCol8000-E260H4

HUAWEI

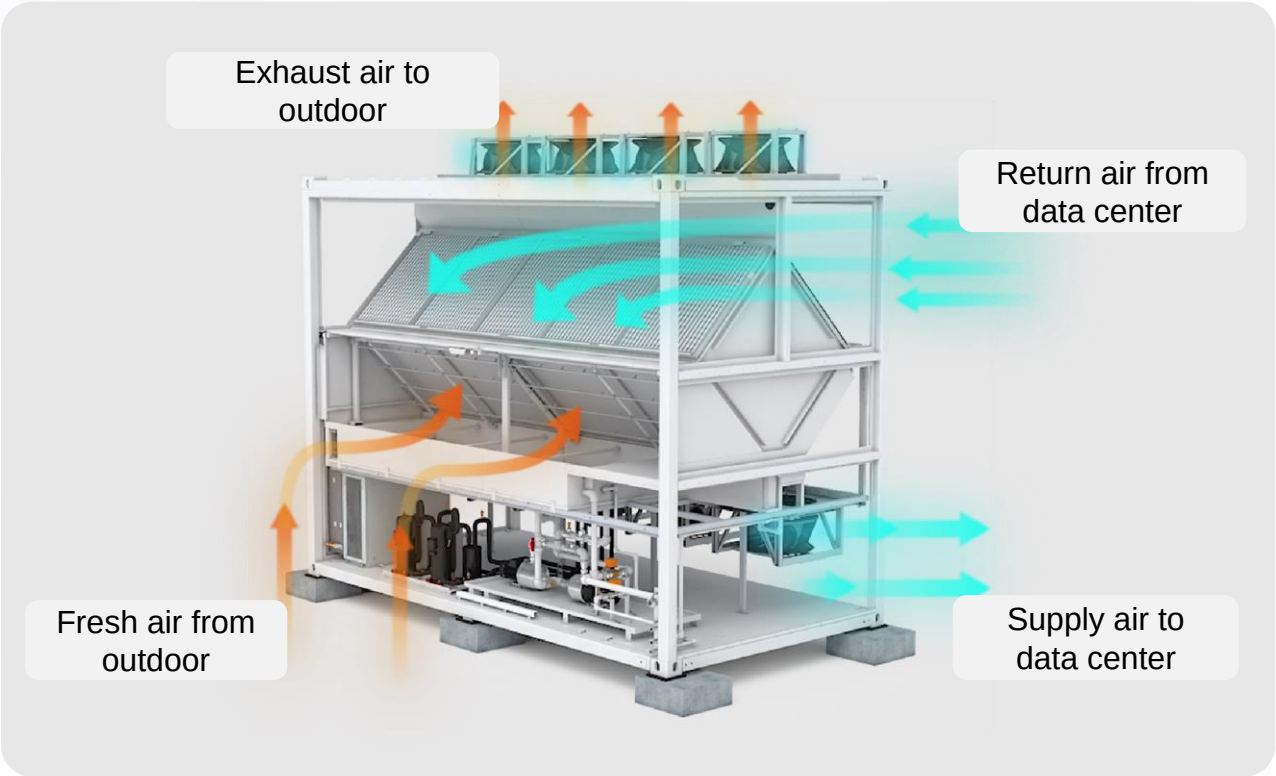
INTRODUCTION

Indirect evaporative cooling is a free cooling solution applied in data centers. Huawei FusionCol8000-E indirect evaporative cooling product is prefabricated with DX cooling and key functional components. In addition, the solution implements convergence of cooling , power and AI energy efficiency optimization, helping to build a new-generation simple, green, smart, and reliable cooling solution.

FusionCol8000-E260H4

WORKING PRINCIPLES

The air-to-air heat exchanger uses external cold air and water spray evaporation to dissipate heat for the data center.



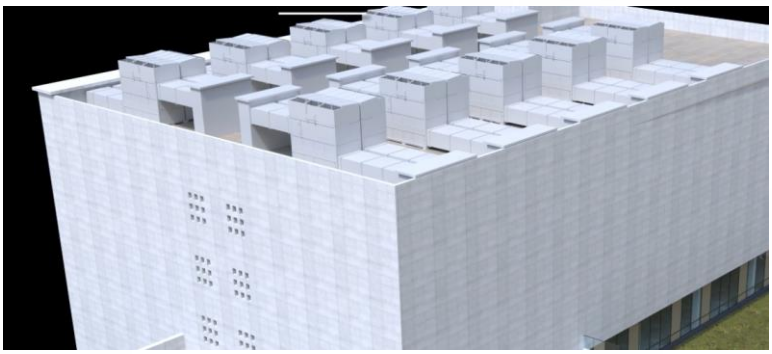
Mode	Ambient T℃	Fans	Pumps	Compressor	Remark
Dry Mode	Low Dry bulbtemperature	ON	OFF	OFF	Switching points are automatically switched based on load changes.
Spray Mode	Low wet bulb temperature	ON	ON	OFF	
Hybrid Mode	The spray mode does not meet the cooling capacity requirements.	ON	ON	ON	

APPLICATION SCENARIO

- ISP
- Carrier IDC
- Cloud data center

01 Side installation

02 Rooftop installation



03 Indoor installation

Simple

- Integrated all-in-one system. Optional components humidifier, 2-in-1 damper for fireproof and block, saving 50% TTM.
- Integrated cooling-power architecture, reducing footprint by removal of UPS.
- Modular fan driver module, maintained in one minutes.

50%
Less TTM

15%
Less footprint of power supply system

1 min
Maintenance on modular fan driver

Green

- High efficiency polymer air-air heat exchanger and spray system for optimized free cooling. CLF=0.115@London
- EC fan: Separated architecture, improving air volume by 45% and efficiency by 6%
- Wet-film humidifier : 0 power consumption

0.15
Low CLF by free cooling

6%
Higher fan efficiency

0
Humidification power

Smart

- Automatic fault diagnosis in 15 minutes.
- iCooling optimization technology helps to reduce CLF by accurate response to IT load.

15 min
Fault diagnosis

8%
Lower CLF by iCooling

Reliable

- Dual power supply & No compressor restart and 0 temperature fluctuation during power switch.
- Operating harmonic THDi < 5%
- Spray water pipe equipped with ultraviolet sterilization, sterilization rate up to 99.99%
- Indoor air is completely isolated from out door free cooling sources, preventing affecting indoor environment.

0 fluctuation
During power switch

<5%
THDi

99.99%
Ultraviolet sterilization

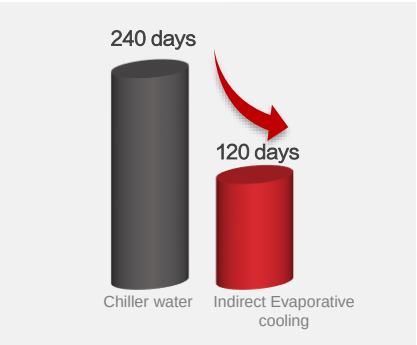
0
Air pollution from outdoor

CLF: cooling load factor, CLF=cooling system power / IT system power
GUE: grid utilization effectiveness, GUE= IT system power quota / total power quota

SIMPLE

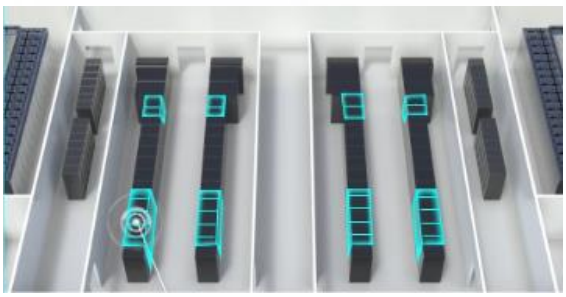
01 Prefabricated in one module, one-stop delivery

Ulanqab Huawei Cloud Data Center



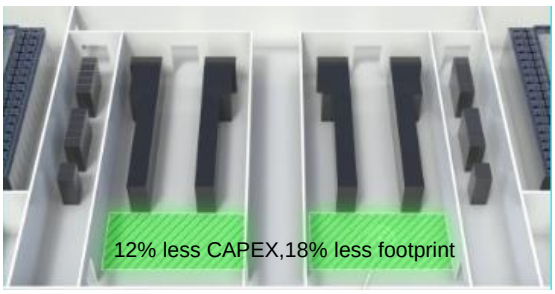
TTM Comparison

02 Integration of cooling&power, no need for UPS, simplified power distribution link, 12% less CAPEX, 18% less footprint



Conventional power system

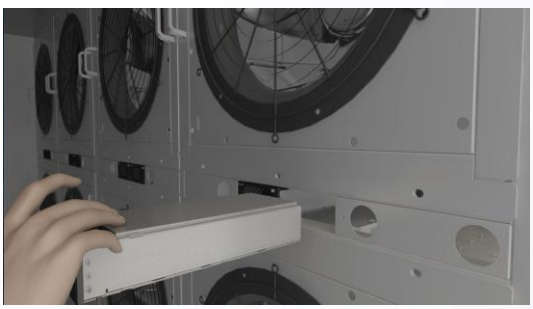
VS



EHU power system

03 Modular design on controller and fan driver. Maintained in one minute.

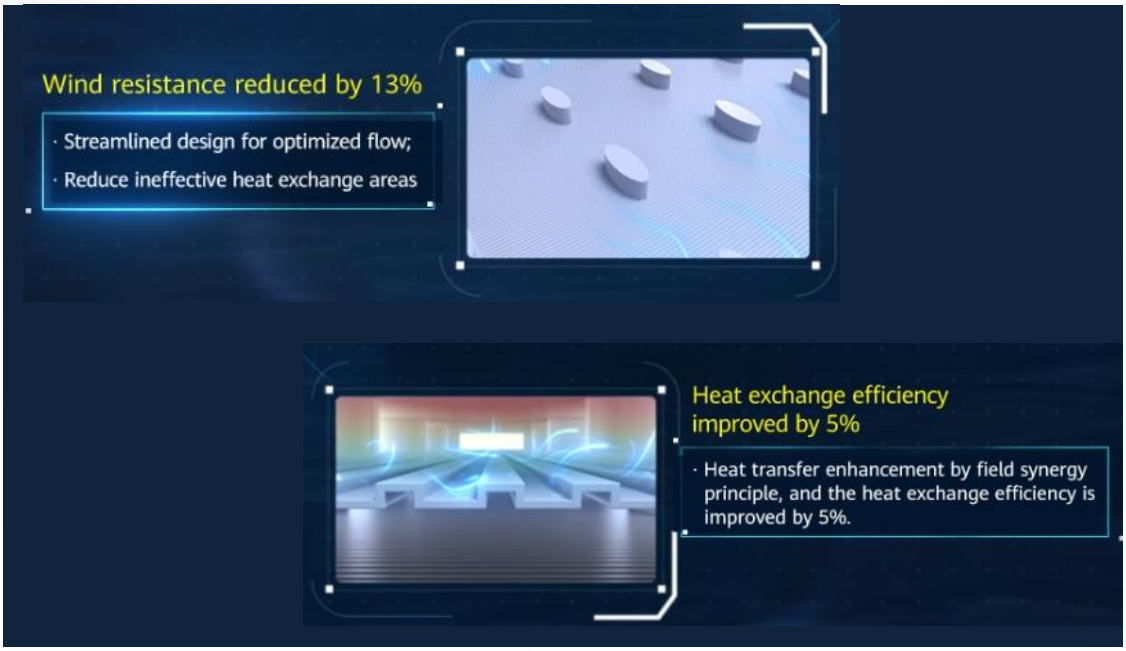
Main control module hot swap maintenance



Fan driver module hot swap maintenance

GREEN

01 High efficiency polymer heat exchange core. Full utilization of free cooling source. CLF≤0.115@London

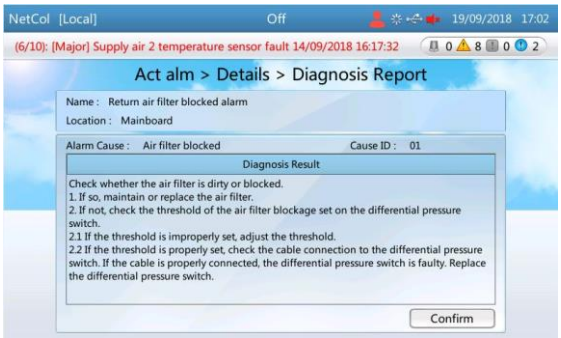


02 High-efficiency EC fan: separated architecture, improving air volume by 45% and efficiency by 6% compared with a common EC fan.

SMART

01 Fault diagnosis. Automatic export of diagnosis report.

Fault cause analysis



Diagnosis report

02 iCooling smart efficiency optimization. Fast and accurate response to IT load.

RELIABLE

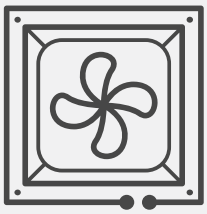
01 Wide operation range. Stable running under -40℃.

Antifreeze protection mode is enabled temperature lower than 5 ℃

Monitoring of outdoor temperature

Minimum speed of fan set to 15%

Regulating fan speed

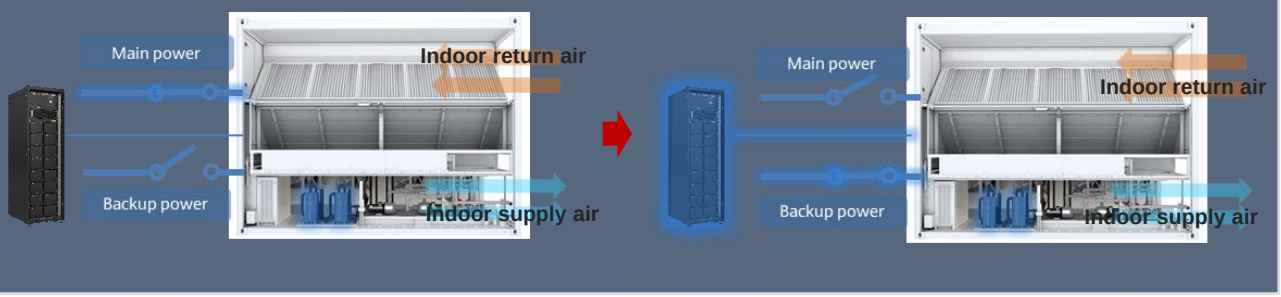


Inclined heat exchanger Downwind drainage

Stable operation of heat exchanger

02 No temperature fluctuation during power switch

Compressor and EC fan run continuously without shutting down during power switch, complying with continuous cooling requirements of Tier IV.

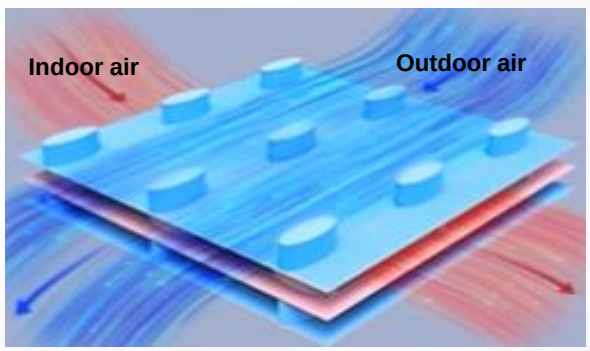


03 Spray water pipe equipped with ultraviolet sterilization. Sterilization rate up to 99.99%.

Water outlet Water inlet

04 No risk of air pollution from outdoor

Indirect heat transfer without pollution



KEY COMPONENTS

Polymer heat exchange core

- A self-developed efficient heat exchanger core is used. The heat exchanger core adopts the patented flow design, which improves efficiency and reduces air resistance;
- The heat exchanger core has high adaptability. It applies to high-temperature, low-temperature, and high- and low-temperature impact environments.

Variable frequency scroll compressor

- A DC variable-frequency compressor is adopted, which features low noise, a long service life, and high reliability, stability, and energy efficiency;
- The high-precision drive automatically adapts to the system pressure fluctuations;
- The compressor drive supports precise self-check. The compressor and drive generate alarms independently.

High-efficiency EC fan

- A self-developed high-speed fan is used, which features large air volume, high static pressure, high reliability, and a long service life;
- The fan is separated from the drive. Its efficiency is improved by more than 6% compared with a common EC fan;
- The direct drive that the fan adopts has higher transmission efficiency than the belt drive, which reduces belt replacement and routine checks.

Water pump

- A horizontal three-stage centrifugal pump is used, which features high pump lift, small size, high reliability, and long service life;
- The water pump is made of new lubrication sealing material. Wear parts such as water pump spindle seal and seal ring do not need to be maintained in the life cycle;
- The N+1 redundancy design ensures cooling supply.

Main control module & EC fan drive module

- The main control module and fan drive module support hot swap maintenance, which avoids the impact of traditional fan shutdown and maintenance on the equipment room environment, greatly saving the O&M time;
- The fan drive is separated from the fan, improving the system reliability.

Display module

- The 7-inch TFT touch screen is used to provide a human-machine interface for query, setting, monitoring and maintenance;
- Displays the temperature and humidity curve for 30 days, enabling O&M personnel to view the unit running status on site.

TECHNICAL SPECIFICATIONS

Model		FusionCol8000-E260
Total capacity/ Sensible capacity (SHR)		260 kW / 260 kW (100%)
Key performance	Auxiliary cooling capacity	130 kW
	Auxiliary cooling type	DX
	Refrigerant type	R410A
	Indoor air flow	60,000 m³/h
	Outdoor air flow	65,000 m³/h
	Indoor external static pressure	150 Pa
	Outdoor external static pressure	150 Pa
	Supply air temperature/humidity	25℃/50%
	Return air temperature/humidity	38℃/25%
	Humidification capacity (optional)	10 kg/h
Power supply	Power supply	380-415V AC, 3PH, 50/60Hz
	Inputs of power	Dual
	Rated power on dry mode	44.6
	Rated power on spray mode	45.6
	Rated power on hybrid mode	80
Installation requirement	Architecture	All-in-one architecture
	Application environment	Indoor, outdoor
	Dimension (D×W×H)	4700mm×2438mm×3600mm
	Net weight/operation weight	5500kg/6500kg
	Load-bearing requirement	≥ 600kg/㎡
Water pipe connection	Spray water inlet 1/2	DN25, G 1in internal thread
	Spray water drainage	DN40, G 1-1/2in internal thread
	Condensate drainage	DN25, G 1in internal thread
Air duct connection	Indoor supply air duct	2290mm x 1253mm
	Indoor return air duct	2290mm x 1285mm
	Outdoor fresh air duct	4436mm x 682mm
	Outdoor exhaust air duct	4580mm x 2368mm
Application environment	Operating temperature	-40℃ ~ +45℃
	Operating humidity	5% RH ~ 95% RH
	Storage temperature	-40℃ ~ +70℃
	Storage humidity	5% RH ~ 95% RH
	Altitude	0-4000m. Derating beyond 1000m
Communication interface		FE, RS485
Certification		CE/EAC/UKCA/RoHS/REACH/WEEE

Remarks:

- Cooling performance condition: Indoor return air DB 38℃, indoor supply air DB 25℃. Outdoor air DB 35℃, outdoor air WB≤27℃.
- It is recommended to select the cooling capacity based on the extreme climate in 20 years.

TECHNICAL SPECIFICATIONS

Model		FusionCol8000-E260
Material of heat exchanger		Polymer
Compressor	Type	Variable frequency scroll compressor
	Speed	1200rpm~6000rpm
	Quantity	2/3
Evaporator	Maximum pressure	2.6MPa
Condenser	Maximum pressure	4.25MPa
Water pump	Quantity	2
	Power supply	1.2kW, 380V, 50Hz, 12m^3/h,19.5m lift
Water spray	Type	Spray on heat exchanger
	Quantity of nozzle	64
Indoor air fans	Quantity	4
	Air flow volume	60000 m^3/h
	Power of single fan	5.9kW
	Fan type	EC
	Speed range	30~100%
Outdoor air fans	Quantity	4
	Air flow volume	65000m3/h
	Power of single fan	5.3kW
	Fan type	EC
	Speed range	15~100%
Air filter	Indoor air filter	G4
	Outdoor air filter	G3

Remarks:

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