



Indirect Evaporative Cooling Solution

## **FusionCol8000-E Series**



## INTRODUCTION

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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.

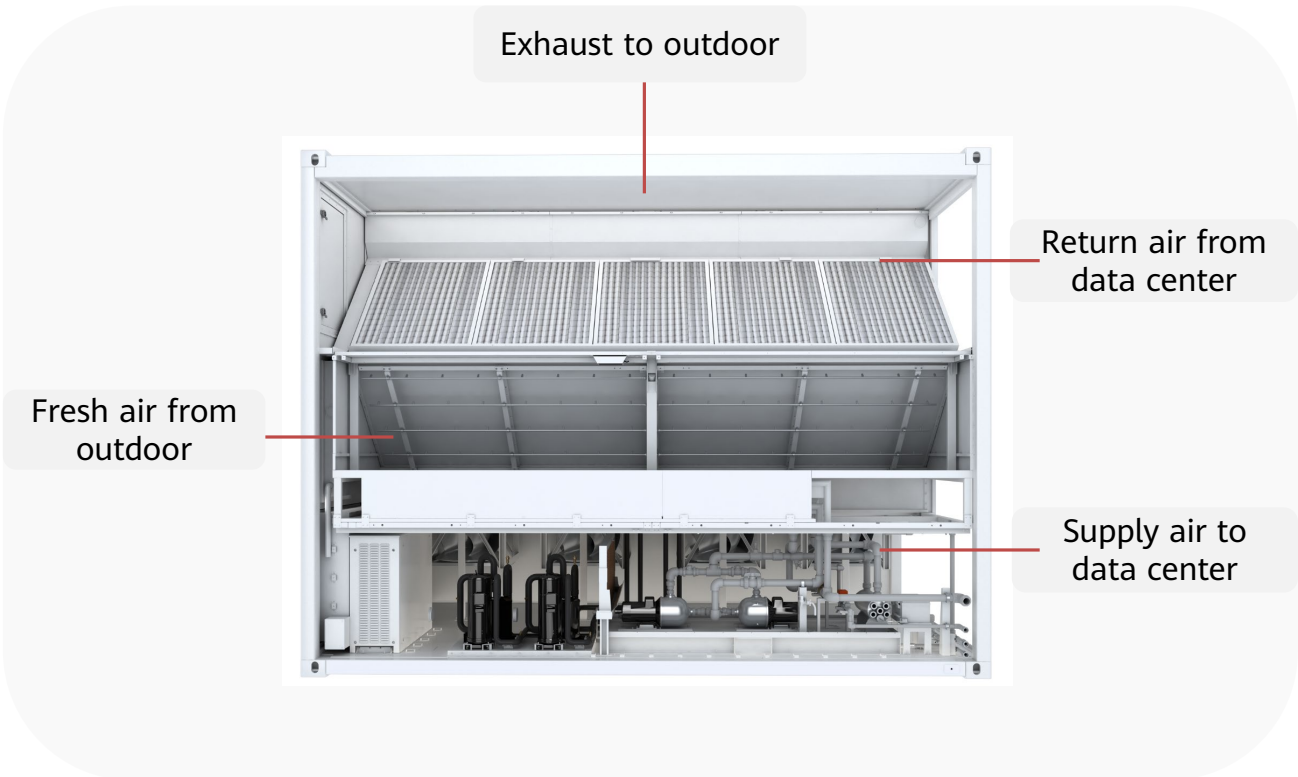


**Indirect Evaporative  
Cooling**

**Data Center**

## WORKING PRINCIPLES

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

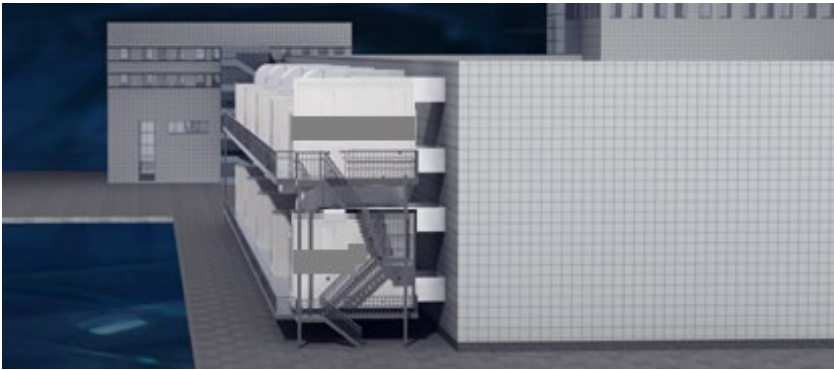


Mode	Ambient T°C	Fans	Pumps	DX	Remark
Dry Mode	Dry bulb ≤ 16°C	ON	OFF	OFF	Switching points are automatically switched based on load changes.
Spray Mode	Dry bulb > 16°C and wet bulb ≤ 19°C	ON	ON	OFF	
Hybrid Mode	wet bulb > 19°C	ON	ON	ON	

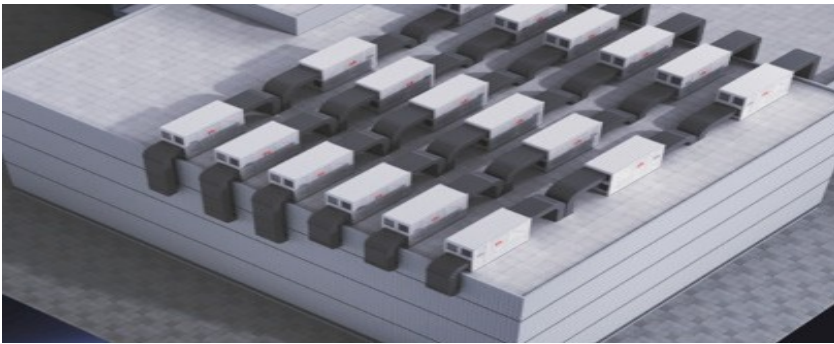
## APPLICATION SCENARIO

- ISP
- Carrier IDC
- Cloud data center

### 01 Side installation



### 02 Roof installation



### 03 Indoor installation





## Simple

- Integrated all-in-one system. Optional components includes dehumidifier, humidifier, shutoff and fire extinguishing damper, saving 50% TTM.
- Integrated cooling-power architecture, reducing footprint by removal of UPS.
- Modular fan driver module, maintained in one minutes.



## Green

- High efficiency air-air heat exchanger and spray system for optimized free cooling. CLF≤0.15@Shenzhen, China
- 8% high efficiency EC fan
- 3% higher GUE by modulating peak power with lithium battery system.
- 0 power consumption wet film humidifier.



## Smart

- Automatic fault diagnosis in 15 minutes.
- iCooling optimization technology helps to reduce CLF by accurate response to IT load.
- Optional image and noise recognition, helping remote and fast O&M.



## Reliable

- Dual power supply. No compressor restart and 0 temperature fluctuation during power swith.
- 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.

**50%**

Less TTM

**15%**

Less footprint of power supply system

**1 min**

Maintenance on modular fan driver

**0.15**

Low CLF by free cooling

**8%**

Higher fan efficiency

**3%**

Higher GUE

**0**

Humidification power

**15 min**

Fault diagnosis

**8%**

Lower CLF by iCooling

**Smart O&M**

Image and noise recognition

**0 fluctuation**

During power switch

**5%**

THDi

**99.99%**

Ultraviolet sterilization

**0**

Air pollution from outdoor

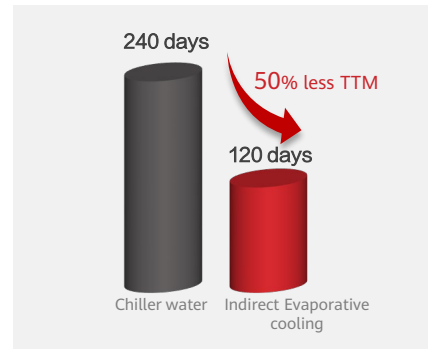
CLF: cooling load factor, CLF=cooling system power / IT system power  
GUE: grid utilization effectiveness, GUE= IT system power quota / total power quota

# SIMPLE

**01** Prefabricated in one module, one-stop delivery, saving 50% of TTM.

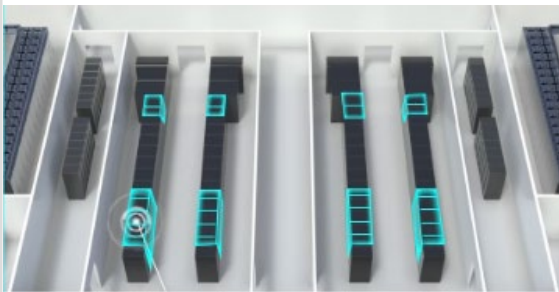


Ulanqab Huawei Cloud Data Center



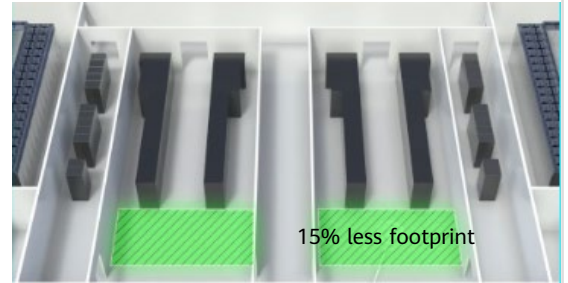
TTM Comparison

**02** Cooling-power integration, no need for UPS, saving 15% of footprint of power system for cooling.



Conventional power system

VS



15% less footprint

EHU power system

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



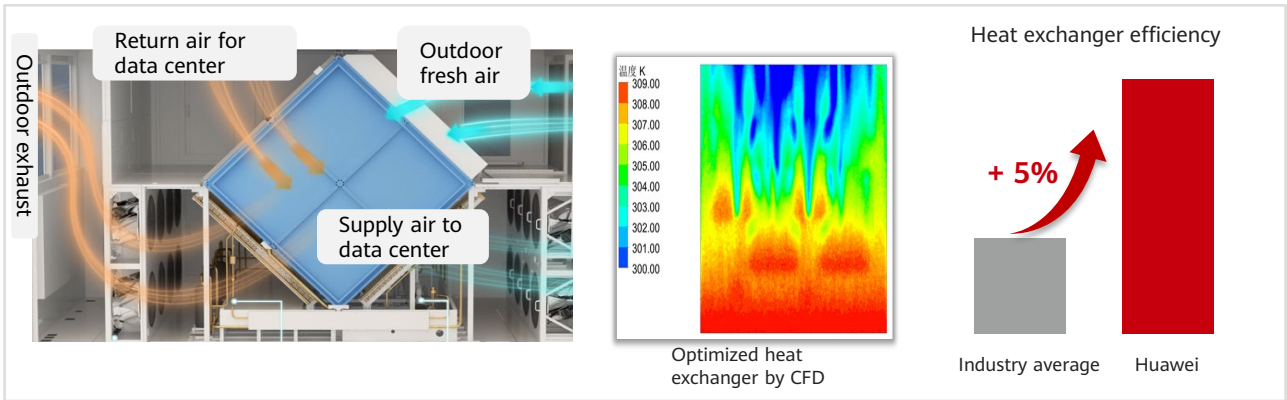
Plug-in maintenance on controller



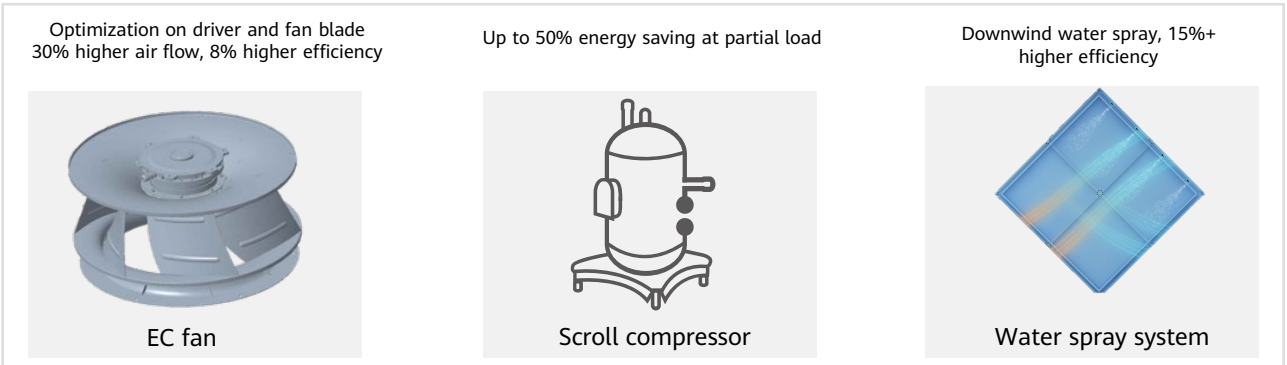
Plug-in maintenance on fan driver

# GREEN

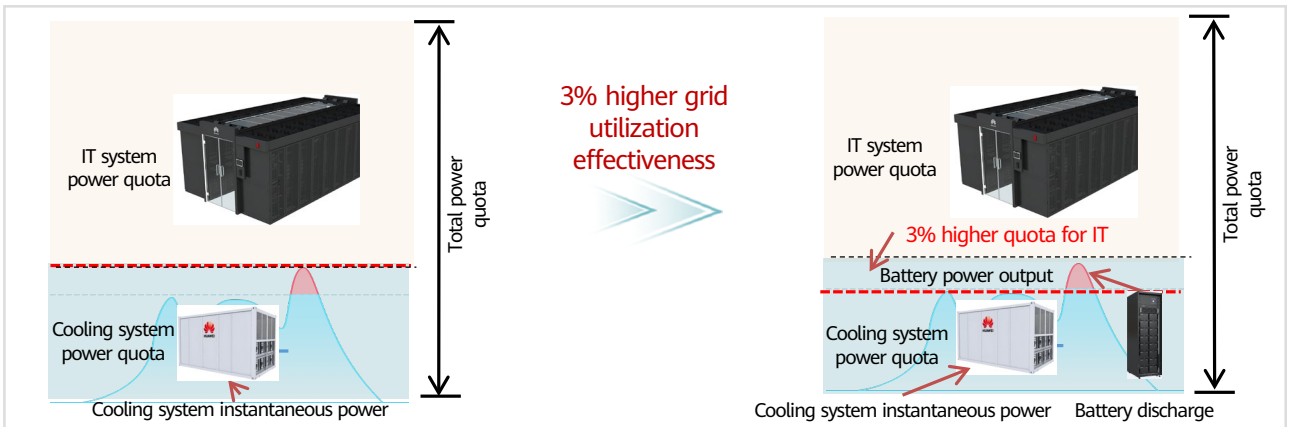
**01** High efficiency indirect air-air heat transfer and water spray system. Full utilization of free cooling source. CLF≤0.15@Shenzhen, China



**02** High efficiency EC fan, variable frequency compressor and spray system.



**03** 3% higher grid utilization effectiveness by peak power regulation with lithium battery.



# 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.

**iCooling@AI, PUE reduced by 8%**

## 03 Image and noise recognition. Automatic and remote inspection.

**Smart inspection**

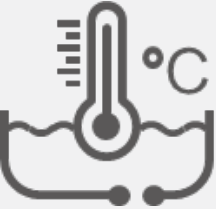
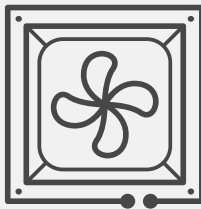

**Auto inspection report**

检测项目	结果	状态
室内送风机	风机运行正常, 声音, 振动无异常	正常
室外排风机	风机运行正常, 声音, 振动无异常	正常
空调	运行正常, 温度正常	正常
电源系统	各电源模块运行正常, 电压正常	正常
冷却系统	冷却液温度正常, 流量正常	正常
过滤网	过滤网运行正常, 风量正常	正常
...	...	...
检测结论	该服务器运行正常, 未发现异常	正常
专家建议	继续保持	




# RELIABLE

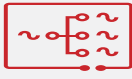
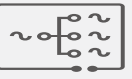


## 01 Wide operation range. Stable running under -40°C.

Antifreeze protection mode is enabled temperature lower than 5 °C	Minimum speed of fan set to 15%	Inclined heat exchanger Downwind drainage
<p>Monitoring of outdoor temperature</p> 	<p>Regulating fan speed</p> 	<p>Stable operation of heat exchanger</p> 

## 02 No temperature fluctuation during power switch


 **Continuous running**

Power switch from main to standby

Main		→	Main	
Standby			Standby	

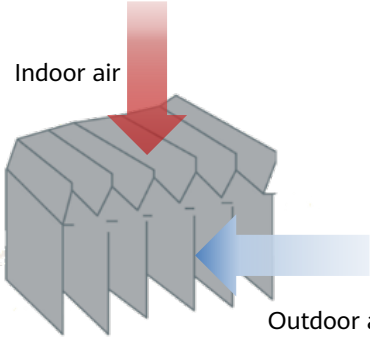
## 03 Spray water pipe equipped with ultraviolet sterilization. Sterilization rate up to 99.99%.

Water outlet                      Water inlet



## 04 No risk of air pollution from outdoor

Indoor air



Outdoor air

Isolation of indoor and outdoor air

## KEY COMPONENTS

### Polymer heat exchange core

- The polymer material can improve cold and heat weatherability, low surface hardness and slow down scale formation.
- The core surface adopts pressure loss reduction and cross-scrambled design to ensure uniform spraying, and the heat exchange efficiency is 5% higher.
- Reduce the requirements on water hardness and alkalinity, saving 50% of the cost compared with the RO water treatment equipment.



### Variable frequency scroll compressor

- The DC inverter compressor has high energy efficiency, low noise, long service life and high reliability,
- Precise driver reduces pressure loss and copper loss, improving efficiency by 5%.
- The patented vector control algorithm is used to double the frequency modulation speed and save 50% of partial loads.



### High-efficiency EC fan

- Designed for data center application scenarios. Fans and drivers are separated. 90% of fan failure occurs on fan driver. The unit keeps running during fan driver maintenance.
- Improve the efficiency of drive, motor, and fan blade. The optimal efficiency reaches 70% under high static pressure, which is 8% higher than the industry level.
- Optimize the aerodynamic shape of fan blade with the concept of aerodynamics and bionics in aviation field, increasing the flow volume by 30% compared with the industry level;



### Water pump

- Horizontal three-stage centrifugal pump is adopted, with high lift, small dimension, high reliability and long life.
- The pump adopts new lubricating seal material. Maintenance free during the life cycle on water pump shaft seal, sealing ring and other vulnerable parts;
- The N+1 redundancy design ensures cooling supply.



### Main control module and 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 m <sup>3</sup> /h
	Outdoor air flow	65,000 m <sup>3</sup> /h
	Indoor external static pressure	150 Pa
	Outdoor external static pressure	100 Pa
	Supply air temperature/humidity	25°C/50%
	Return air temperature/humidity	38°C/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	40.4
	Rated power on spray mode	41.6
	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/m <sup>2</sup>
Water pipe connection	Spray water inlet	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°C ~ +45°C
	Operating humidity	5% RH ~ 95% RH
	Storage temperature	-40°C ~ +70°C
	Storage humidity	5% RH ~ 95% RH
	Altitude	0-4000m. Derating beyond 1000m
Communication interface		FE, RS485
Certification		CE/RoHS/REACH/WEEE

### Remarks:

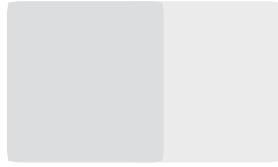
- Cooling performance condition: Indoor return air DB 38°C, indoor supply air DB 25°C. Outdoor air DB 35°C, outdoor air WB≤27°C.
- It is recommended to select the cooling capacity based on the extreme climate in 20 years.

## 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 <sup>3</sup> /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 <sup>3</sup> /h
	Power of single fan	5.3kW
	Fan type	EC
	Speed range	30~100%
Outdoor air fans	Quantity	4
	Air flow volume	65000m <sup>3</sup> /h
	Power of single fan	4.8kW
	Fan type	EC
Air filter	Speed range	15~100%
	Indoor air filter	G4
	Outdoor air filter	G3

### Remarks:

- Cooling performance condition: Indoor return air DB 38°C, indoor supply air DB 25°C. Outdoor air DB 35°C, outdoor air WB≤27°C.
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