



—Integrated Data Center Unit—

KSTAR **ITCube™** Data Center Integrated Solution

KSTAR
— Stock code: 002518 —

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Version number: KSD/L 2021-01

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— Stock code: 002518 —

COMPANY PROFILE

Founded in 1993, Shenzhen KSTAR Science & Technology Co., Ltd (Stock Code: 002518) is a National Torch Plan Key High-tech Enterprise, and also a pioneer of UPS industrial and a total solution provider for Data Center Critical Infrastructure & Photovoltaic Inverter Systems in Mainland China. KSTAR is fully committed to the R&D and has been providing high-quality products with full service to over 90 countries and regions worldwide, leading the industrial development with innovation.



ISO9001



ISO14001



OHSAS18001



IECQ QC080000

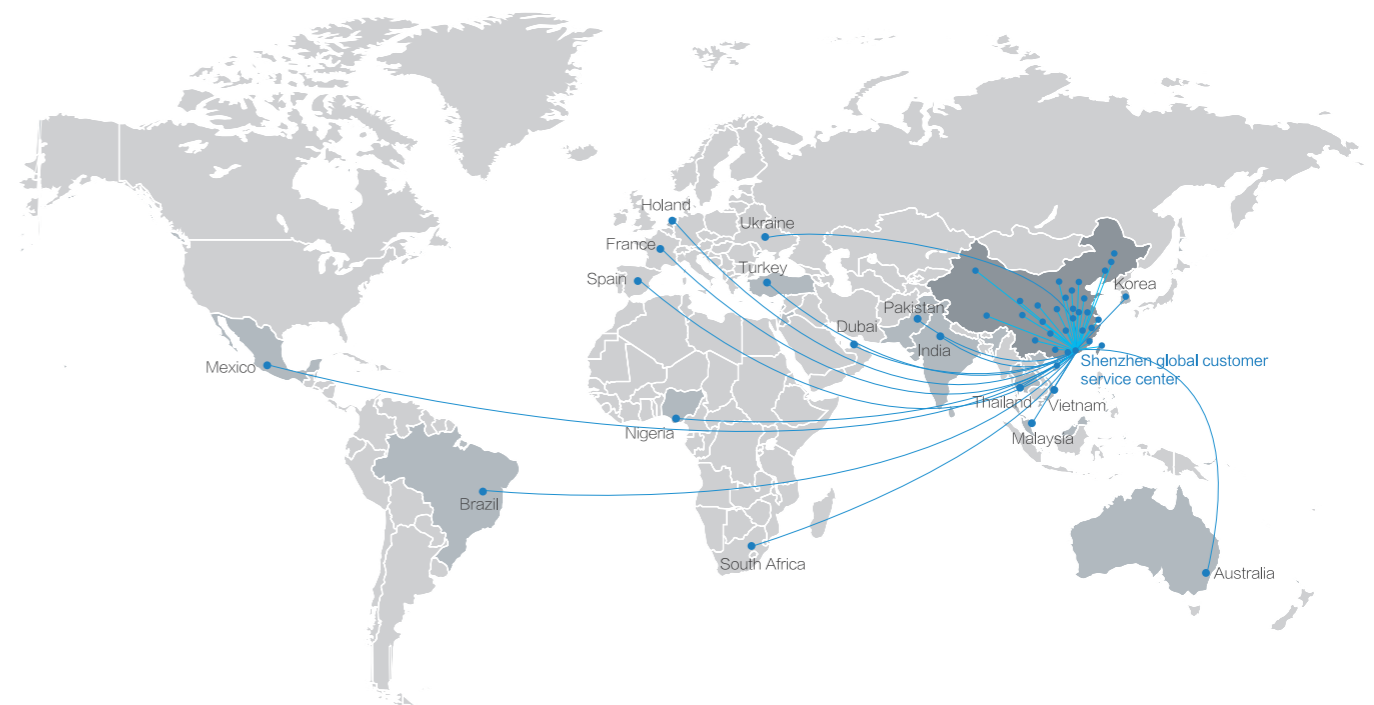
Global Service Network

7 × 24 Response and Support

**31 Domestic Service Centers
172 Domestic Service Stations**

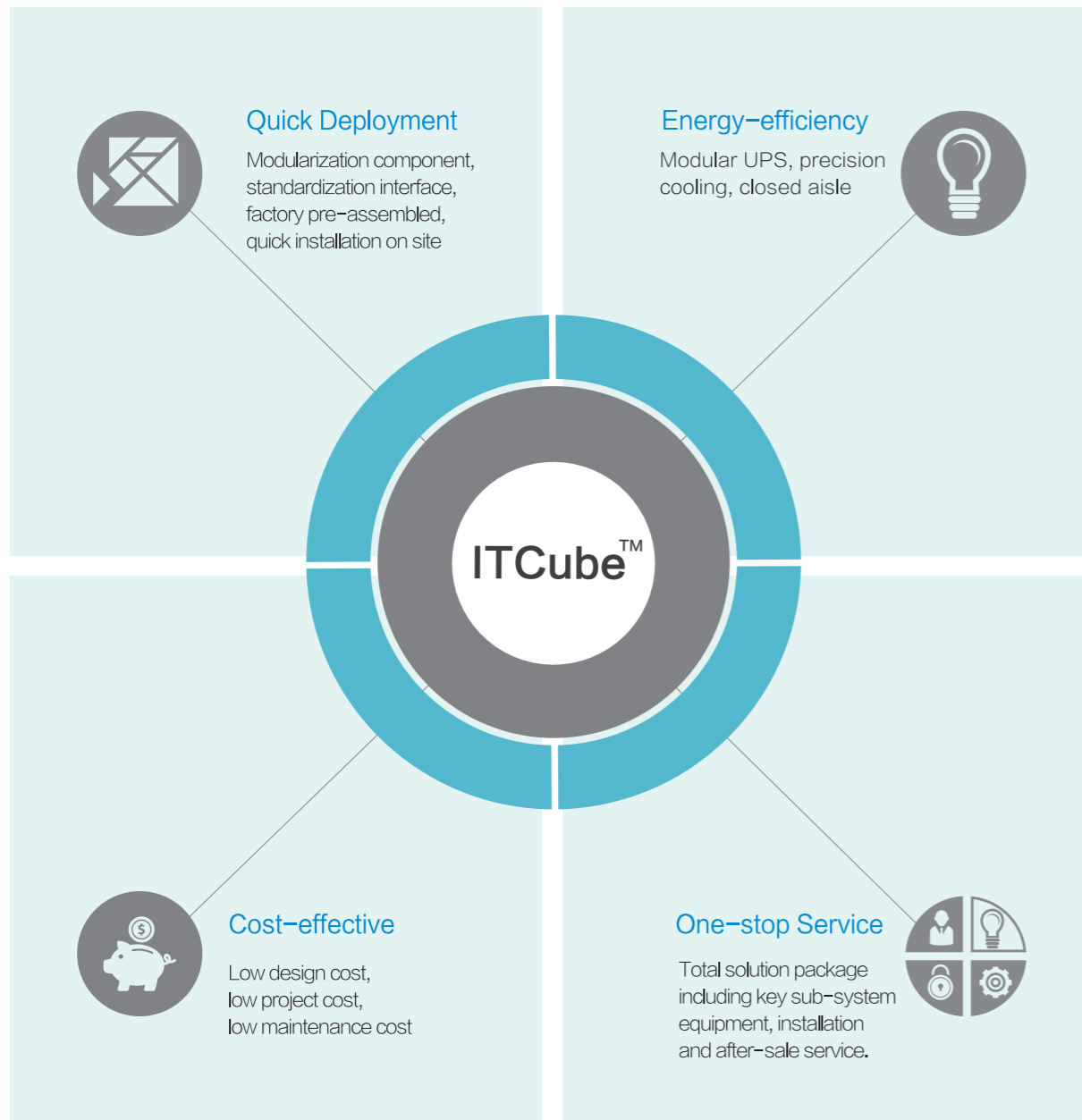
**National Customer Service Hotline:
400-700-9662**

**17 Overseas Technical Service Centers
40 Overseas Service Engineers**



In order to meet the rapid increase of business of customers, achieve rapid deployment and flexible expansion, KSTAR has introduced ITCube series integrated data center solution. ITCube solution comprises all-in-one, green power-saving and modularization concept, this can help customer to realize rapid deployment, flexible expansion, high-efficient operation, straightforward management for new generation data center.

Core Value of ITCube

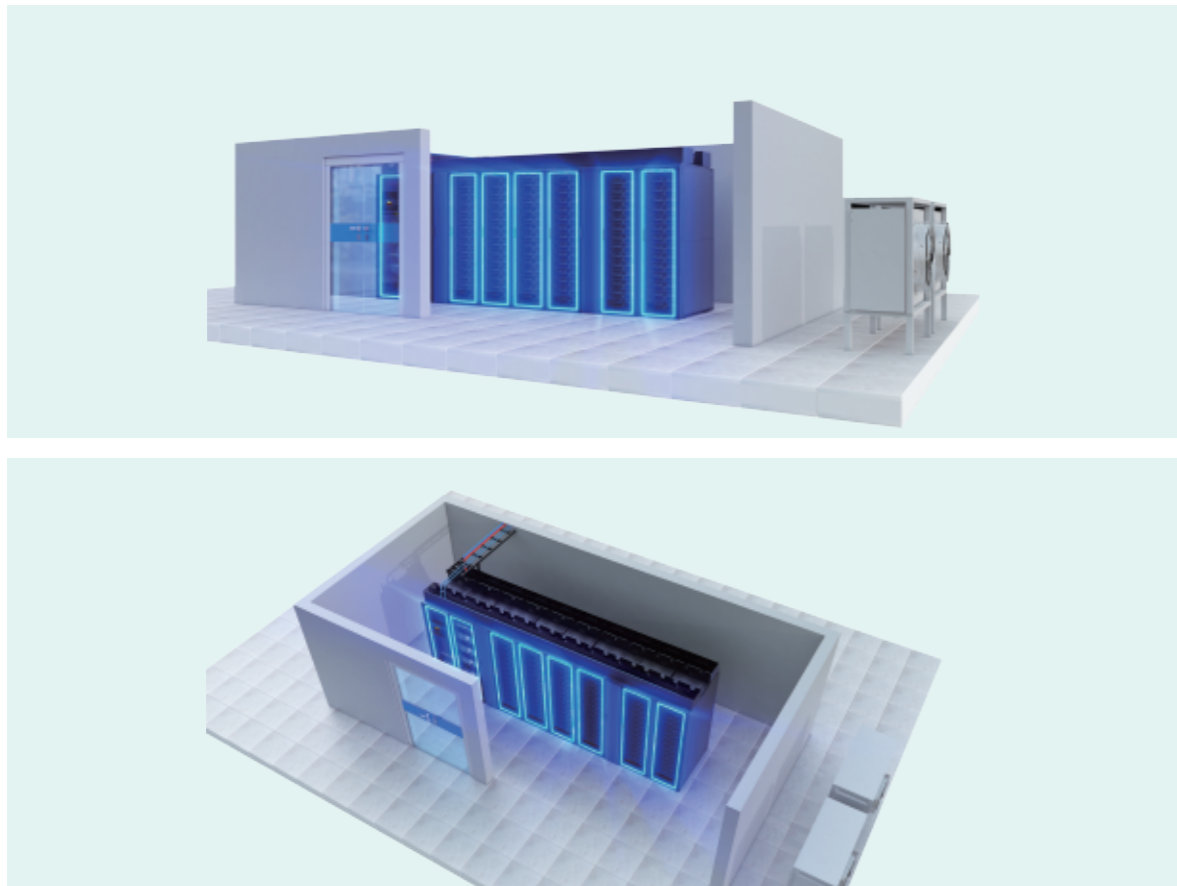


ITCube Product Overview

KSTAR ITCube series data center solution includes three solutions of IDU(Integrated Data Center Unit),IDM(Integrated Data Center Module), IDR(Integrated Data Center Room), covering all of indoor scenes of data center in order to meet the diverse needs of customers.

 <p>Micro-enterprises, branch office</p>	<p>IDU (Integrated Data Center Unit)</p> 
 <p>Small and medium enterprises, regional center, high-density deployment</p>	<p>IDM (Integrated Data Center Module)</p> 
 <p>Large enterprises</p>	<p>IDR (Integrated Data Center Room)</p> 

Internal layout of one row intelligent IDU



General introduction

KSTAR IDU integrate with cabinets, monitoring, power supply and distribution system, batteries, inrow air conditioner and other infrastructure; KSTAR IDU can support one row sealed cold/hot aisle, battery packs can be configured inside or outside the cabinets.

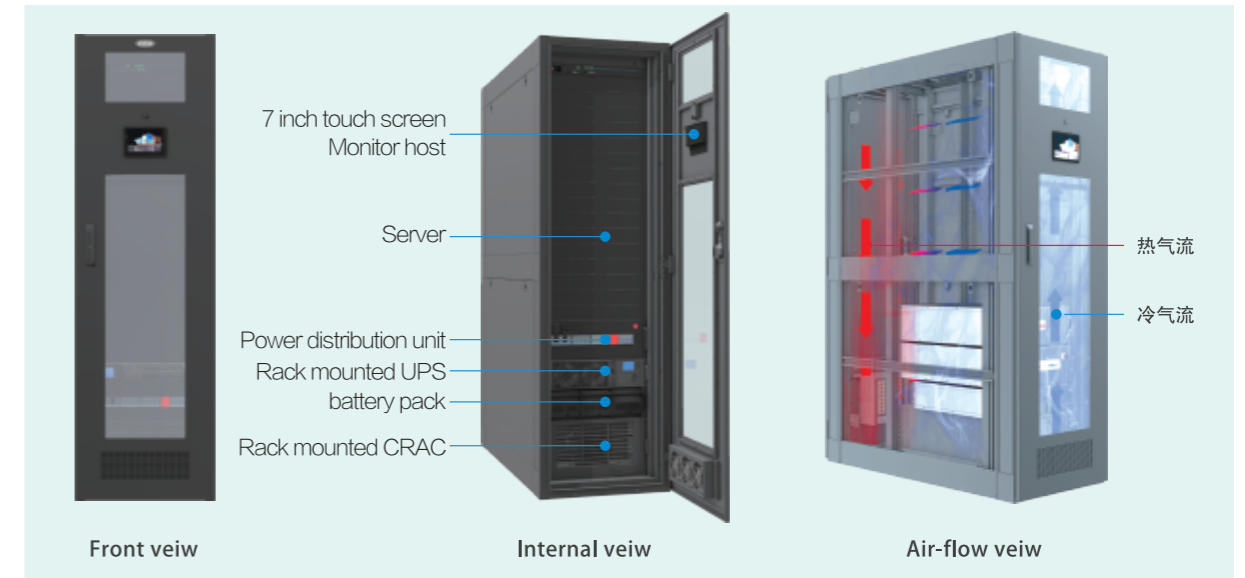
Application

KSTAR IDU is better to be used in the small to medium data center of which power is less than 40kVA and space is less than 50m², computer room of large enterprises branch, financial service network, school, hospital, retailing, government department and so on.

Value to customer

Safety	<ul style="list-style-type: none"> Sealed micro environment, dust-proof, noise-proof, little affected by the environment, lifetime lengthens 1 to 2 times. Key subsystem can be configured as N+1/N design and enhance the stabilization of the system
High efficiency	<ul style="list-style-type: none"> Flexible configuration by high-efficiency power modules Short distance of cooling path, sealed aisle, cold air and hot air separation, avoid hot spot, total PUE is less than 1.4
Ease of Use	<ul style="list-style-type: none"> Modularization component, standardization interface, quick installation on site Prefabricate assembly, plug and play, simple setting Centralized monitor, intelligent management, remote monitor

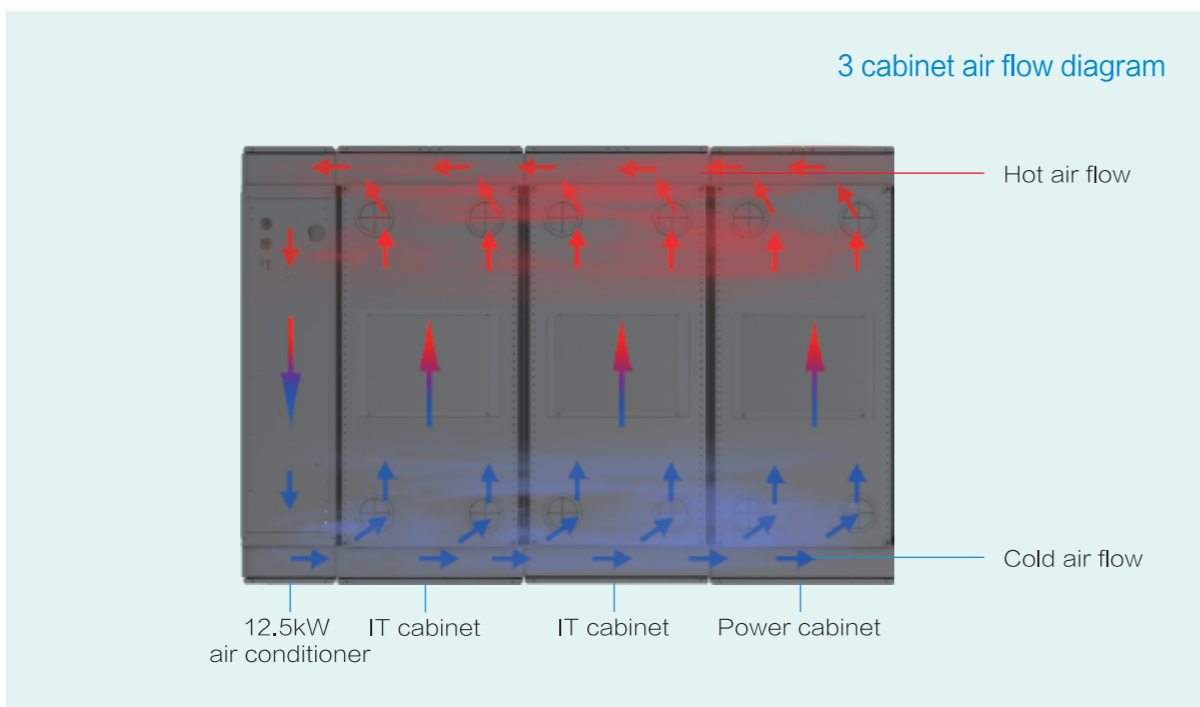
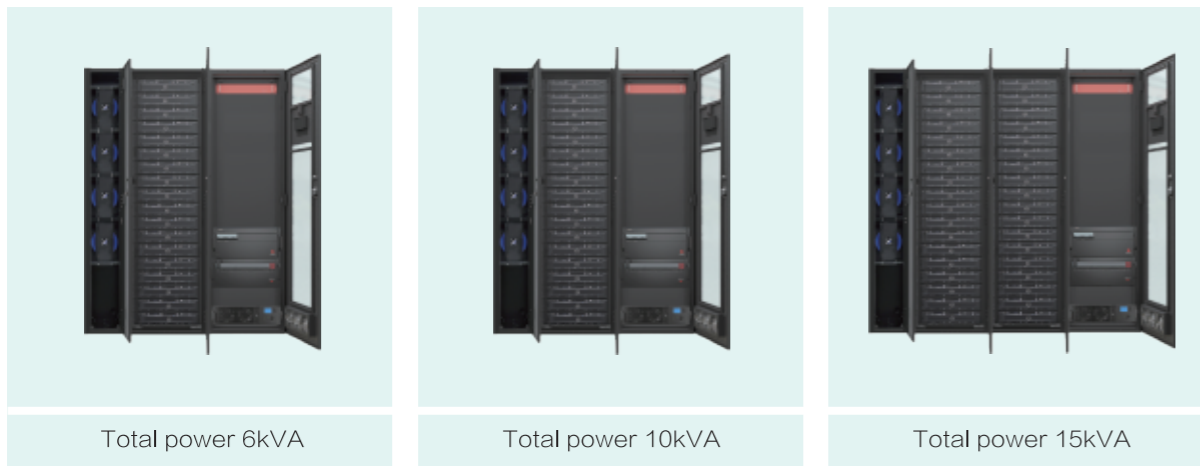
Internal layout of one cabinet intelligent IDU



Specification

Mode	IDU-03AN One integrated cabinet	IDU-06AN One integrated cabinet
Physical features	Full sealed design, flexible configuration	
Appearance	Full sealed design, flexible configuration	
Dimension	600 × 1200 × 2000	
Power distribution		
Dimension (W × D × H) mm	600 × 1200 × 2000	
Input	220V/1Ph/50Hz	
Power cable in	Top/bottom cable in	
Input breaker	63A/1P	
UPS Power(KVA)	3	6
Available space	23	20
Backup time (min)	30	15
CRAC(Rack mounted)		
Rated cooling capacity(KW)	3.5(without outdoor unit version optional)	7
Dimension (W × D × H) mm	440*800*5U	440*800*7U
Number	1	
Monitor		
Display on site	10 inch touch screen	
Temperature/humidity sensor	Yes	
Smoke sensor	Yes	
Water leakage detection	Yes	
UPS	Yes	
Precision power distribution monitor	Yes	
Air conditioner	Yes	
Emergent ventilation	Yes	
Fire fighting		
Fire protection(rack mounted)	Optional	

Typical configuration External batteries



Total power	IT cabinet	Maximum power of single cabinet	CARC cooling capacity	Dimension(W × D × H) mm
6kVA	1	5kW	5.5kW	1500 × 1400 × 2000
10kVA	1	7kW	7.5kW	1500 × 1400 × 2000
15kVA	2	12kW	12.5kW	2100 × 1400 × 2000

Typical configuration Standard equipment

Mode	IDU-06	IDU-10	IDU-15
Appearance			
Power cabinet	<p>UPS module Support single UPS running or working in parallel, nominal capacity ≤6kVA</p> <p>Power distribution unit Power input + power output + C level lightning module + external maintenance bypass</p> <p>Monitor host Monitor the intelligent equipment in the IDU in real time</p>	<p>UPS module Support single UPS running or working in parallel, nominal capacity ≤10kVA</p> <p>Power distribution unit Power input + power output + C level lightning module + external maintenance bypass</p> <p>Monitor host Monitor the intelligent equipment in the IDU in real time</p>	<p>UPS module Support single UPS running or working in parallel, nominal capacity ≤15kVA</p> <p>Power distribution unit Power input + power output + C level lightning module + external maintenance bypass</p> <p>Monitor host Monitor the intelligent equipment in the IDU in real time</p>
Inrow CRAC	<ul style="list-style-type: none"> High efficiency inrow air conditioner Air supply method: front supply and back return Cooling capacity: 5.5kW Cooling capacity: air cooling Optional low temperature kit, drainage pump, etc. 	<ul style="list-style-type: none"> High efficiency inrow air conditioner Air supply method: front supply and back return Cooling capacity: 7.5kW Cooling capacity: air cooling Optional low temperature kit, drainage pump, etc. 	<ul style="list-style-type: none"> High efficiency inrow air conditioner Air supply method: front supply and back return Cooling capacity: 12.5kW Cooling capacity: air cooling Optional low temperature kit, drainage pump, etc.
IT cabinet	<ul style="list-style-type: none"> High strength server cabinet 2 PDU 1 set emergent ventilation 	<ul style="list-style-type: none"> High strength server cabinet 2 PDU 1 set emergent ventilation 	<ul style="list-style-type: none"> High strength server cabinet 2 PDU 1 set emergent ventilation
Environment	<ul style="list-style-type: none"> Recommended space 15~50m² Recommended height ≥2.4m Sealed aisle design, noise proof and sound proof 	<ul style="list-style-type: none"> Recommended space 15~50m² Recommended height ≥2.4m Sealed aisle design, noise proof and sound proof 	<ul style="list-style-type: none"> Recommended space 15~50m² Recommended height ≥2.4m Sealed aisle design, noise proof and sound proof
Optional	<ul style="list-style-type: none"> Fire protection module 	<ul style="list-style-type: none"> Fire protection module 	<ul style="list-style-type: none"> Fire protection module
Dimension (W × D × H)mm	1500 × 1400 × 2000	1500 × 1400 × 2000	2100 × 1400 × 2000

One Row Intelligent IDU

Single cabinet series product options



Optional accessories for multi cabinet series products



Two Row Sealed Aisle Intelligent Micro Module IDM



General introduction

Key subsystem can be configured as N+1/N design and enhance the stabilization of the system. Sealed aisle adopts rotated skylight, and it work with fire protection system and will not affect the running of fire protection system.

Application

Recommended power of IDM is less than 200kVA, and space is larger than 50m². IDM is mainly used in small-medium data center. Multi-IDM solution can be used in large data center, cloud computing center, backup data center and so on.

Value to customer

Value to customer	• Modularization component, standardization interface, fast deployment & flexible expansion
	• Prefabricate assembly, plug and play, simple setting
	• Centralized monitor, intelligent management, remote monitor
High efficiency	• Flexible configuration by high-efficiency power modules
	• Short distance of cooling path, sealed aisle, cold air and hot air separation, avoid hot spot
	• Total PUE is less than 1.4
Safety	• Key subsystem can be configured as N+1/2N design and enhance the stabilization of the system.
	• rack mounted FM200 device in some critical location,
	• Sealed aisle adopts rotated skylight, and it work with fire protection system and will not affect the running of fire protection system.

Specification

General characteristics

Dimension of single row IDM (L×W×H)	L×2460mm×2000mm, L≤15m
Dimension of two row IDM (L×W×H)	L×3600mm×2000mm, L≤15m
Number of cabinets in IDM	One row: 4~24; Two row: 6~48
Power of IDM	20~200kVA
Power input	380/400/415Vac, 50/60Hz, 3Ph+N+PE
Reliability	Tier II or above
Installation	Deploy on flat ground, or deploy on raised floor

UPS

Nominal voltage	380/400/415Vac, 50/60Hz, 3Ph+N+PE
Input power factor	≥0.99
Output power factor	≥0.9
Rated power	20~200kVA, Support on-line expansion
Efficiency	≥96%
Modular UPS	Hot swappable power module make it easy to maintain

Cooling system

Cooling capacity (kW)	Air cooling: 25 / 40; Chilled water: 35 / 65
Dimension(W×D×H) mm	600×1200×2000
Cooling type	Air cooling/Chilled water

Cabinet

Dimension(W×D×H) mm	600 / 800×1200×2000
Available space	42U
Optional	Blind plate, L bracket, Movable/fixed tray, cable management arm, sealed module
IP level	IP20 or above

Power distribution

Input voltage	380/400/415Vac, 50/60Hz, 3Ph+N+PE
Rated capacity	0~630A
Input	Single input/Dual input
Number of output branch	21P~126P
Others	B level lightning protection, 7 inch touch screen, remote monitor

Monitor

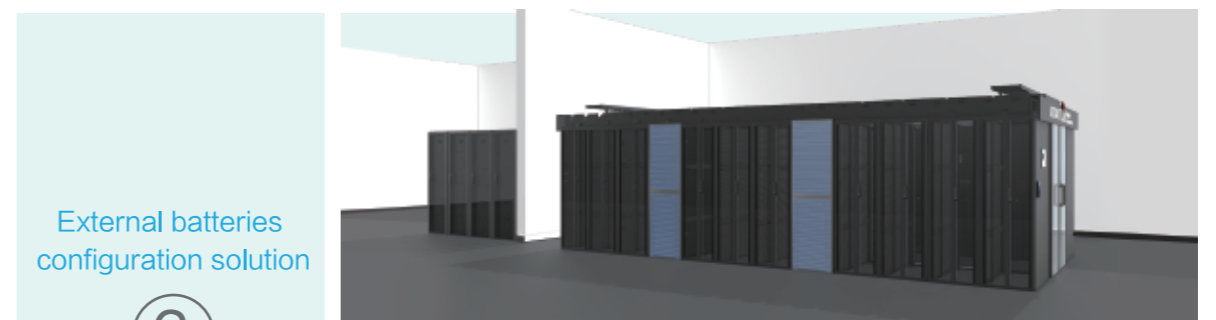
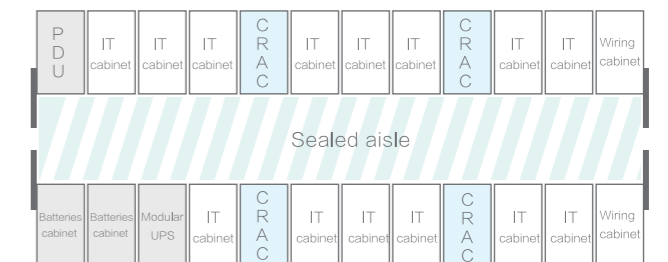
Alarm	Light and sound alarm, phonecall alarm, SMS alarm, E-mail alarm
User interface	Remote web interface, 10.4/21.5 inch touch screen, APP, Wechat
Function module	Centralized management(UPS/CRAC/Power distribution etc.), entrance guard management, CCTV management, alarm management, environment management(temperature and humidity, smoke sensor, water leakage detection)

Typical configuration Internal / external batteries



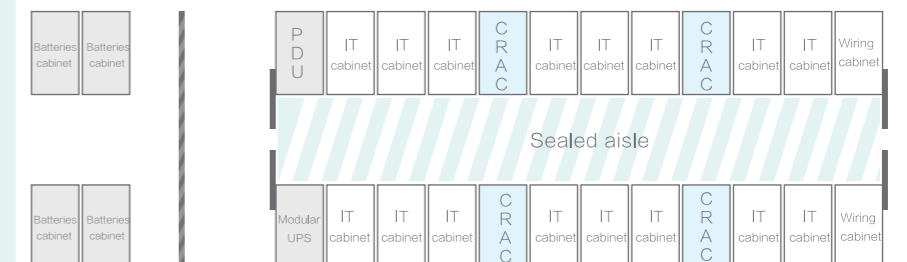
Internal batteries configuration solution

1



External batteries configuration solution

2



Total power	Number of cabinet	Maximum power of single cabinet	CRAC	Redundancy	Width of aisle
20 kVA	4~6	4 kW	25 kW×2	N+1	1200
60 kVA	10~18	5 kW	25 kW×3	N+1	1200
100 kVA	12~18	7 kW	40 kW×3	N+1	1200
200 kVA	25~36	7 kW	40 kW×5	N+1	1200

Note: length of sealed aisle ≤ 15m

Two Row Sealed Aisle Intelligent Micro Module IDM

Typical configuration Internal / external batteries

Internal UPS configuration solution ①




External UPS configuration solution ②




Total power	Number of cabinet	Maximum power of single cabinet	CRAC	Redundancy	Width of aisle
20 kVA	4~6	4 kW	25 kW × 2	N+1	1200
60 kVA	10~18	5 kW	25 kW × 3	N+1	1200
100 kVA	12~18	7 kW	40 kW × 3	N+1	1200
200 kVA	25~36	7 kW	40 kW × 5	N+1	1200

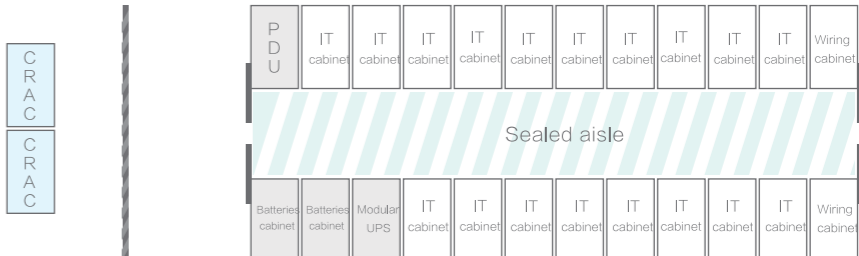
Note: length of sealed aisle ≤ 15m

Typical configuration Internal / external batteries

Internal CRAC configuration solution ①




External CRAC configuration solution ②

Total power	Number of cabinet	Maximum power of single cabinet	Internal CRAC	External CRAC	Redundancy	Width of aisle
20 kVA	4~6	4 kW	25 kW × 2	20 kW × 2	N+1	1200
60 kVA	10~18	5 kW	25 kW × 3	35 kW × 2	N+1	1200
100 kVA	12~18	7 kW	40 kW × 3	40 kW × 3	N+1	1200
200 kVA	25~36	7 kW	40 kW × 5	60 kW × 3	N+1	1200

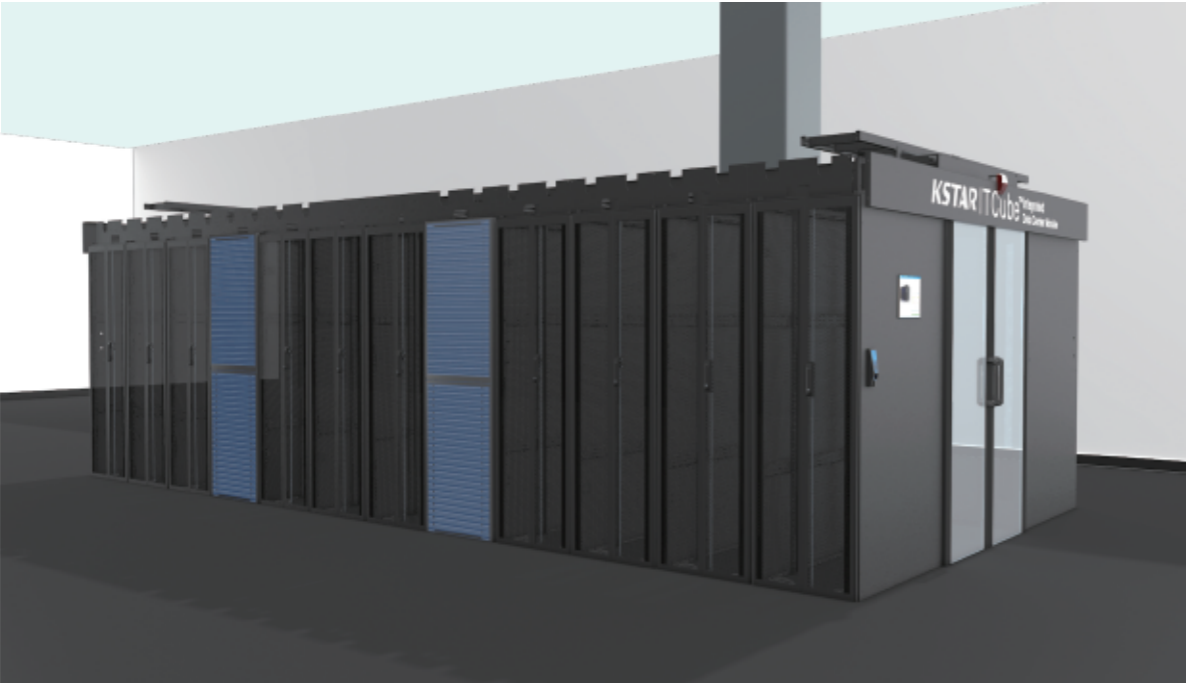
Note: length of sealed aisle ≤ 15m

Two Row Sealed Aisle Intelligent Micro Module IDM

Typical configuration One row / With pillar solution

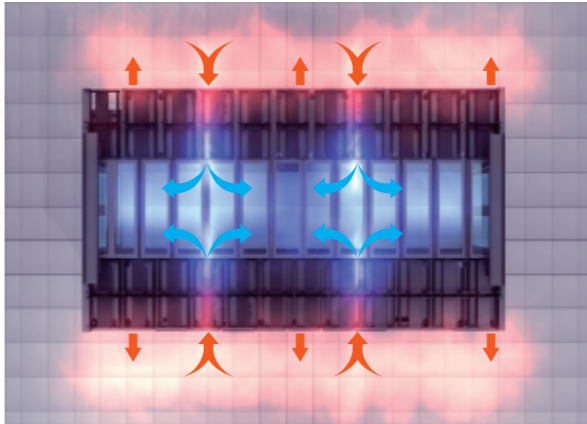


One row sealed solution.

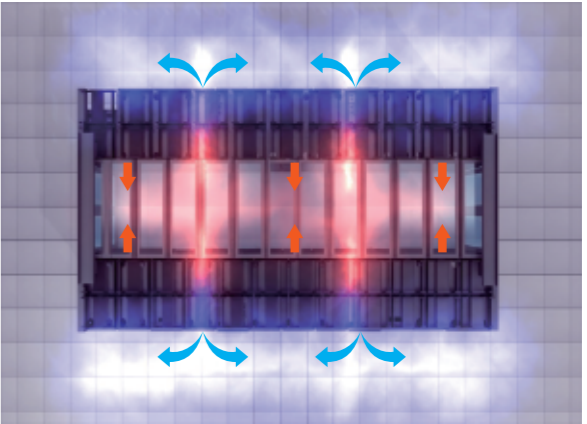


Surrounding pillar solution.

Typical configuration Cold aisle / hot aisle

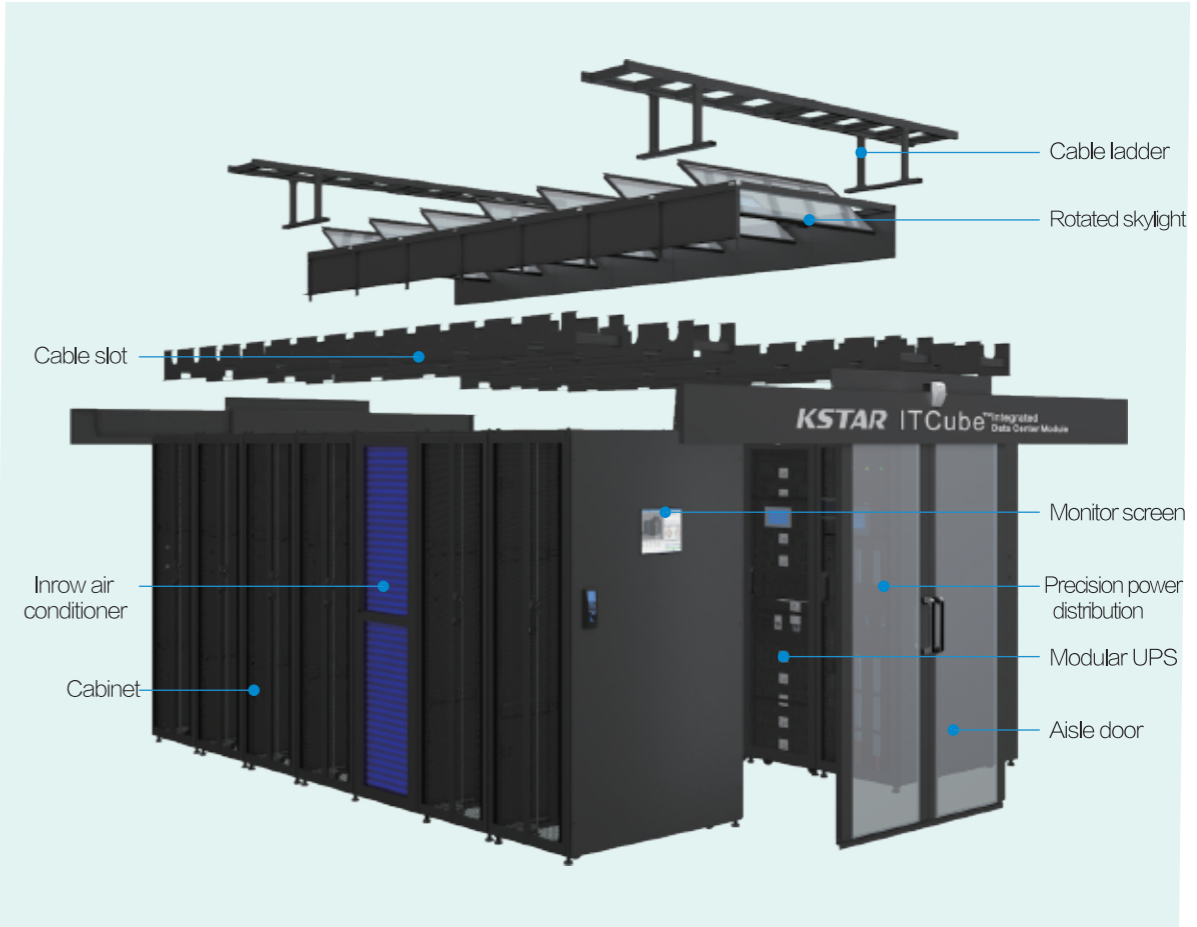


Cold aisle



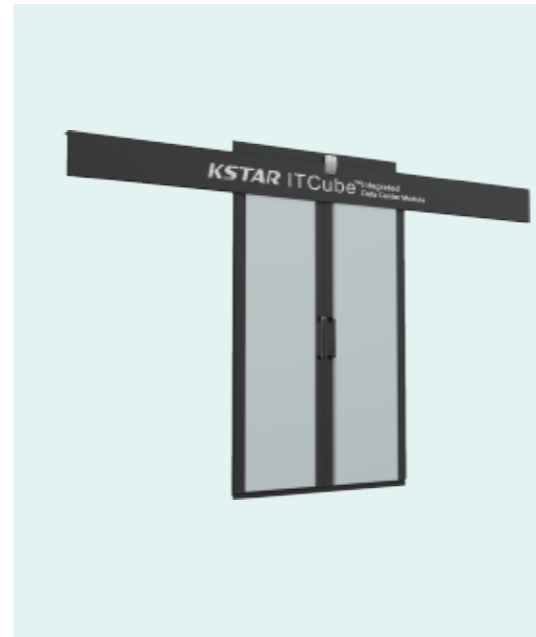
Hot aisle

Layout of two row sealed aisle intelligent micro module IDM



KSTAR dual sliding door

- The dual sliding door can be set as automatically or manually working
- The door can be controlled with remoted ways, which including keypad or access cards
- The material of door is polycarbonate with 6mm thickness. There will have alumimun airtight frame structure. The top and bottom provide with soft brushes.
- The door can be open with button inside the aisle if any emergency situation
- The doors shall be able to be operated with a remote control along with the provision of access control with both the option of keypad with defined PIN number, access cards
- The controller should be mounted on the place where is easy to see and touch
- The system is driven by motor electrical way
- Smart lighting system provided



KSTAR skylight panel

- The material of the panel is polycarbonate / lexan.
- The panel is modular designed
- The panel shall have the feature of tilting upside down to about 45 degrees when there is an increase in temperature in the cold aisle in case of emergency.
- If any emergency, the controller shall control the door and top panel open



KSTAR SR series high density server cabinet

Features

- High strength 9 folded framework structure, maximum static load is up to 2510KG
- High density hexagonal mesh, ventilation rate is 75%.
- Meet standards of ANSI/AIARS-310-D, DIN41497, PARTE, IEC60297-2, DIN41494, PART7, GB/T3047.2-92; compatible with 19 inch international standard, metric standard, STSL standard
- Materials: SPCC high-quality cold-roll steel plate; thickness :the square hole is 2.0mm, others are 1.2mm
- Surface treatment of degreasing, pickling, phosphating, electrostatic paint
- Standard black, other color can be customized

Selectable dimension

W×D×H (mm)	600 × 1000 × 2000, 42U
W×D×H (mm)	600 × 1100 × 2000, 42U
W×D×H (mm)	600 × 1200 × 2000, 42U
W×D×H (mm)	800 × 1000 × 2000, 42U
W×D×H (mm)	800 × 1100 × 2000, 42U
W×D×H (mm)	800 × 1200 × 2000, 42U
Note	Other dimension can be customized

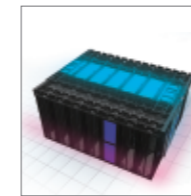
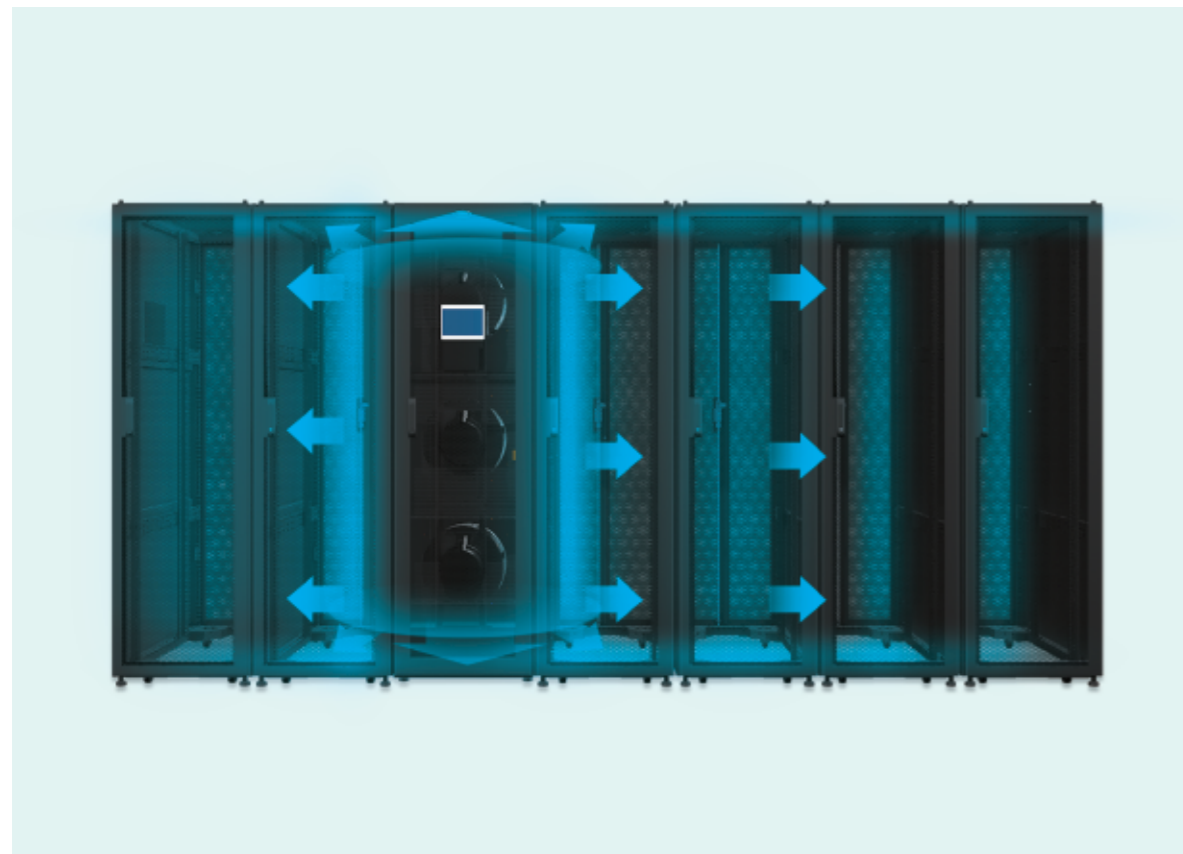


Sealed aisle kit



KSTAR FocusAir™ Series Row Level Precision Air-conditioner

- Cooling capacity 3.8-12.5kW for IDU, 25-65kW for IDM
- The unit equipped with caster and leveling foot margin, convenient to transport
- Precise airflow organization, air supply with EC fan, the air volume automatically matching to the load of servers, remarkable energy saving effect
- Equipped with inverter compressor, the refrigerant variable flow output, matching the variation of the hot source load in real time, precisely cooling and operating at high efficiency
- The full series is standard equipped with electronic expansion valve, adjust opening of EEV steplessly, precise control flow, keep the air-conditioner worked in the highest energy saving state
- Support RS485, SNMP communication, and remote monitoring
- Group control technology, realize automatically switch between units and work in turn function
- Abundant options: water leakage detector, extension subassembly, power supply protection subassembly, temperature sensor



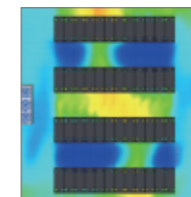
Cold/hot aisle enclosed system

Isolating cold and hot aisle in the cabinet, avoid to local hot spot due to short-circuit between cold and hot airflow, improve cooling efficiency through increase air supply and return temperature, increase the power density of cabinet up to 15kW/rack, directly decrease the planning area of the computer room, and saving construction cost



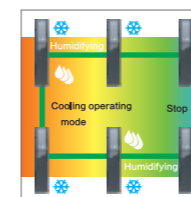
Row level air supply cooling

Parallel deployment with air-conditioner and IT cabinet, cooling closed to hot source, improve cabinet level cooling density, decrease the consumption on the path of air supply, increase air supply and return temperature, high efficiency and energy saving



Fluid simulation of computer room

Using fluid mechanics simulation software (CFD) to simulate for computer room deployment in the preliminary design, predicting temperature field and airflow organization path, predicting cooling effect, avoid cooling capacity loss and local hot spot existed, providing perfect utilizing deployment solution



Air-conditioner group control function

Multiple air-conditioner units operated in coordinated control, high efficiency and reliable intelligence in-turn mode, avoid competitive operation occur, such as heat at cooling mode or dehumidify at humidifying mode, keep all the units worked in a good condition, and improve the cooling system energy efficiency in result

Fluorine pump intelligent double circulation system

Compressor operating mode

Summer or transitional season, outdoor ambient temperature over than internal temperature in computer room or less than it but not reach the fluorine pump startup condition, so startup compressor worked in cooling mode

Fluorine pump energy saving operating mode

Winter or transitional season, outdoor ambient temperature ($\leq 15^{\circ}\text{C}$) less than internal temperature in computer room and meet the condition of fluorine pump startup, shutdown compressor, and startup the fluorine pump, worked in energy saving operating mode



KSTAR UPS Input and Output Power Distribution Cabinet

Common type input current: 0-1600A

Precise type input current: 0-630A

Input type: Single circuit / double circuits

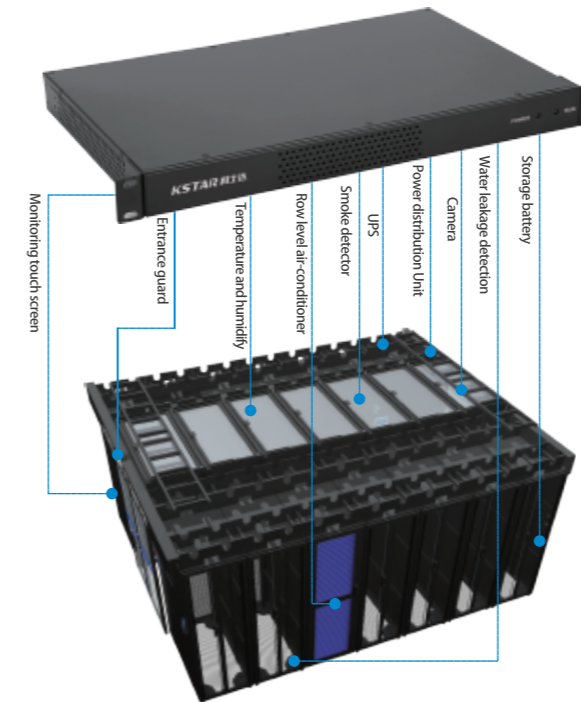
- Three phase meter (LCD touch screen optional)
- Main circuit monitoring (branch circuit full power consumption monitoring)
- Short-circuit, overload, lightning protection (three phase unbalance optional)
- Fault alarm (Short-circuit, overload, over-current, over and under voltage etc.)
- Storage for operation history and fault record
- Hot-swappable and phase-change breaker optional
- Support Modbus/RS232/RS485 background communication



KSTAR Power and Environment Monitoring System

Features

- Standard 19 inch rack mounted installation, 1U height, ultra-low power consumption
- Monitoring host software and hardware integrated design, highly integration
- It shall have the capability to support maximum of at least 80 sensors with expansion
- Can support 16 devices(2 USB camera), maximum 32 with expansion. (Features)
- Adopting B/S structure, no need to install client software
- Operation voltage 100~240VAC; operation temperature -5 degrees to 45 degrees celsius. IP20
- Automatic generate performance report of the facility and environment in the computer room
- Support various alarm types included audio and light, telephone and voice, short message, e-mail etc.
- Support multiple terminal APP browse on mobile phone or tablet PC, also WeChat official account
- Information and alarms record support 3rd party connections such as SNMP,485,dry contacts, etc
- Support multiple terminal APP browse on mobile phone or tablet PC, also WeChat official account
- There should be upper cable tray on the top side of the containment, which can contains the power and signal cables
- Support whole power supply system visualized

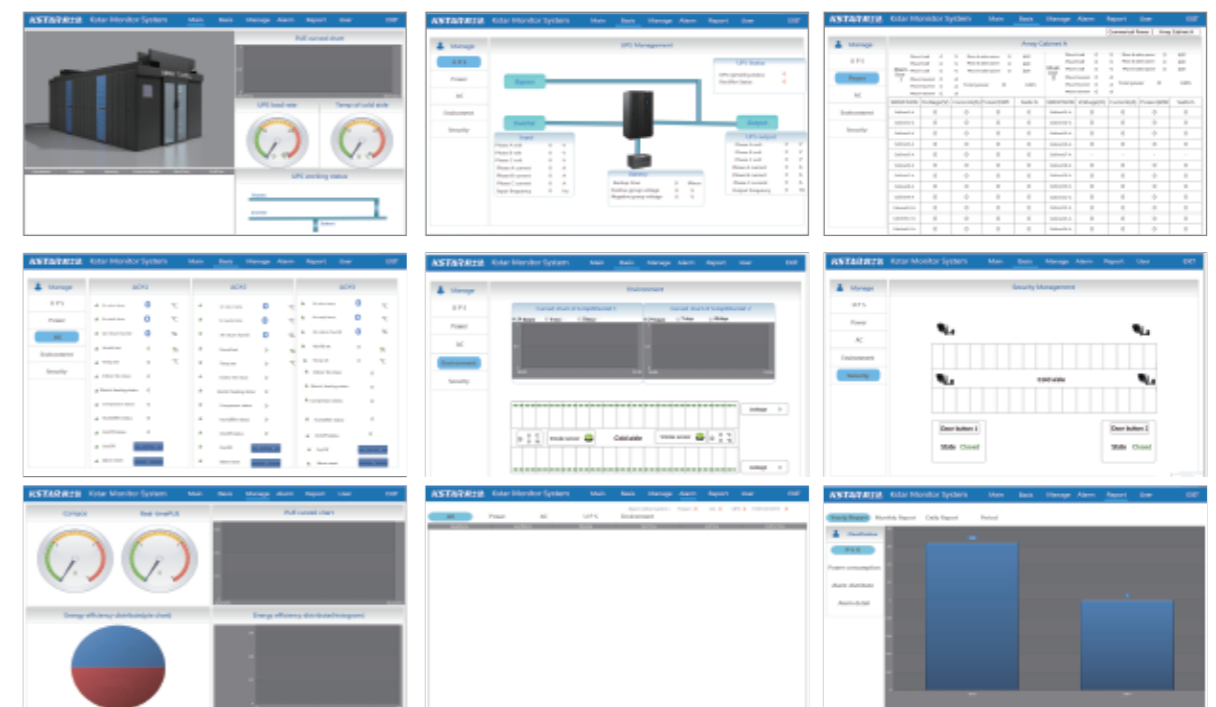


KSTAR Maintenance-free Lead Acid Battery

- KSTAR VRLA battery, widely used in the field of UPS/telecommunication/electricity, the float life 8-10 years in the standard environment. Battery capacity: 38Ah-3000Ah
- KSTAR sealed gel battery, widely used in the field of UPS/telecommunication/storage energy, the float life 10-18 years in the standard environment. Battery capacity: 38Ah-3000Ah
- KSTAR battery possess thorough anti-leakage solution (patent No. ZL 2007 2 0196379.3); and possess battery production licence, pollutant discharge permission licence



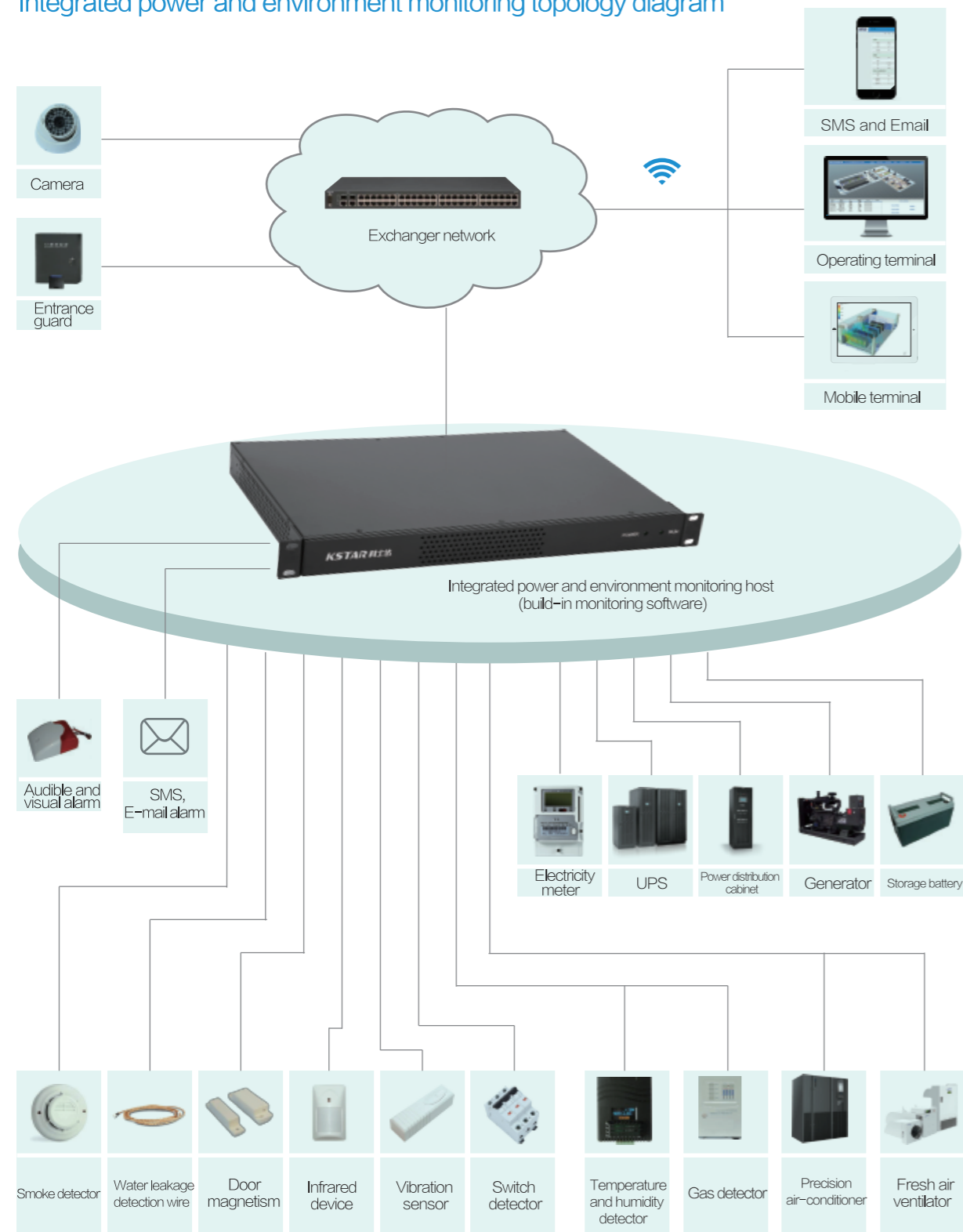
Monitoring system software interface



ITCube™ Series Sub-system

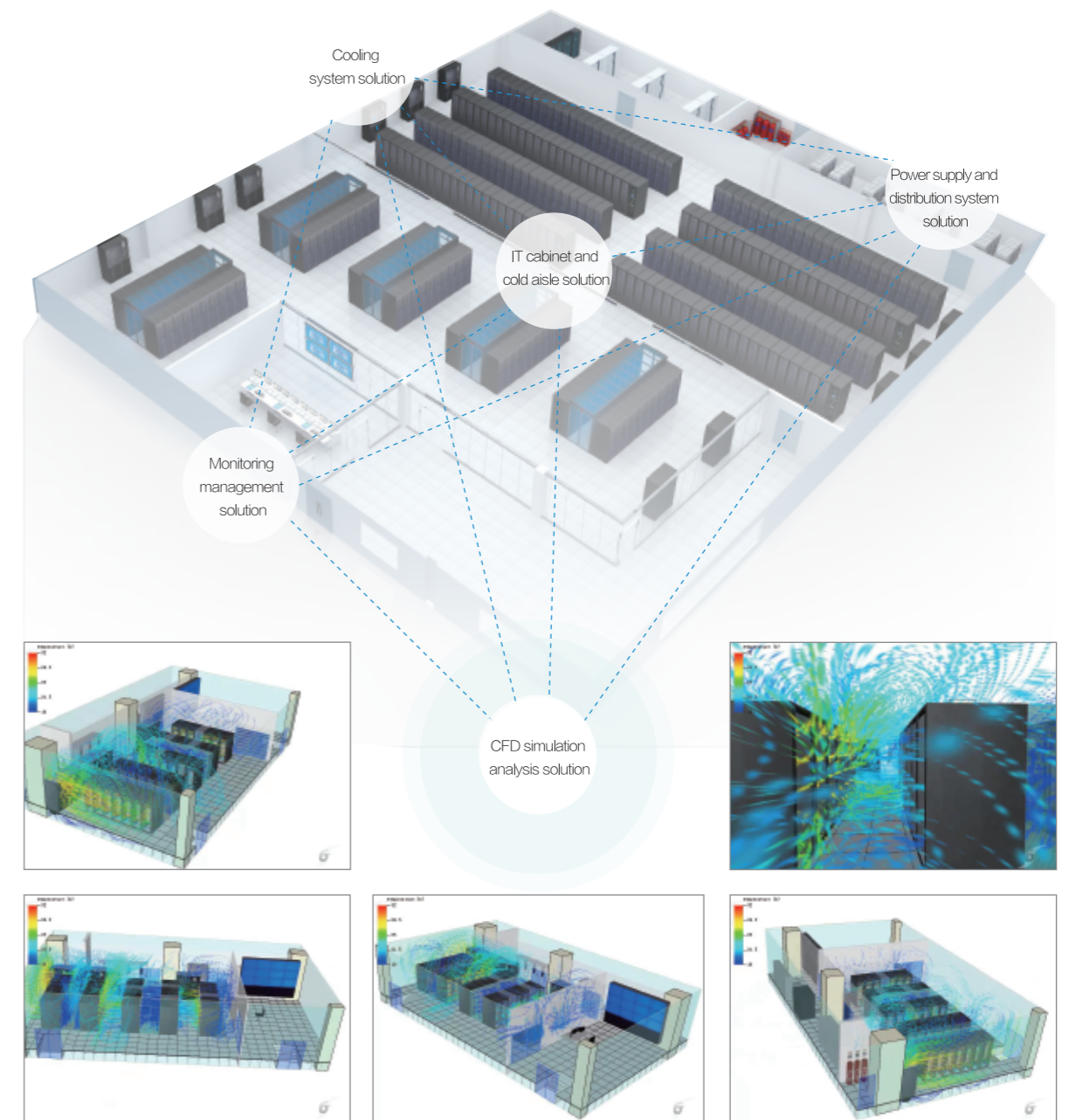
Monitoring System

Integrated power and environment monitoring topology diagram



Medium and Large Scale Data Center Solution (IDR)

IDR (Integrated Data Center Room) solution is mainly faced to medium and large data center, which integrated with UPS, precision air conditioner, precision power distribution, IT cabinet, cold aisle enclosed system products, so provide integrated datacenter solution.



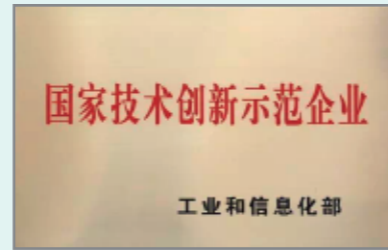
Qualification Certificate



National Torch Plan Key Hi-tech Enterprise



National Recognized Enterprise Technical Center



National Technical and innovative demonstration Enterprise



Post-doctoral Research Center



Guangdong Province Credible Demonstration Unit



Regard Contract and Abide Credit Enterprise



ISO9001 Quality Management System Authentication Certificate



ISO14001 Environment Management System Authentication Certificate



Energy Saving Authentication Certificate



OHSAS 18001 Occupational Health Safety Management System Authentication Certificate



CE Authentication Certificate