PLUG & POWER

BM 5.0 Intelligent Modular Data Center Solution

Introduction

iBlock BM 5.0 is indoor modular data center with sealed aisle by two-row equipment with uniform dimension, integrated sub-systems with power distribution system, power supply system, thermal system, bearing system, aisle system, monitoring system, cabling system, etc. High standard modular design on each sub-system for flexible configuration as requirement, achieves data center rapid deployment, smooth expansion, intelligent management, energy-saving. iBlock BM is one of major data center construction trend.

Application

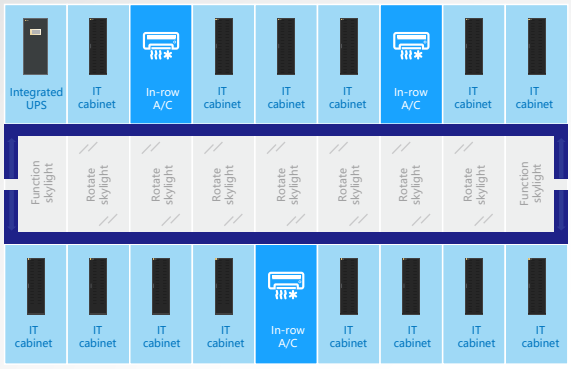
Middle-large data center

National government Public institution data center

Telecommunication IT equipment room

College & University data center

Financial data center



Integrated UPS cabinet: UPS inside modular data center

UPS outside of modular data center

Room air conditioner (down flow) with raised floor

Feature

Intelligent management

- Updated displayer shows massive information from modular data center. Configurable UI for information and equipment.
- Easy maintenance, rapid routing inspection, rapid trouble shooting and alarm analysis.
- Intelligent management of integrated alarm, report, work-order, efficiency, etc.
- AI thermal-power management: linkage between cooling and power supply to achieve accurate system optimization, adjust cooling output, to remove "hot-spot" and get best on-line equipment and cooling solution.

- **AI Thermal-power management**
- **Maintenance improved**

Energy-saving

- Sealed aisle to avoid mixed air flow to improve efficiency.
- High return air temperature to improve air conditioner EER.
- In-row air conditioner accurate cooling to improve efficiency for high density application.
- Optional free-cooling kit for air conditioner to drop power consumption and save energy greatly.
- Inverter compressor design to provide accurate tracking cooling to heat fluctuation application for high efficiency.
- Compared with traditional data center, energy saves 30% ~50%, PUE drops to 1.25.

- **Energy saves 30% ~ 50%**
- **PUE drops to 1.25**

Safe and reliable

- iPower: Power distribution visualization for real-time monitoring on important routes to achieve predicted alarm.
- Multiple level staff access management.
- Real-time aisle temperature and humidity for predicted alarm.
- Operating status visualization of UPS, air conditioner, smoke sensor, water leakage, etc.
- All equipment in modular data center are self-developed for high compatibility.

- **Power distribution Visualization**
- **Operating status Visualization**

Flexible deployment

- All sub-systems are prefabricated in factory. Optimized package for on-site convenient arrangement for installation. Deployment period 6~12 weeks, which save construction time more than 50%.
- Modular component design with uniform interfaces for flexible expansion as cabinets, together with its sub-systems, saves initial investment. Smooth power density expansion from 1kW to 15kW per cabinet. Customized solution supports maximum 50kW per cabinet power density.

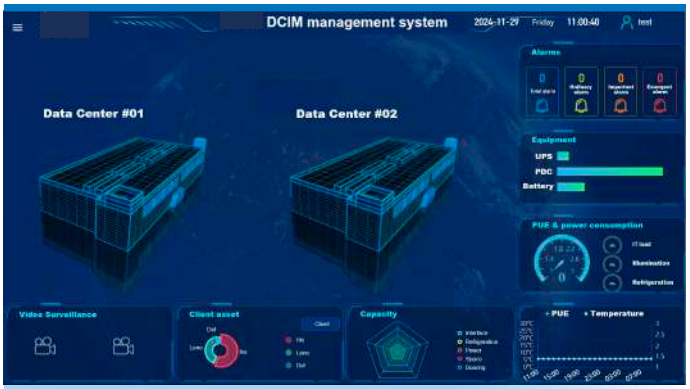
- **Save construction period 50%**
- **50kW / cabinet power density**

Intelligent management

Intelligent monitoring management platform: 3D/2D modular data center layout view on each sub-systems of UPS, power distribution, thermal, bearing, monitoring, security, especially visualization on full route of power supply, thermal, estate resource, for flexible configuration and management from multiple dimension, and for multiple linkage strategy to fulfill actual requirement. Local APP maintenance improves entire maintenance efficiency, simplifies routing inspection, sends alarm in time, locates fault rapidly.

- Visualization of load rate

- Visualization of power distribution system

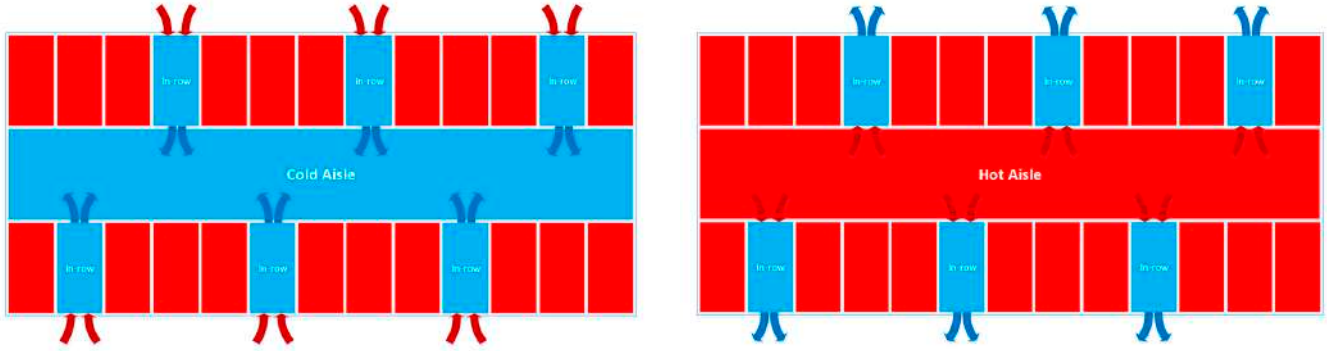


- Centralized monitoring for multiple data centers

Massive information overview

Energy-saving

IT cabinets and in-row air conditioners are installed face to face for sealed cold / hot aisle. suitable for middle-high power density modular data center solution, which saves more than 25% energy compared with traditional equipment room. Integrated UPS saves 1 or 2 cabinet space with traditional solution (PDC+UPS). Refrigerant pump free-cooling solution saves massive power consumption and drops modular data center PUE greatly.



Sealed cold / hot aisle design drops power consumption

Traditional: UPS + PDC

Integrated UPS: UPS and PDC in one cabinet

Integrated UPS save 1~2 cabinets for modular data center

Compressor mode

Compressor is on-line when in hot season

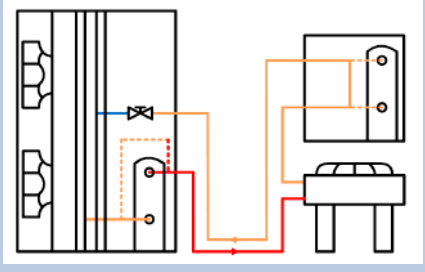
Hybrid mode

Compressor and pumps are on-line during transition season, pump provides auxiliary cooling to drop compressor pressure to improve efficiency.

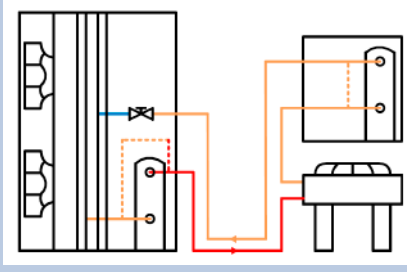
Pump mode (free-cooling)

In cold season, compressor is off, pump is on with low power consumption, which utilizes outdoor cooling resource to reduce power consumption greatly.

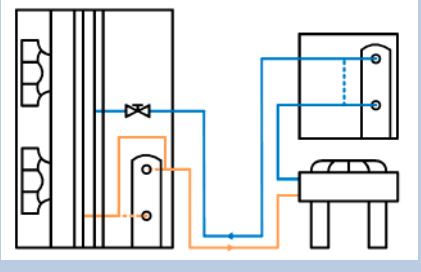
Compressor mode



Hybrid mode



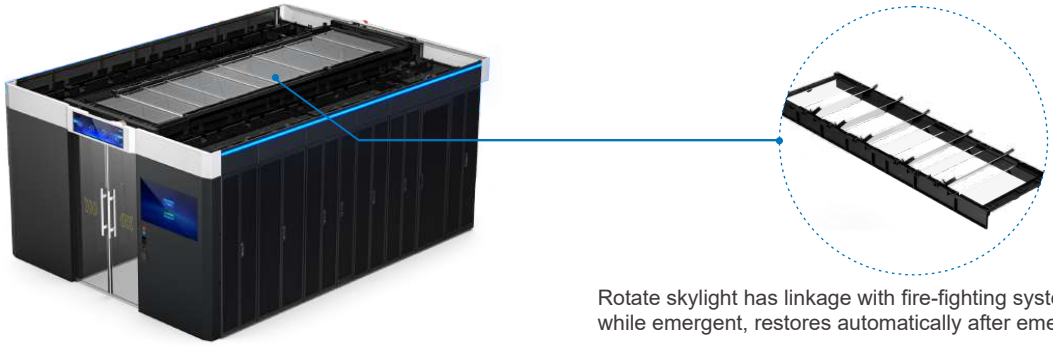
Pump mode (free-cooling)



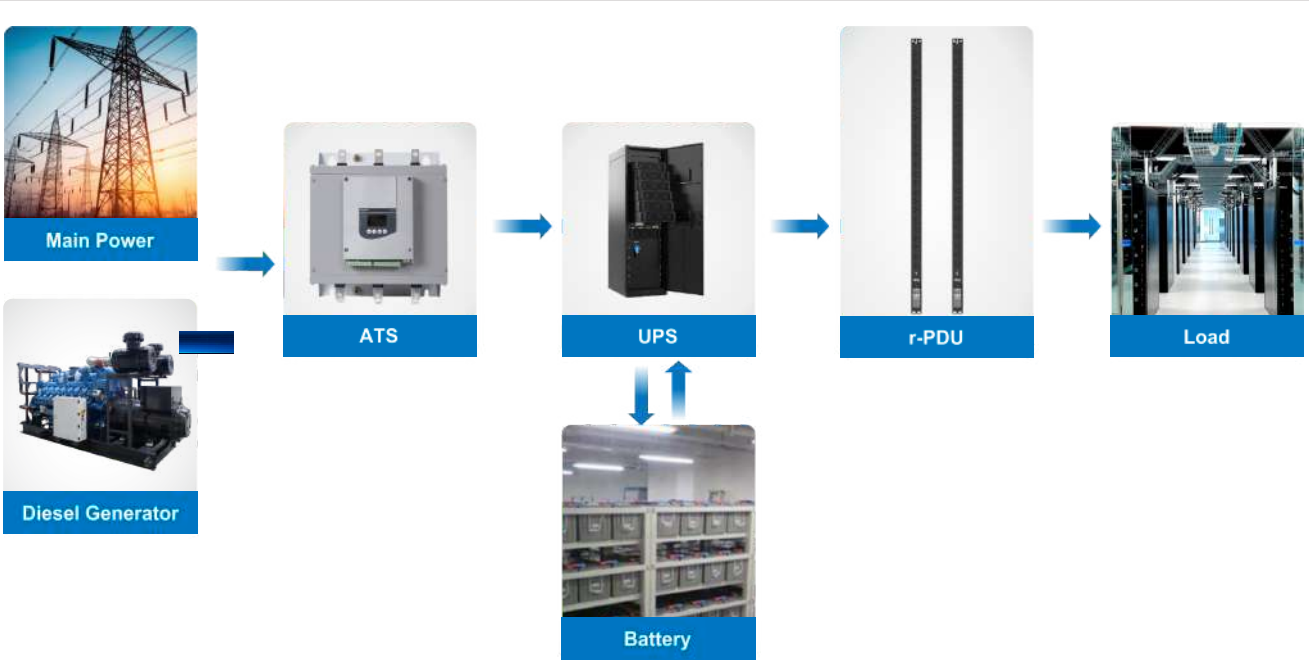
Refrigerant pump free-cooling principle

Safe and reliable

Skylight automatically opens to allow fire distinguishing gas to enter aisle to put out fire quickly. ensures data security. Visualization of full power supply route achieves intelligent monitoring to cut off power supply except fire-fighting system, ensures power supply security of data center. Customized access permissions for variable staff management to prevent mis-operation, ensures operating and maintenance security for data center.



Rotate skylight has linkage with fire-fighting system, opens automatically while emergent, restores automatically after emergent.



iPower intelligent monitoring

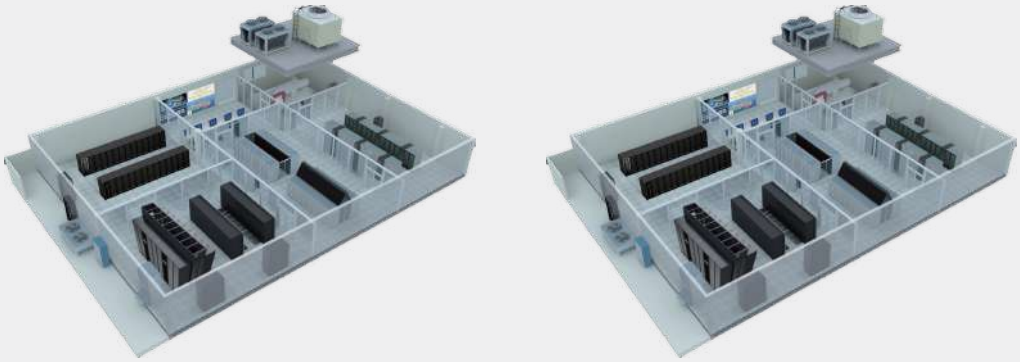
Configurable Authorization management

Flexible deployment

BM is designed with modular prefabrication and standard interfaces. Installation and assembly as modules on-site to reduce construction period lower to several weeks. Modular design achieves expansion by modular components or cabinet, which saves investment. Each subsystem equipment is built flexibly and quickly like building blocks.

Modular design on component / sub-system

Modular design on solution structure



Modular design on entire data center

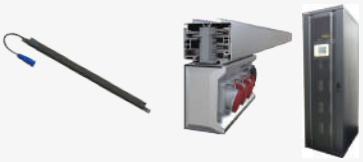
Sub-systems

Bearing & Aisle system

- IT Cabinet: New structure design enhances bearing capacity. Multiple optional accessories for variable applications.
- Sealed aisle: Panoramic aisle design, dedicated installation interfaces on aisle components and cabinets, ensures fast installation and well aisle sealing. Restore rotated skylight with one-button control for easy operating and management.
- Lintel logo, aisle energy-saving lamp: full-color outline light strip, customized color by client for operation and maintenance, and indicates of multiple levels alarm during maintenance.
- Aisle door: optional double opening door or double opening automatic electric door.
- Cabling system: Multiple cable tray inside and outside of cabinet for variable function cable management.

Power Distribution System

- Customized design on precision power distribution cabinet by actual requirement with default functions such as power detection, power quality detection, and intelligent communication.
- Optional intelligent r-PDU for more accurate power and capacity management.
- Optional r-PDU with lightning protection and digital power meter.
- Innovative iPower-line intelligent busbar solution: top mounted installation for space saving, full-bar access plug-in, flexible expansion, easy maintenance.



Monitoring System

- Management of permissions for system users/data center personnel and provides predicted analysis of possible overload situations.
- Real-time monitoring and predicted warning of temperature / humidity in aisle.
- Operating status and alarms of UPS, air conditioner, smoke sensor, fire sensor, water leakage sensor, etc.
- Optional access to video surveillance, door access and other extended functions.
- Optional on large displayer for local visualization operating and maintenance.
- DCIM management system for intelligent management of modular data center based on infrastructure data collection.
- 2D and 3D visualization management, for clear and intuitive operating and observe, real-time displays data center status of both entire modular data center or each components.

UPS System

- Same dimension and style with IT cabinet for uniform appearance in modular data center.
- Tower UPS or modular UPS can be configured. Modular UPS has multiple options of single power module capacity: 15 / 20 / 25 / 30 / 50 / 100kVA.
- Power density of single cabinet reaches 300kVA, saves data center space.
- Integrated UPS: integrated UPS with a capacity of 90kVA/125kVA and power distribution system in one cabinet, saves data center space.

Thermal System

- 7-inches large true color touch displayer, friendly UI design, easy operating and maintenance.
- Full sensible heat ratio design and high energy efficiency.
- Variable capacity output design with heat load tracking technology, which saves energy greatly for client.
- Maximum 16 pieces external temperature sensors for one air conditioner, achieves temperature management that fully matched with inverter air-cooled in-row, inverter refrigerant pump free-cooling in-row, TM system terminals, modular UPS, and other energy-saving products to achieve very low PUE.
- Teamwork functions, allows maximum 32 sets air conditioners operating under coordinated method.
- Maximum 70kW inverter refrigerant pump free-cooling in-row air conditioner, reaches new height of cooling capacity in one cabinet for modular data center.

Optional Acessory

- Rope water leakage sensor, smoke sensor, fire sensor, hydrogen sensor.
- Door access and management.
- Large displayer.
- Video surveillance.
- Fire-fighting system.

BM 5.0 modular data center specification

iTem	Parameters			
Modular data center	Dimension（L x W x H) (mm)	Dual-row sealed hot or cold aisle L x 3400 x 2300; L x 3400 x 2500; L ≤ 15m L x 3600 x 2300; L x 3600 x 2500; L ≤ 15m		
	Cabinet quantity	≤ 50		
	Main power input	380 / 400 / 415VAC, 50 / 60Hz, 3Ph+N+PE		
	Cabling	Up / Down		
	Installation	Direct on concrete floor, or on prefabricated foundation		
IT Cabinet	Dimension (W x D x H) (mm)	600 / 800 x 1100 / 1200 x 2000 / 2200		
	Client space	44U / 48U		
	Ventilation	Hexagonal mesh door, ventilation rate ≥ 75%		
	Ingress Protection Rating	IP20		
In-row precision air conditioner	Cooling capacity	12.5 / 25 / 35 / 40 / 48 / 60 / 70kW		
	Indoor unit dimension (W x D x H) (mm)	300 x 1000 / 1100 x 2000 (12.5kW) 300 x 1100 / 1200 x 2000/2200 (25kW, 35kW) 600 x 1100 / 1200 x 2000 / 2200 (40kW, 48kW, 60kW, 70kW)		
	Main power input	380 / 400 / 415VAC, 50 / 60Hz, 3Ph+N+PE		
	Refrigerant	R410A		
Integrated UPS **UPS inside modular data center**	Capacity	90KVA: (5+1) x 15kVA power modules 150kVA: (4+1) x 30kVA power modules 150kVA: (5+1) x 25kVA power modules		
	Input	Type	380 / 400 / 415VAC, 50 / 60Hz, 3Ph+N+PE	
		Power factor	> 0.99	
		THDi	< 3% (100% linear load)	
	Output	Power factor	1	
		Rated voltage	380 / 400 / 415VAC	
		Voltage accuracy	±1%	
		THDv	< 2% (Resistance load), < 3% (non-linear load)	
	System	Efficiency	Normal mode > 96%; ECO mode > 99%	
		Ingress Protection	IP20	
		Communication	RS485, Dray contact, SNMP, EP0	
		Operating temp.	0 ~ +40℃	
		Storage temp.	-25℃ ~ +70℃	
		Humidity	0 ~ 95% (No condensation)	
	Power distribution	Main input type	Single input: MCCB / Dual input: ATS	
		Input capacity	250A	400A
		UPS	1×200A+2×160A, MCCB	3×250A, MCCB
		IT	2×20×32A/1P, MCB	2×24×32A/1P, MCB
		Air conditioner Other	4×63A/3P, 3×16A/1P, MCB	8×63A/3P, 3×16A/1P, MCB
iPower-line	Input	380 / 400 / 415VAC，50 / 60Hz，3Ph+N+PE		
	Input capacity	250A / 400A / 630A		
	Output branches	IT output branches: 40A/1P，63A/1P，40A/3P，63A/3P		
Monitoring	Displayer	13.3 inches		
		21.5 inches		
		43 inches		
	Management	Environment management		
		Power management		
		Intelligent management		