

AIRSYS



INNOVA

Integrated Micro Data Center

Product identification

01 Product Series

IMDC: Integrated Micro Data Center

03 Row No. of Rack

DUAL – Dual row, abbr. as “D”
SINGLE – Single row, abbr. as “S”

05 Rack Height

2000mm
2200mm

01	02	03	04	05	06
IMDC	.	DUAL SINGLE	.	2000 2200	XXX

02 Separator Character “.”

04 Separator Character “.”

16 Code For Custom Design

3 digit alphanumeric code

Applications

The INNOVA series Integrated Micro Data Centre (IMDC) from AIRSYS is a fully-equipped modular data center solution, complete with standard IT racks, power supply and management systems, wiring, lighting, intelligent monitoring, precision cooling systems and fire detection and protection systems.

The IMDC system excels as a small to medium sized computer room or data center (typically with a serviced-area <600m2) and is perfectly suited to servicing the needs of bank branches, Telecom small to medium sized companies, local Government offices, education institutes, medical institutes, hospitals, etc.

Product features

Installation and Operating Efficiency

The integrated power supply and distribution enable extremely quick deployment and ease of installation, which can shorten set up times by up to 50%.
The modular, self-contained arrangement means that hot and cold air is separated, eliminating hot spots and reducing the PUE to as low as 1.2.

Capital Investment

The IMDC system is a solutions-based product, with standardized components, meaning minimized external engineering design is required. When this is coupled with the minimal height needed for installation (just 2.6m), construction costs can be reduced by up to 10%.
As the core components are modular, the initial investment may be reduced as future expansion is a simple process.

Reliability

The industry-leading integrated cooling equipment from AIRSYS is factory tested to ensure high quality and safe and stable operation. As both the power supply and cooling equipment are modular in design, N + X redundancy is readily achievable, therefore obtaining a very high reliability.
Real-time monitoring and display can also assist users in making operational decisions.

Energy Efficiency

The IMDC system can reduce data center energy consumption by 30% - 50% and operating costs by up to 44%. This is achievable through a combination of hot and cold aisle containment, localized zone cooling, integrated frequency conversion technology and on-demand cooling, all of which significantly reduce the energy required for air conditioning.



Product specification

Item		Specification description
System		
Dimensions	mm	300mm Single row sealing cold/hot channel: L x 1560mm x 2180mm, L≤10800mm
Power input		208/220V (3Ph, 60Hz) 380/400/415V (3Ph, 50/60Hz) 440/460/480V (3Ph, 60Hz)
Operational environment		T1: - 30°C ~ +45°C; T3: - 20°C ~ +55°C
Reliability level		Tier II or Tier III (Can be extended to Tier IV)
Altitude	m	0 ~ 1000m (derated when altitude is over 1000m)
Installation		Can be installed directly on concrete floor, or raised floor
Racks		
Dimensions (H x W x D)	mm	2000 x 600 x 1200/2200 x 600 x 1200
Available space		42U/47U
IP rating		IP20
Air-cooled In row air-conditioning		
Cooling capacity	kW	25.1/38.3
Indoor dimensions (H x W x D)	mm	2000 x 300 x 1200/2000 x 600 x 1200
Power input		380/400/415V (3Ph, 50/60Hz), 440/460/480V (3Ph, 60Hz)
Refrigerant		R410A
Water-cooled In row air-conditioning		
Cooling capacity	kW	26.4/68.6
Indoor machine sizedimensions (H x W x D)	mm	2000 x 300 x 1200 / 2000 x 600 x 1200
Power input		200~240V (1Ph, 50/60Hz)
Medium		Water/glycol solution
Rack typeUPS		
Power input		380V (3Ph, 50/60Hz)
Nominal capacity		10/15/20kVA
Modular UPS		
Input voltage		380V (3Ph, 50/60Hz)
Nominal capacity		50-800kVA

System architecture

Typical configuration

IMDC.D.2000 Typical configuration

Item	Description
Module Dimension (HxWxD)	2000mm x 6200mm x 3600mm
Server Rack Quantity	11
Power Supply	AC 380V 1Ph 50Hz
IT Total Power Consumption	44 kW
Individual Rack Power	4 kW
Applied Environment	T1
Tier Rating	Tier II
Altitude	0~1000 (derating derated use when the altitude is over 1000m)
Installation	Installation directly on concrete floor or raised floor

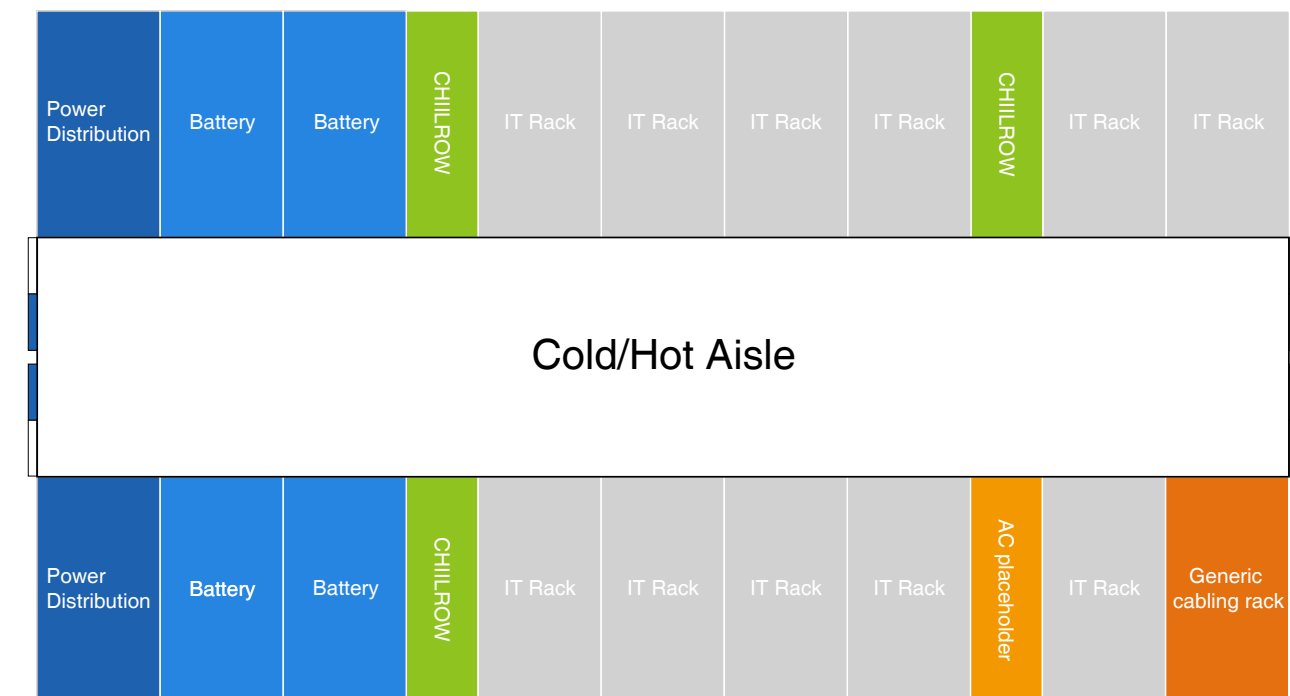
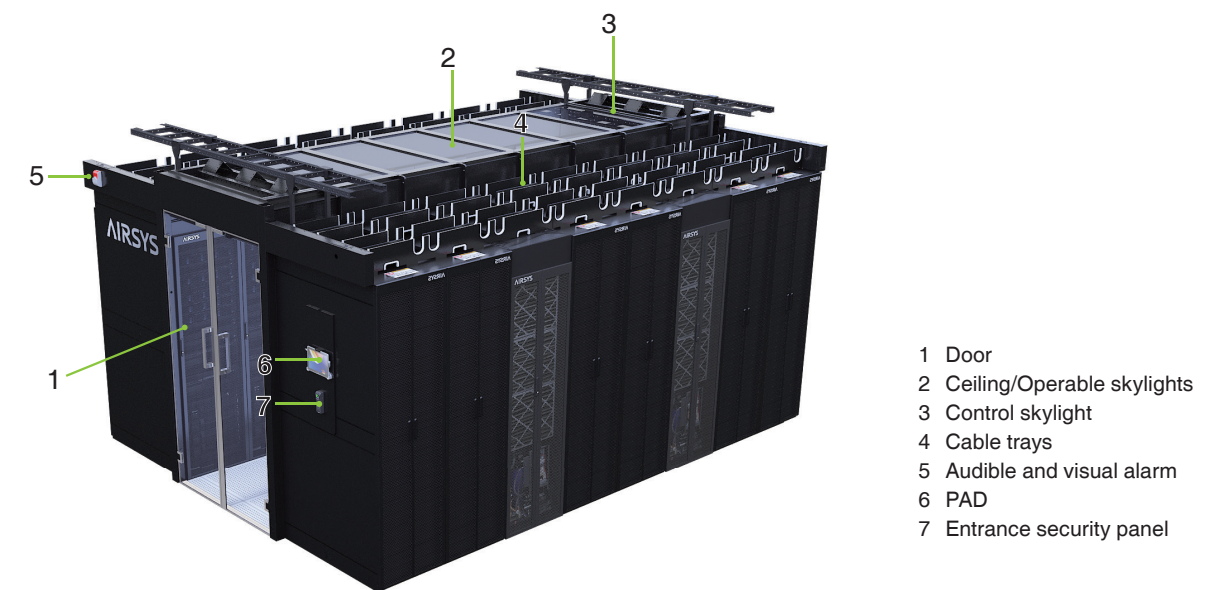


Image 6-1 IMDC.D.2000 Typical configuration

Installation room

- 1、 The installation room must be totally clean and have had all dust removed from the wall, floors and ceiling;
- 2、 The height of the installation room shall not be less than 2.6 m;
- 3、 The bearing capacity of the date center room shall not be less than 8kN/m2;
- 4、 The IMDC unit must be grounded within the installation room, with a grounding resistance less than 1;
- 5、 The installation room needs to provide adequate drainage provisions for the removal of air-conditioner condensate;
- 6、 The recommended power supply shall be terminated in the installation room for connection to the IMDC;
- 7、 The smoke detector and temperature sensor of the IMDC shall be connected to the central fire protection system in the installation room, or externally as best suited;
- 8、 The installation room itself shall provide the overall fire extinguishing system;
- 9、 The installation room must be adequately ventilated to ensure sufficient airflow is maintained.

General arrangement diagram



Racks

The industry-standardized IMDC server racks are available in heights of 42U and 47U, and are able to accommodate both front and rear airflow configurations. The racks meet the requirements of the IEC 60297-1 standard, providing a secure and stable mounting space for data center servers and associated equipment.

Cabinet appearance



Safety and Reliability

The cabinets have been designed with strength as a priority and can withstand a magnitude 8 earthquake. This strength translates into the cabinet being able to bear a dynamic load of 1000 kg and a static load of 1200 kg.

could be contained in the air containing blind flange, guarantee the sealing of the channel surround system optional shelf and L installation guide and other accessories. The optional shelf can support a at least weight of 80 kg, and the guide rail up to 45 kg.

There are no less than two reliable connections between the cabinet and the installation room grounding device.

Ventilation area is greater than 75% of the area of the cabinet doors, providing an excellent horizontal air flow environment, to meet the heat dissipation requirements of high power consuming equipment.

Cabinets and associated componentry are all black, and the spraying material conforms to the European ROHS standard. The powder coating is adopted to import ICI powder, and the coating mark conforms to the requirements of GB/T4054-1983 standard.

Cabinet doors are equipped with a professional quality security lock and handle; the lock can withstand a sizable impact without damage. Anti-corrosion and moisture proofing measures have also been applied to the lock, which has been designed for many thousands of open/close cycles.

Cabinet characteristics

Flexible Structure

Side panels can be quickly disassembled, to provide convenient access for easier installation and troubleshooting.



- Both caster wheels and support feet are incorporated into the frame, enabling racks to be easily maneuvered and secured in place.
- Mounting holes within the high-strength steel frames of the cabinet are numbered 1 to 42U/47U, for ease of equipment installation.
- Ample cabling space is provided within the cabinet, with two vertical grooves available for flexibility.
- As the cabinet design is standardized, there is a high level of compatibility and interchangeability with equipment.
- The top of the cabinet hosts the cable inlet and outlet, complete with modular bristle brush to prevent cable damage while sealing the unit. The bottom of the cabinet is equipped with an operable ventilation panel.
- Each server cabinet is equipped with a pair of standard installation angles, able to be adjusted forward and back as necessary.
- A reinforced frame, and in particular bottom portion, ensure the rigidity and strength of the cabinet.
- The internals of the cabinet have been designed around the industry-standard 19 inch equipment and can be fully adjusted as required to support the installation of sliding tracks from all major manufacturers, such as Dell, HP, IBM, etc. 130 ° QianHouMen open; "Seamless parallel machine" can be achieved easily.

Cabinet Technical Details

Parameter	Technical Details
Dimensions (W*D*H)	600/800mm×1200/1100/1000mm×2000mm/2200mm
Color	Black
Material	High strength, Grade A high quality carbon cold rolled steel plate and galvanized sheet
Air intake	Front and rear
Installation space	2000mm high rack provides 42U available space. 2200mm high rack provides 47U available space.
Installation	Anti-static floor/base or cement floor
Door opening	The front door is single-hinged, the back door is double-hinged
Protection rating	IP20

Aisle containment system

The Aisle Containment System is configurable in both single and double row options; i.e. racks may be fitted to either or both sides of the aisle. Similarly, the aisle can be utilized in either a hot- or cold-aisle arrangement.

The upper ceiling of the aisle is a flat grid style arrangement, for ease of access and modularity.

The framing system is designed to accommodate independent racks or modules, such that each module can be installed and removed independently or those adjacent, however, adjacent units may also be connected if required.

A door is located at each end of the aisle, ensuring adequate access and egress provisions, and the aisle environment is continuously monitored by the fire protection system. For increased control, an environmental monitoring system can be installed within the aisle to enable remote monitoring and alarm functionality.

All mechanical and electrical components of the IMCD are in accordance with relevant national standards, communication industry standards and IEC standards. Similarly, all physical properties are in accordance with the international IEC 297 (19-inch) metric standard and relevant ETSI (European Standards Association) standards.

Single row aisle containment

The single row aisle option is suitable for use in either hot or cold aisle applications. The system includes server cabinet, integrated wiring cabinet, power distribution cabinet, precision air conditioner, battery cabinet, skylight ceiling, doors, and additional associated components. The single row arrangement can accommodate up to 24 cabinets.



Dual row aisle containment

The double row aisle option is suitable for use in either hot or cold aisle applications. The system includes server cabinet, integrated wiring cabinet, power distribution cabinet, PDU, precision air conditioner, skylight ceiling, doors and additional associated component. The double row arrangement can accommodate up to 48 cabinets.



Double doors

The column head and the tail each set a pair of double doors, the top of the column set the ceiling frame, forming a sealed space. Double door sliding door and sliding door are optional.

The gate can be installed automatically or manually. Movable door bidirectional installation push pull or move handle.

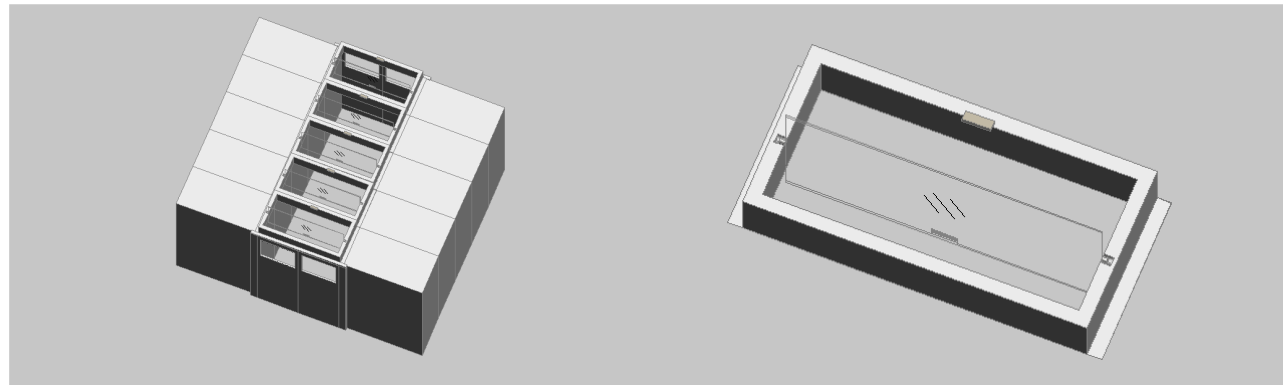
Ceiling

The ceiling frame is based on a standard 600 mm wide modular design. Each ceiling unit can be installed or removed separately and is easily connected to adjacent units to create a sealed join.

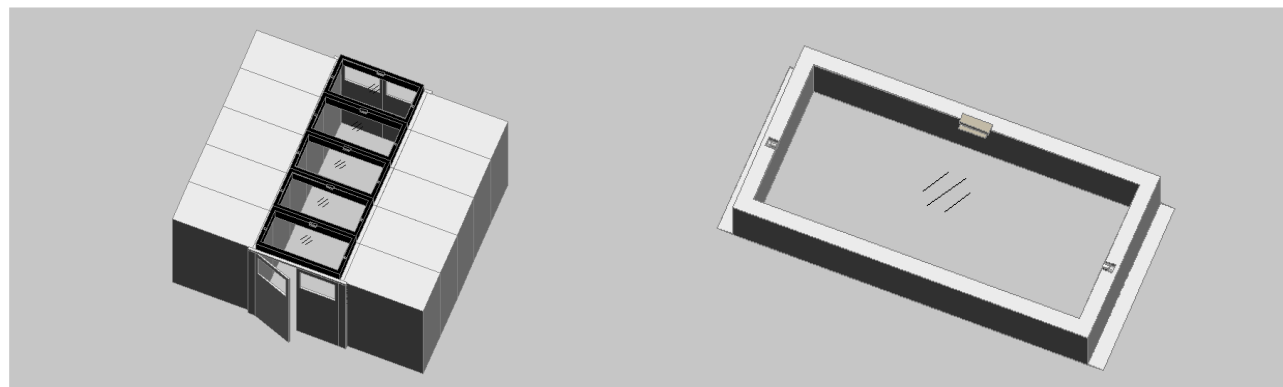
The frames of active skylight ceiling units incorporate the linkage for automatic operation by the fire protection system, but also support manual control. Under normal circumstances, the active skylight is held closed by an electromagnetic lock. When a fire is detected, the electromagnetic lock is released, and the gravity-driven active skylight automatically opens, allowing the fire extinguishing gas/foam/fluid (from the installation room fire extinguishing system) to enter the aisle. When open, the active skylight panel angle will be 90° (vertical) and once the frames are accounted for, achieves a total open area of 67%, which is sufficient for fire suppression within the aisle. Refer to the Fire Protection System section in this document for further information.

Active skylight ceiling panel

The rotating opening of the skylight does not affect daily maintenance work and sufficient clearances are maintained within the aisle. The rotational axis has been selected to reduce the induced forces when the electromagnetic lock is released, effectively avoiding any continued swing of the skylight.



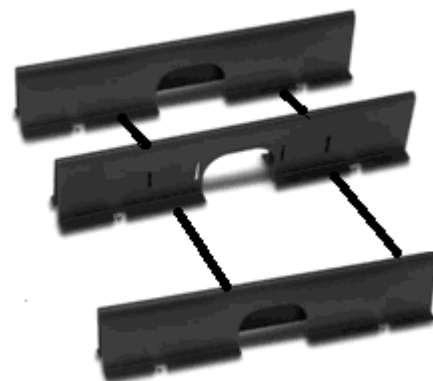
Active skylight in opened position



Active skylight in closed position

Cable channel

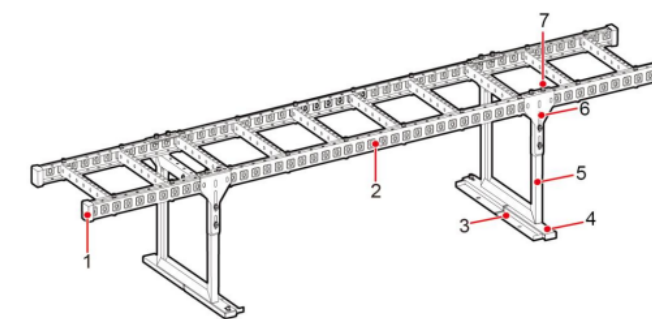
The cable channel within the cabinet is divided into two sections; a communications cable section and power cable section. This arrangement ensures separation between power and communications cables is maintained for both the elimination of interference and ease of installation and troubleshooting.



Cable ladders

Power cables and communications cables are to be installed in dedicated cable ladders, to ensure adequate separation is maintained between high and low voltage cabling. Cable ladders are typically used:

- Between two IMDC modules
- Between the two sides of a single IMDC module
- Anywhere else where a more permanent cable route is required



- 1 Cover
- 2 Ladder
- 3 Rack fixing hole
- 4 Fixed board
- 5 Fixed base
- 6 Transfer joint
- 7 Earth bolts

Grounding

All metal components of the IMDC modules are earthed through their connection to the aisle framing system. The framing system must be connected to a permanent grounding point located within the installation room, in accordance with all international and local codes and standards.

Sealing

Wide sealing tape is used between door and door, both sides and bottom to prevent gas leakage. In the upper front of the double-row cabinet, install the seal groove to seal the channel air leakage. The professional channel surrounds the system cabinet, and the inlet sealing performance reaches IP54.

Power supply system

Power supply requirements

The IMDC system, utilizing a standardized racking and modular design, complete with integrated lighting and protection systems, network isolation, and power management is comparable in all aspects to a traditional computer room environment. As such, IMDC modules require an installation room of similar quality to a traditional computer room or data center, including the quality of power supply, the specifications of which are tabled below for a Grade A supply:

Supply Grade	A
Specification	
Steady-state voltage tolerance range, %.	± 2 %
Steady state frequency tolerance range, Hz	$\leq \pm 0.2$ Hz
Voltage waveform distortion rate, %	3-5 %
Allowable power outage duration, ms	0-4

Power distribution cabinet

The IMDC system utilizes AIRSYS designed and manufactured power distribution cabinets which have been specifically designed for seamless incorporation into the system. Fitting within standard rack dimensions, and with a focus on conformity of appearance, the distribution cabinets offer an ideal solution allowing for flexible expansion, simple step-by-step function implementation, ease of initial installation and continued maintenance and management.

Appearance



Product features

Flexibility

The modular design of the power distribution cabinet provides the flexibility to meet the requirements of all installations and ensures an optimum racking layout is always achievable. AIRSYS can provide a full range of power distribution cabinets to meet all national and local standards, all complete with high-quality protective mesh doors for both appearance and operational safety.

The front door, back door and both side panels of the all distribution cabinets are fully removable, enabling the greatest flexibility for installation and maintenance.

The cabinets come with both caster wheels and adjustable support feet for both ease of both initial installation and future re-positioning and maintenance access.

Construction

The cabinet is constructed from a 1.5 mm thick cold-rolled steel frame, providing high tensile and compressive strength to ensure the longevity of the cabinet structure.

The internal angle square-hole mounting frame, base plate and installation beam are all constructed from 2.0 mm steel for increased rigidity, while the side panels and other plate components utilize 1.2 mm cold rolled steel plate.

The high-quality steel mesh forming the front and rear doors has a ventilation area in excess of 75% of the area of the door area, providing an excellent horizontal air flow path.

Safety

IMDC power distribution cabinets from AIRSYS comply with CE 73/23 & 93/68 (low voltage safety) and 89/336 (EMC) and Australian and New Zealand EMC standards (C-Tick). Similarly, all switchgear within the power distribution cabinets conforms to the IEC 947-2 and IEC 898 standards, ensuring safety, performance and reliability.

Further to this compliance, all IMDC power distribution cabinets must pass the strict AIRSYS testing regime at the factory prior to shipping.

The power module itself requires a three-phase five-wire power input; when operational, no current or voltage can be input to the to the neutral line, regardless of the balance of the output load. The cabinet and components are well protected through a quality earthing protection device. An independent busbar also assists in maintaining the stability

and safety of the incoming power supply.

The cabinet itself houses all switchgear within a dedicated box with a protective opening cover plate; only the handle and button are visible and readily accessible. A variety of wiring routes to and from the switchgear are readily available and accessible from within the cabinet to ensure a safe installation is always achievable.

Intelligent Monitoring

All power distribution cabinets are equipped with a 7-inch full-color touch screen control panel, which can variously display all main electrical parameters, electrical parameters of connected units, current operating states as well as any alarm information and history. The main electrical parameters typically provide a high-level overview of the IMDC operation, such as voltage, current, frequency, total power, active power, reactive power, power factor, load percentage, historical trend data, etc. The monitoring function of the intelligent controller can retain system data and analyze and report on current and historical trends.

Real-time monitoring of the switching status of the main and branch lines is also achievable.

The controller holds information on 5000 historical alarms, allowing excellent fault analysis and diagnosis.

The RS485 communication interface can be configured to automatically send selected operational data to another monitoring system (such as a BMS), enabling remote monitoring of the power distribution system in real time.

Simple Operation

Due to the standardized and modular nature of the power distribution cabinet, both installation and operation of the power distribution system are much more simple than traditional systems. Navigation through the screens and information on the touch panel controller is straightforward, making viewing the current and historical status of the system safe and simple. And, with the addition of remote monitoring and control, management personnel can view and manage the system from an external location in real time.

Power distribution cabinet technical specifications

	Dimensionssize (WxDxH) (can be customized)	H (mm) 2000	W (mm) 1200	D (mm) 600
Physical specifications	weight	80-240kg (According to selected configuration)		
Rated power		20 ~ 800KVA		
Electrical Specifications	Rated breaker voltage	AC 50Hz/60Hz, 690V		
	Rated operating voltage	AC 50Hz/60Hz, three-phase 380V, single-phase 220V		
	Electrical Input	Un = 380V (3L + N + PE)		
	Electrical Outputs	Up to 126 single-phase outputs (customized according to requirements)		
	Input switch breaking capacity	≥ 25kA		
	Output switch breaking capacity	≥ 6kA		
	Surge protection	Optional OBO surge protection module		
Environmental Limits	IP Rating	IP20		
	Ambient temperature	-10℃ - +65℃		
	Relative humidity	95% (No dew)		
	Altitude	≤ 2000m		
	Other	Non - dustyDust-free environment, , without isolated from strong vibrations and heavy traffic areas where impacts are likely to occur.t		

PDU power distribution unit

The housing of each PDU is made of an electrocoated Aluminum alloy, which effectively resists radio frequency and electromagnetic interference. The electrocoating process also provides an excellent anti-oxidation and acid-proof coating, which can help extend the service life of the unit.

Plastic components are made from impact, heat and UV resistant PC/ABS plastics with melting temperatures of approximately 230-300oC and flame-retardant properties in accordance with the UL94 standard. These factors can effectively prevent socket lead fires occurring.

Each PDU has been thoroughly tested for voltage endurance, grounding/insulation resistance, polarity and electrical loading, amongst other physical and electrical tests.Rated voltage: AC250V; Rated frequency: 50Hz/60Hz; Rated current: 32A; Maximum output power: 10KW.

To ensure all connections are reliable and provide continued connectivity throughout the operation life of the PDU, all plugs and components should: have high elasticity, wear resistance and magnetic interference resistance; be corrosion resistant (typically phosphor bronze); have a pull-out plug test of not less than 5000 cycles; be constructed to a high quality of finish, particularly regarding reliability of contacts, for safety and durability.

Each connection between the PDU and other various functional modules is via a dedicated socket. The status of one socket on the PDU (i.e. if a socket is not connected) does not affect the output of the remaining sockets.

Cables connected to the PDU terminals must have polarity identification in order to correctly distinguish between fire signals, neutral and ground. These cables must also be compliant with relevant flame retardant standards.

A PDU is installed vertically on both sides of the distribution cabinet for easy wiring and each PDU accommodates 16 C13 and 4 C19 sockets, all of which meet IEC standards.

Lighting system

The IMDC lighting system includes a lighting illumination control box and the channel lighting assembly. The Main function of lighting control boxx powers and : power controls supply for the channel lighting components, including the lights themselves, the ; Connect the infrared occupant sensor switch, control the linkage with the channel light , and realize the automatic control of the lights upon entry and exit of the aisle. in and out. The channel lighting assembly includes LED- type light fixtures are supplied as standard lighting fixtures and infrared induction switches installed in the channel. and illuminate the space to The illumination system illuminates above 500 lx.

Grounding

The earthing system of the IMDC module ensures both the normal operation of all electrical systems and personal safety of human operators. It also plays a significant role in the performance indexes such as lighting protection and the elimination of electromagnetic interference. All metal components or earthing points of the power distribution cabinet, racks and air conditioner(s) housed within the IMDC module (as well as the base, frame, skylights and other metal structural parts of the IMDC structure itself) are connected via equipotential bonding. The IMDC structure must be externally grounded to an external earthing point (within the installation room) via a single-core cable with a minimum cross sectional area of 25 mm2, complete with flame-retardant yellow and green color insulation. All cables in the cabinet meet the requirements of YD/T 1173. The color of the insulation or outer sheath of the cable and bus is in accordance with the requirements of GB7947.

Temperature control system

CHILLROW air-cooled in-row air conditioner

The CHILLROW series of precision air conditioners from AIRSYS offers a targeted cooling solution for the IMDC modules and is available in two widths (300mm and 600mm) for increased flexibility. Unit dimensions are similar to standard server cabinets and therefore incorporate seamlessly into the IMDC systems. Cool air is supplied horizontally from the front of the unit and warm return air is drawn in through the rear; the short air path reduces fan motor power consumption. R410A Refrigerant is used in the air-cooled DXA units.



Product features

Highly Efficient and Flexible

The CHILLROW product family from AIRSYS incorporates numerous energy saving technologies, resulting in an average EER (for DXA units) above 3.0. They are also highly flexible due to their unique horizontal airflow arrangement and slim enclosure design.

Easy Maintenance

Service access is via both the front and rear of the units, allowing routine maintenance to occur in location, without affecting the operation of the surrounding equipment or other operational precision coolers. The CRW. F.DXA25C1 unit even has 5 hot-swappable fans which can be independently controlled.

Convenient Installation

The CHILLROW units has have four composite castors, for increased maneuverability in tight spaces, and height adjustable fixed legs, for stability and support once in place. As well as this, pipe connections are able to be made to either the top or bottom of the unit, according to the installation requirements.

CHILLROW Technical Specifications

Specification			DXA.25C1	DXA.35C2
Supply Air Arrangement			Horizontal	
Cooling capacity	ColdTotal (1)	kW	25	40
	Sensible (1)	kW	25	40
Compressor	Maximum input power	kW	8.1	12.5
	Maximum current	A	17.2	24.8
Fans	Air volume	m³/h	5100	11600
	Quantity	n.	5	3
	Type		48V DC axial flow	EC centrifugal fan
	Total input power	kW	1.2	3.1
Refrigerant			R410A	R410A
Power supply			230V/1Ph/50Hz	380V/3Ph/50Hz
Electric heating (optional)	Heating load	kW		9
	Working steps	n	-----	2
Humidifier (optional)	Humidification capacity	kg/h	-----	3
	Input power	kW	-----	2.2
Temperature range			18°C ~ 45°C	18°C ~ 45°C
Storage temperature			-40°C ~ +70°C	-40°C ~ +70°C
Dimensions and weight	Width	mm	300	600
	Depth	mm	1180	1180
	Height	mm	2000	2000
	Weight	kg	92	155

(1)Return air dry bulb temperature 35°C, RH 30%, outdoor dry bulb temperature 35°C;

Supervisory control system

System architecture

The computer room monitoring system consists of both hardware and software components. The hardware systems include:

- Monitoring host
- Intelligent multi-channel controller
- Mining control module
- Monitoring module
- Computer network compatibility

System features

Simple and Intuitive Operation

The system software is based on the real-time multi-task Win2000/XP operating system and displays the monitored data and operating parameters in a graphical user interface (GUI) environment via a Windows display and standard controls. The user operation experience is similar to MS Word and other MS Office software packages, and is therefore accessible and easily understood.

Rich Interface Configuration

Users can configure many aspects of the human-computer interface according to their preferences; rich control and a standard control library are offered for customization, and all controls can be altered in size and color.

Network Connectivity

Client software may be connected to the module software system via an existing external network, such as a local area network (LAN), wide area network or over the Internet. The system can accept connections via Ethernet, FDDI optical fiber networks, ATM, ISDN, PSTN and DDN, transport protocol for TCP/IP. The run status of the system is also detectable by the client software and can automatically restore the connection if required.

Web Functionality

The system offers browser/server mode, enabling users to view the monitoring system interface in real time via any web browser.

Customizable Alarms

Alarms are fully customizable to suit all types of installation and levels of criticality, including graphics, colors, audible and visual alarms, telephone calls and all other modes and responses. Any given event may set off one or more alarms or responses as required.

Open Interface

The system provides users with a rich control interface by default, however, if the needs of a particular industry or application require deeper modifications, users are able to develop the control library according to their specific needs. The end-user system has no restrictions on such further developments or extensions, and the underlying structure does not change.

Rich Management Functions

The control system is responsible for the overall equipment management, alarm management and event handling management, and is critical for end-users and operators, even as a stand-alone management tool. However, when interfaced with an external monitoring system (such as a BMS), even greater integrated management is achievable and more accurately embodies the concept of an intelligent computer room as part of a greater whole.

Open Database Interface

The default system database uses SQL Server2000, but also supports Oracle, Sybase, MYSQL, etc. The system itself is fundamentally disconnected from the database to enable this support for various databases.

Generality

The design of the monitoring system conforms to the open design standard of international industrial monitoring.

Reliability

The monitoring system has good electromagnetic and electrical isolation performance, ensuring the normal operation of the monitored equipment is not affected. All hardware is sourced from internationally respected industrial control equipment manufacturers, with an average failure time of greater than 200,000 hours. All measuring and sensing equipment is equipped with self-calibration functions to ensure all data is continuously accurate, so that no false positives are recorded.

Compatibility

The system controller is capable of supporting products from a variety of well-known manufacturers to provide overarching intelligent control. Along with other AIRSYS equipment, compatibility with products from STULZ , LIEBERT, RC, HIROSS, MGE, EXIDE, SICON, IMV UPS is possible (contact AIRSYS representative for further clarification). Additionally, all devices that provide an open protocol (such as RS-232/422/485, Lonworks, SNMP, etc.) are supported.

Maintainability and Expandability

The modular design philosophy of the greater IMDC system has been applied to both the hardware and software, therefore making system expansion and maintenance a simple process. If equipment needs to be added or removed from in the future, the corresponding items are simply edited in the configuration settings of the controller; standard operators are able to undertake this task.

Security

The IMDC system has been designed with several important security features, for the protection of both equipment and data:

- Exceptional diagnostic functions have been built into the system which monitor the status and working parameters across all components, and indicate faults, identify causes and raise necessary alarms in a timely manner.
- Automatic voice call or SMS alarms are raised to alert the relevant personnel when a failure occurs. Once a failure event occurs, the system will cycle through pre-programmed telephone numbers until someone confirms receipt of the alarm information. required by the listener password, The administrator can also enter the phone query status.
- The inbuilt data management functions enable data storage for over a year, and powerful tools can recall and display data from any given day, along with historical curves, the maximum and minimum values, averages, etc.
- Strict password management ensures the security and continued stable operation of the system.
- Closed-circuit television system integration can be incorporated to allow video recording and playback directly via the remote host (e.g. BMS or security system).

System Superiority

Advanced and industry-specific technologies have been incorporated into the IMDC design, including:

- Monitoring and control system software specifically designed and implemented for use in data centers; applications of traditional monitoring systems can often lack the accuracy and responsiveness required by highly-efficient data centers.
- A system hardware design adopting new video technology to separate PC and video card, solving issues this can create with multi-channel alarms or when video is being recorded.
- AIRSYS anti-jamming technology has been incorporated into the design, solving issues with interference signals, false alarms and potential hardware burnout.
- The monitoring system supports remote web access via a browser; authorized operators can monitor the on-site status, data and images of the installation room from their browser and use their computer hard disk to record video.
- An English language interface with simple to follow layout, coupled with any optional user customization, ensures human-computer interfacing is easy to navigate.

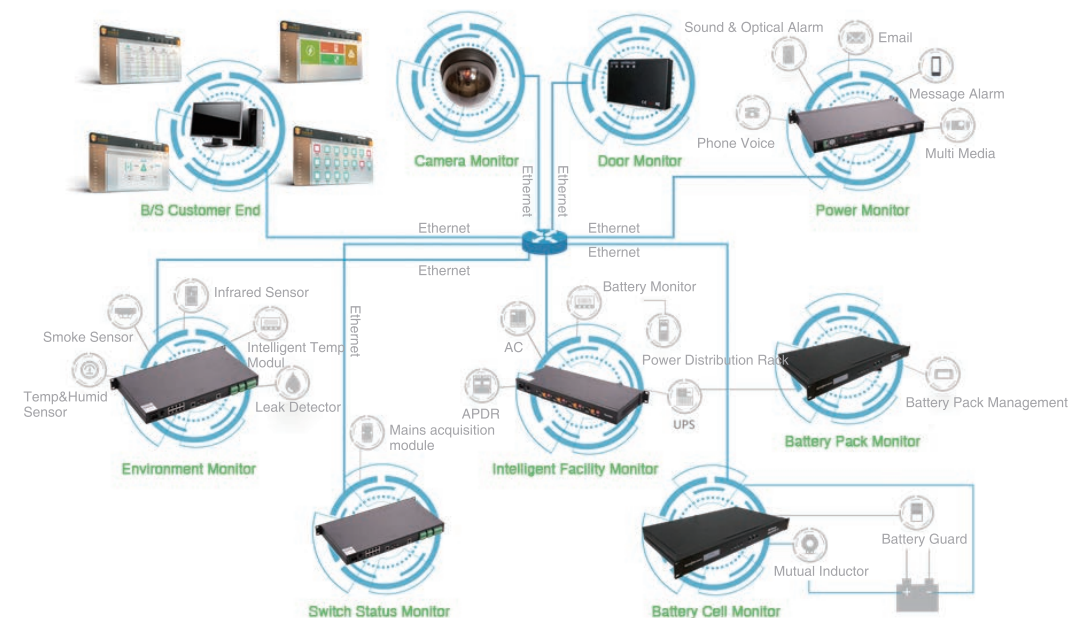
Monitoring management system composition

Monitor objects and content

Item	Content	Relevant and Displayed Parameters
1	UPS input and output at power distribution cabinet	Basic electrical parameters, switch status and alarm information of main circuit input
2	Power distribution cabinet	1. Distribution status: switch closure or disconnection state monitoring; 2. Distribution parameters: electrical parameters and alarm information of all input and output circuits.
3	Precision distribution cabinet	1. Operation status: when the UPS is in abnormal condition, the system operation interface automatically switches to the status and alarm diagram of the corresponding UPS; 2. Operation mode parameters: monitor the UPS rectifier, battery, bypass and input and output load parameters by means of communication protocol
4	UPS monitoring	1. Operation status: the operating state of the air conditioning components. Such as: compressor, fans, heater, humidifier, dehumidifier, ventilation device, etc. 2. Running parameters: real-time operation parameters of the air conditioner. If the corresponding parameter is saved with a historical data curve, select the historical curve menu of the corresponding parameters to view the curve. 3. Air conditioning alarm: when the component of an air conditioner fails, the system operation interface automatically switches to the state and alarm diagram of the air conditioner, and the voice alarm is issued simultaneously.
5	In-row air conditioning monitoring	Alarm will be raised if abnormality in temperature or humidity is sensed. Upon receipt of the alarm, investigations should be performed in a timely manner.
6	Temperature and humidity monitoring	Area leakage monitoring: use the leakage sensor cable to enclose the water source in the machine room and connect it to the computer through the leakage controller and the switch volume acquisition module. If there is a leak in the machine room, the water leakage controller detects the leak and sends the information of the leaking area to the monitoring host
7	Leakage alarm monitoring	The fire alarm system provides dry wiring signal and monitors the fire alarm in the installation room
8	Fire monitoring	Supports live voice and SMS alarm systems. When a failure is detected in the installation room, a call or SMS is automatically made to notify of the failure (allowing the installation room to generally be unattended)
9	Alarms	

System architecture

The system adopts the distributed monitoring, and the monitoring host is placed in the monitor room of the machine room, and centralized monitoring of each subsystem is conducted with a unified interface. Through the network, install the client program on the workstation, realize the distribution monitoring, the client can also use B/S structure, and watch directly in the browser IE.



Monitor management system hardware composition

Monitoring host

The monitoring host is the local data information processing center of the computer room monitoring system. It hosts the field management server and runs the monitoring software based on 2000Server/XP operating system. According to the alarm needs of the system, the corresponding video card/sound card/network card/telephone voice card or telephone voice system will need to be arranged.



Intelligent multichannel controller

The intelligent multi-channel controller is the core part of the information transmission of the computer room monitoring system. Mining control module equipment environment parameter to protocol data were collected through multi-channel bus (RS - 485/232/422, Lonworks, etc.) to tandem ZhiNengDuo channel controller, ZhiNengDuo channel controller combine data to monitor the host. At the same time, the control command of the monitoring host to the device is transmitted to the mining control module through the intelligent multi-channel controller to drive the execution control



Mining control module

The mining control module is used to collect signals (such as analog quantity and digital quantity) and transmit the signal to the monitoring host through the intelligent multi-channel controller, as well as to accept the control signal from the monitoring host. The control module includes an analog control module, a digital control module and a communication conversion module.



Monitoring module

The monitoring module is responsible for converting the sensed equipment and environmental information into analog signals or digital signals, and then transmitting them to the mining control module. It also receives analog or digital control signals sent by the mining control module, to control the hardware equipment and set relevant parameters. The monitoring module includes temperature and humidity sensors, leak detection sensor, power monitor, air conditioner monitoring unit (monitoring general comfort air conditioning), battery monitoring, entrance guard controller, switch control module, a variety of switch contacts and all remaining integral sensors.



Monitoring system performance specification

- Maximum monitoring points of the system: 100,000.
- System real-time data transmission time: 1 s or less
- System control commands transmission time: 2 s or less
- System linkage command transmission time: 2 s or less
- System access to the largest number of users: no limit
- System MTBF: 10000 hours or more

Fire protection system

Overview

The IMDC fire protection system covers a range of functions and components including fire/smoke detection, raising of alarms, skylight mag-lock operation and fire escape device activation. The fire mode controller is central to the fire protection system and is responsible for interpreting signals and triggering responses. There is a sealed channel around the top the IMDC, which is able to capture smoke and trigger an alarm at the fire mode controller. There is also a fire escape device located in the distribution cabinet.

The IMDC fire mode controller is to be integrated with the central fire protection system to raise alarms and trigger operation of the installation room fire extinguishing system.

Install a monitoring box in the micro module monitoring cabinet, and the built-in skylight electromagnetic lock control module;

Operation

When smoke is detected in the IMDC, an alarm signal is immediately raised at the fire mode controller, which then automatically outputs a fire signal to the external monitoring system (e.g. central fire protection system, BMS etc.), as well as raising local audible and visual alarms. The fire mode controller simultaneously assumes control of the fire escape device, cuts power to the air conditioning unit(s) and de-energizes skylight mag-locks (opening the skylights). With the ceiling of the IMDC now open, the installation room fire-extinguishing medium may freely enter the aisle.

Requirements

- The IMDC fire mode controller must be integrated with the central fire protection system; the central system supplier shall provide the fire protection solution for the IMDC installation room.
- The fire protection system must satisfy the requirements of the data center, adhere to the relevant fire department provisions and receive approval of the design from the fire department.
- Gaseous agent, high-pressure water mist, and water sprinkler type fire extinguishing systems may be used to protect the IMDC (subject to specification). All installations shall account for the specifics of the installation room and ensure nozzle/outlet placement results in suppressant being supplied directly into the open skylights.
- There is an option to install a very early smoke detection (VESDA) system, including relevant reconfiguration of the smoke and thermal detection and management system.

Cabling system

The IMDC is designed with a high-level (overhead) cable management system to ensure the ease and safety of cable installation.

The main features of the cabling system include:

- Complete isolation of high and low voltage, AC/DC high voltage class cables, low current class cable and optical fiber can also be separated
- micro module at the top of the vertical and horizontal trough trough. The transverse groove is located at the top of each column of the micro module to realize the horizontal line. The longitudinal slot is connected to the micro module and two cabinets.
- micro module at the top of the slot with the strength of the clear identification
- each cabinet on the left side of the installation at the back of the weak wire slot, on the right side of the installation of two vertical communication, PDU and dc PDU
- through rooms go line between the two micro module frame to connect, go line frame is divided into the power cord and signal line aircraft line



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