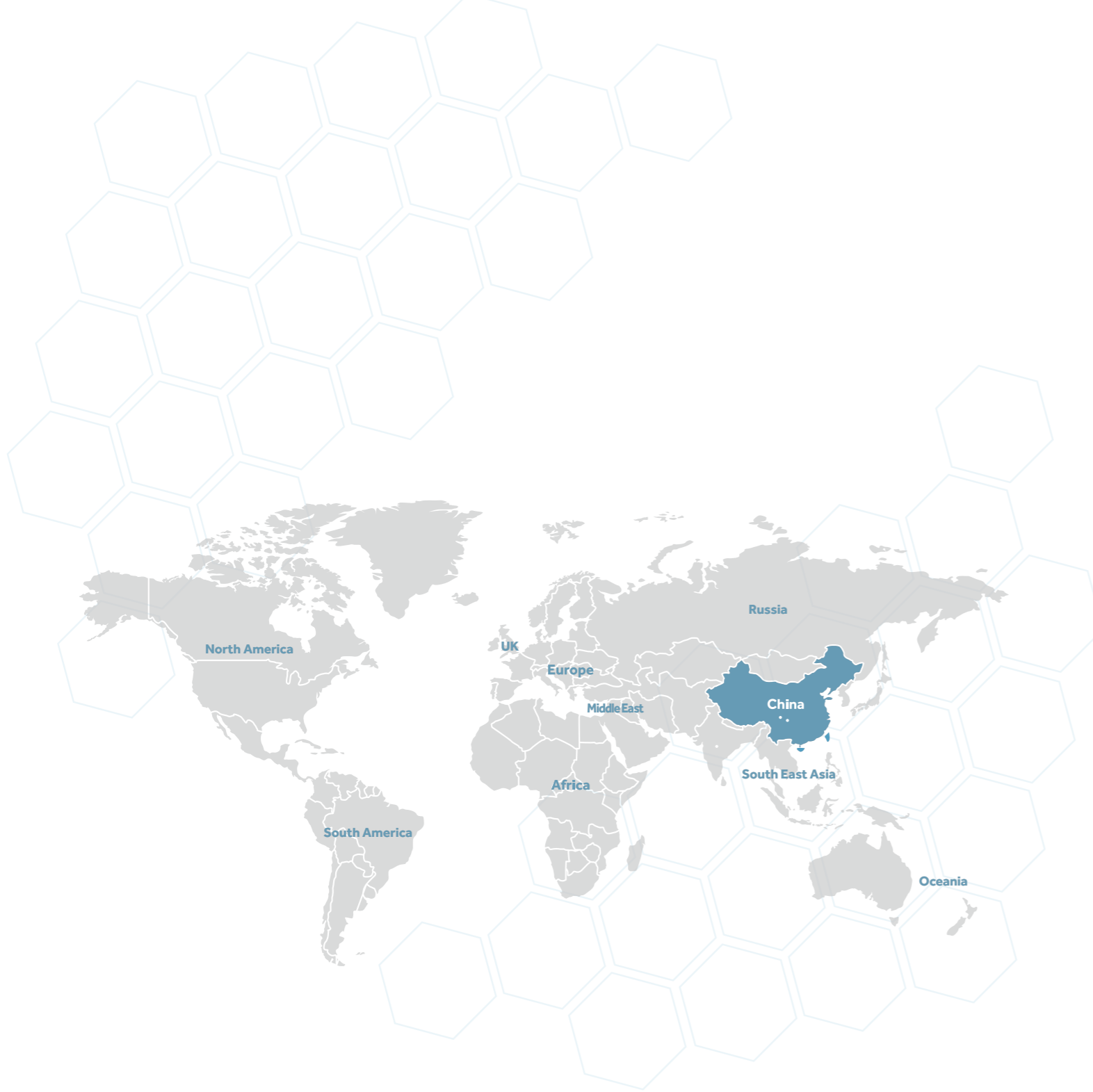


Blood Bank Refrigerator Solutions

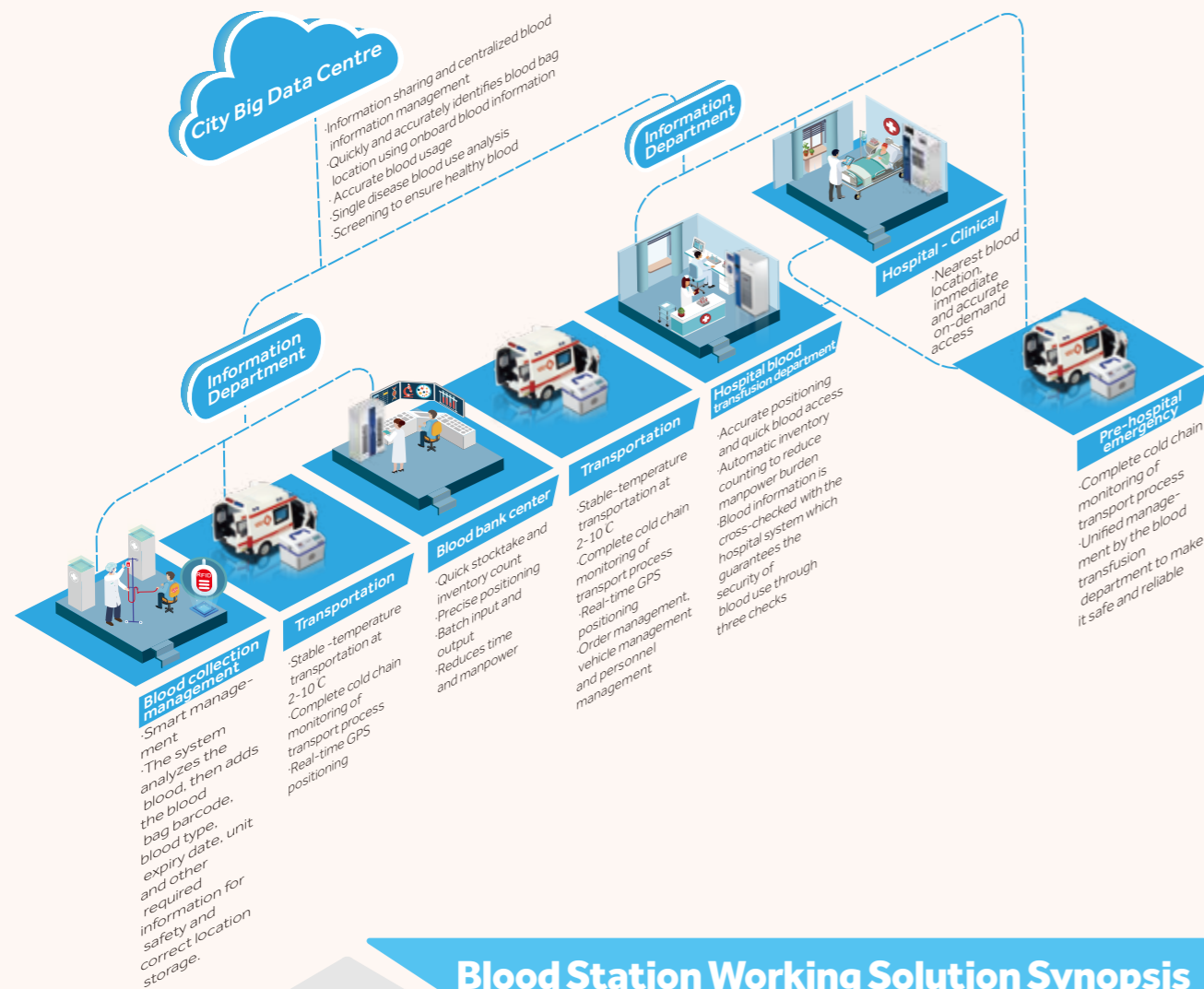


JAN 2021



Blood Network Solution

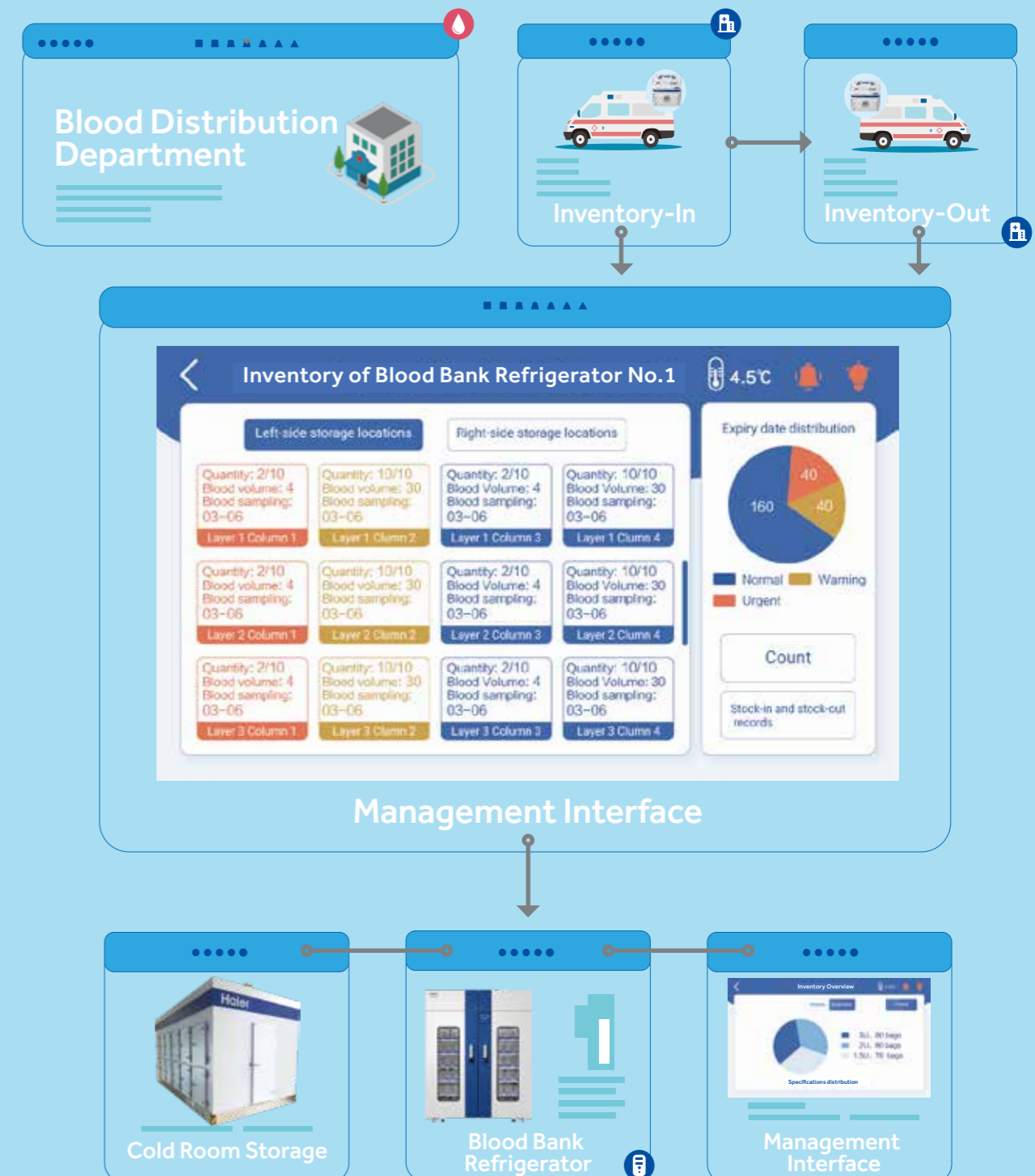
IoT Intelligent Blood Safety Management provides a unified and secure systemized platform for the entire region's blood supply. IoT is linked with the data management system and builds blood information that interconnects between a region's blood transfusion centre and/or central blood bank and the blood usage within the hospitals through establishment of a unified blood management platform. The blood use database is strengthened by the system's surveillance of the overall process from blood collection to clinical use or from vein to vein. Through the IoT Intelligent Blood Safety Management, it guarantees total blood quality and safety across the region health network.



Blood Station Working Solution Synopsis

By adding RFID tags to blood bags and either scanning or writing the information, this program ensures accurate positioning of blood products with the intelligent IoT information management system. Through batch verification, quality information control, batch storage accuracy, transport of blood from collection to clinical transfusion, this system enhances the blood quality and safety across the entire health network.

The main aim of the scheme is to strengthen the blood information management from collection to clinical infusion, enhancing blood quality and safety. It is achieved by using an RFID read-write device, RFID detector, RFID walk-in cold room, transfer boxes and blood bank refrigerators which feed data into an IoT blood solution ecosystem. Information such as, blood products batch scanning, batch check information, quality control information, batch stock-in and stock-out, quick inventory count, accurate positioning, information statistics, cold chain storage information, transport information and blood bank product movements can be assimilated to provide a complete picture of an organization's blood management and supply network.

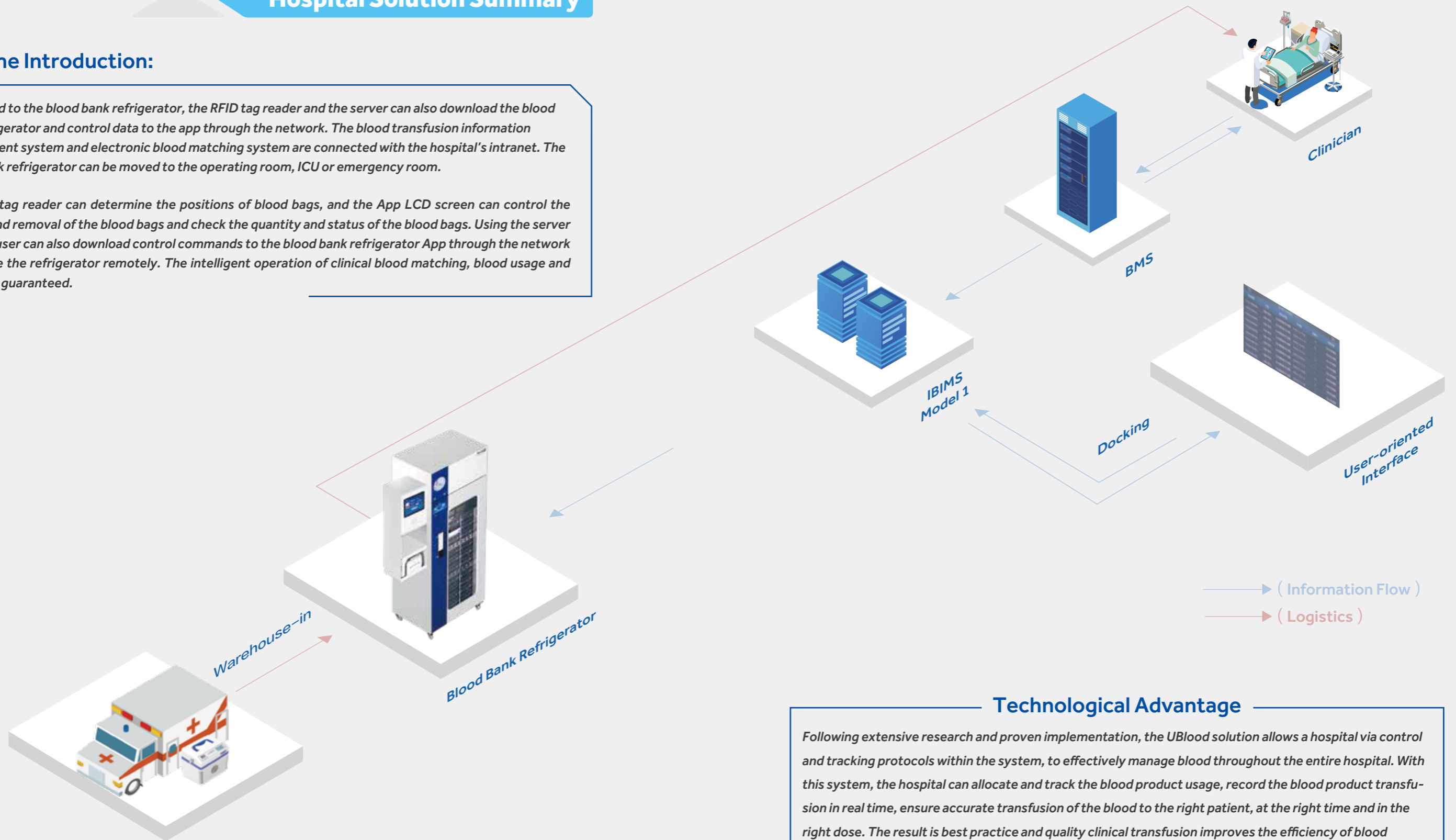


Hospital Solution Summary

Scheme Introduction:

Connected to the blood bank refrigerator, the RFID tag reader and the server can also download the blood bank refrigerator and control data to the app through the network. The blood transfusion information management system and electronic blood matching system are connected with the hospital's intranet. The blood bank refrigerator can be moved to the operating room, ICU or emergency room.

The RFID tag reader can determine the positions of blood bags, and the App LCD screen can control the storage and removal of the blood bags and check the quantity and status of the blood bags. Using the server data, the user can also download control commands to the blood bank refrigerator App through the network to operate the refrigerator remotely. The intelligent operation of clinical blood matching, blood usage and safety are guaranteed.



→ (Information Flow)
 → (Logistics)

Technological Advantage

Following extensive research and proven implementation, the UBlood solution allows a hospital via control and tracking protocols within the system, to effectively manage blood throughout the entire hospital. With this system, the hospital can allocate and track the blood product usage, record the blood product transfusion in real time, ensure accurate transfusion of the blood to the right patient, at the right time and in the right dose. The result is best practice and quality clinical transfusion improves the efficiency of blood management and the blood use safety for blood recipients.

Blood Station Product Overview

Cold Room Storage



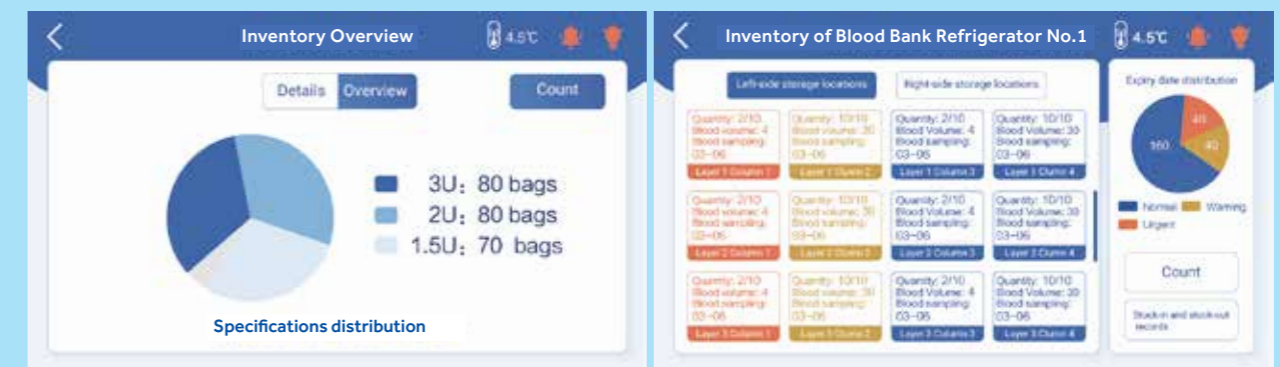
Product Features

- Large 10-inch screen PLC intelligent control system provides users with clear display of storage conditions.
- PLC intelligent control system with self-diagnostics alerts users in the event of a malfunction.
- Cold air leakage is reduced as the air cooling fan stops when the door is opened and it is equipped with door open sensor and alarm.
- Dual refrigeration system switches automatically in case of fault of one system and the laminar air flow supply device within the unit ensures the temperature uniformity of $\pm 2^{\circ}\text{C}$.
- Energy-saving liquid self-cooling technology cools the liquid by more than 5°C through the use of melted ice and reduces energy consumption by 5%.
- Certified ISO13485 medical device quality management system.
- Complies to the WHO/PQS quality and safety certification.

Blood Bank Refrigerator



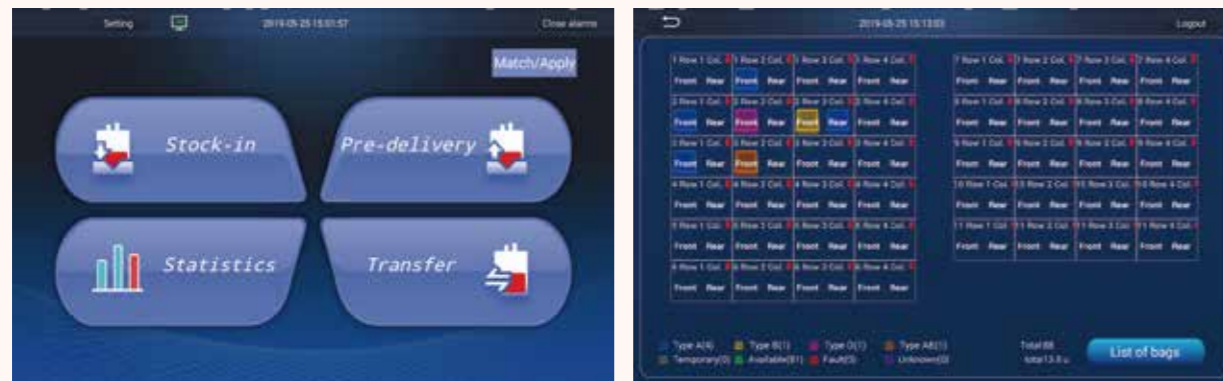
- **Smart IoT scientific and intelligent inventory management:** the blood inventory management App ensures accurate, real-time and automatic management of stock-in and stock-out information.
- **RFID precise positioning and visual management:** automatic RFID identification ensures intelligent and dynamic positioning of the blood bags, guides users precisely for accurate and swift blood bag identification and removal.
- **Intelligent and fully interactive visual blood bank management:** with the touch of one button, or via the refrigerator App, view statistics and query of the blood donation code, product code, blood type, blood volume, expiry date and other information of the blood bags in stock. Clearly displaying the storage location of the blood with the closest expiry date to ensure first-in first-out management practices.
- **The refrigerator or freezer has a built-in RFID read-write device:** to ensure state of the art inventory count using a simple one-button protocol, the inventory information is displayed in real-time to fast track the bag from the blood bank to the required location.
- **Accurate positioning:** users can quickly query and find the location of any blood bag stored at the blood bank.
- **Information is accurate and reliable:** the blood information stored in the RFID tag is encrypted with read-only information to ensure that such information cannot be deleted or tampered with, and thus is safe, secure and reliable.



Software management interface

Hospital Blood Department Products

Blood Bank Refrigerator



Software management interface

Functional Characteristics

- The system ensures accurate blood positioning and one-stop blood access to reduce the door opening duration of the blood bank refrigerator, guaranteeing the blood storage environment and ensuring blood quality and safety.
- No need for manual count; on each occasion when the blood bank refrigerator is closed, the automatic inventory counting mechanism will be activated to automatically count and update the inventory levels.
- Intelligent inventory management follows the first-in-first-out principle to improve the efficacy of blood transfusions; the blood delivery process goes through three checks to ensure the security of the blood transfusion.
- The Blood bank is accessible within the operating room ensuring priority to blood matching from the blood bank refrigerator within the operating area, ensuring immediate blood collection and zero wastage.



Transport Cooler

The transport cooler is a specially designed transport temperature/humidity controlled storage device with integral wireless monitoring to transport blood products and biological samples.



Functional Characteristics

- Equipped with cold chain monitoring module for temperature and humidity:
 - * Displays data in real-time and information is uploaded to the cloud platform for query through the 4G module.
 - * GPS positioning allows users to query the movement and track the transport cooler in real time.
 - * Camera monitoring to automatically identify whether there are stored items in the cooler to prevent stored items being left in error.
- Storage temperature is maintained at 2-6°C once the cooler is fully charged; the transfer temperature can be maintained at 2-10°C with no power.
- Storage security is enhanced with NFC swipe card module, lock/unlock status information is uploaded in real-time.
- 12V and 100-240V power supply for in-vehicle operation.
- Energy-efficient optimized semi-conductor refrigeration technology.

Blood Bank Refrigerator



Product Line

Automated Blood Management Refrigerator
Used at Blood Station



HXC-429TR HXC-629TR HXC-1369TR

Automated Blood Management Refrigerator
Used at Hospital



HXC-149R HXC-429R HXC-629R

Unattended Self-help Blood
Distribution Refrigerator



HXC-629ZZ

Automated Blood Management Refrigerator
with Touch Screen



HXC-149T HXC-429T HXC-629T HXC-1369T

Automated Blood Management Refrigerator
with LED Display



HXC-149 HXC-429 HXC-629 HXC-1369

Standard Blood Bank Refrigerator



HXC-158 HXC-158B

Automated Blood Management Refrigerator



HXC-429TR

HXC-629TR

HXC-1369TR

Information Statistics

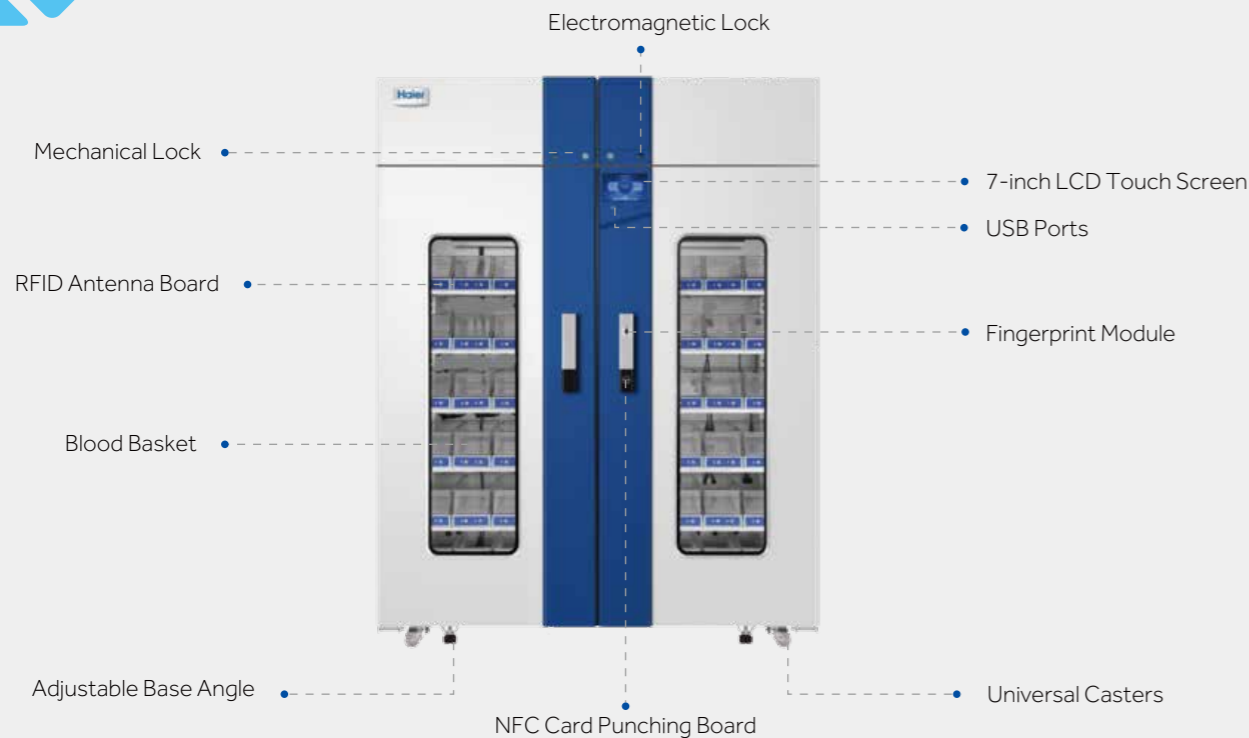
- Blood donation code, product code, blood type, blood volume, expiration date and other information of the stored blood bag can be inquired at the client terminal or refrigerator App with one-click statistics, which can clearly display the blood storage location of blood bag with the most recent expiration date, satisfying the management principle of first-in-first-out.

Precise Positioning

- It can quickly inquire and position the location information of any blood bag in the finished goods inventory.
- Smart inventory check, one-key inventory check.
- The refrigerator or cold storage has a built-in RFID read-write board to achieve fast inventory check of the physical information in the finished goods inventory with real-time inventory information display to quickly complete and confirm the blood stock handover.

Information Security

- The blood information in the RFID tag is encrypted, the information is read-only to ensure that the data cannot be deleted, changed or falsified to ensure the safety and reliability of blood products.



- Microcomputer Control**
 The temperature inside the unit is controlled within $4\pm 1^{\circ}\text{C}$ with temperature control accuracy of 0.1°C , and the large high-definition LCD touch screen display makes it convenient to observe.
- Inverter Compressor**
 High efficiency and energy saving, low noise and long service life.
- Three-layer Glass Foam Door**
 With large viewing three-layer glass foam door design, surface glass with LOW-E film to reduce heat transfer efficiency with no condensation at 25°C , and 85% humidity environment.
- Standard USB Port**
 With optional disc temperature recorder.

- Multiple Fault Alarms**
 High/low temperature alarm, power failure alarm, door ajar alarm, sensor error alarm, and low battery alarm. It is configured with remote alarm interface with two alarm modes (sound buzzer alarm and light flashing alarm).
- Speed Control Condenser Fan**
 High efficiency and energy saving, low noise and long service life.
- Double Protection of Door Mechanical Lock and Electromagnetic Lock**
 Electromagnetic lock can realize NFC card punching unlocking and fingerprint unlocking function.

Information Flow



Operation Instructions

Blood Bag Inbound:



Blood Bag Outbound:



Specifications

Product Model No.	Voltage (V/Hz)	Internal Temperature (°C)	External Dimension (W*D*H mm)	Internal Dimension (W*D*H mm)	Effective Volume (L)	NW / GW (Kg)	Stainless Steel Shelf (layer)	Loading Capacity (400ml bags)
HXC-429TR	220/50	4±1	625*940*1830	505*680*1315	429	190/230	5	120
HXC-629TR	220/50	4±1	765*940*1980	644*680*1456	629	235/280	6	192
HXC-1369TR	220/50	4±1	1545*940*1980	1425*680*1456	1369	430/490	6	384

Automated Blood Management Refrigerator with Touch Screen

Product Features

Information Statistics

- Real-time control and monitoring of blood information in the cabinet is possible via built-in smart blood management APP and cloud network connection. Blood product information and temperature are available in large LCD display.



Control Interface

- The intuitive high-definition LCD touch screen can display temperature graph, working status, events and alarm records.



Microcomputer Control

- A dual control system of six high-precision sensors and mechanical thermostat ensures that the temperature inside the cabinet is maintained at 4±1°C.

Stable and Reliable Operation

- The refrigeration system is powered with a high-quality, energy-efficient inverter compressor and variable speed fan motors. Temperature control responses quickly and reliably for a more uniform temperature using less power and lower noise.



Multiple Safety Protection

- Multiple alarms include high and low temperature, power failure, door ajar, sensor error, and low battery. Sound buzzer, visual flashing light and remote contacts are standard alarm features. Built-in battery provides power to the alarm system in the event of a main power failure. Fingerprint and standard NFC swipe card module are optional.

Multiple storage partitions are provided. Management of blood products by types and expiration dates is easy and efficient



HXC-1369T



Specifications

Model		HXC-149T	HXC-429T	HXC-629T	HXC-629TB	HXC-1369T	
Technical Data	Type	Drawer-Type	Drawer-Type	Drawer-Type	Drawer-Type	Drawer-Type	
	Climate Class	N	N	N	N	N	
	Cooling Type	Forced Air Cooling	Forced Air Cooling	Forced Air Cooling	Forced Air Cooling	Forced Air Cooling	
	Defrost Mode	Auto	Auto	Auto	Auto	Auto	
	Refrigerant	R600a	R600a	R600a	R600a	R600a	
	Sound Level (dB(A))	39	40	40	41	41	
Performance	Temperature Range (°C)	4±1	4±1	4±1	4±1	4±1	
	Ambient Temperature (°C)	16-32	16-32	16-32	16-32	16-32	
Control	Controller	Microprocessor	Microprocessor	Microprocessor	Microprocessor	Microprocessor	
	Display	LCD Touchscreen	LCD Touchscreen	LCD Touchscreen	LCD Touchscreen	LCD Touchscreen	
Electrical Data	Power Supply (V/Hz)	220-240/50/60	220-240/50/60	220-240/50/60	115/60	220-240/50/60	
	Power (W)	240	245	255	255	320	
	Electrical Current (A)	1.4	1.5	1.5	3	2	
Dimensions	Capacity (L/Cu.Ft)	149/5.3	429/15.1	629/22.2	629/22.2	1369/48.3	
	Blood Storage Capacity (450ml blood bags)	60	195	312	312	624	
	Net/Gross Weight (approx)	kg	108/136	182/217	212/252	212/252	380/445
		lbs	237.6/299.2	400.4/477.4	466.4/554.4	466.4/554.4	836/979
	Interior Dimensions (W*D*H)	mm	505*560*610	505*680*1315	645*680*1455	645*680*1455	1425*680*1455
		in	19.7*32.3*23.8	19.7*26.5*51.3	25.2*26.5*56.7	25.2*26.5*56.7	55.6*26.5*56.7
	Exterior Dimensions (W*D*H)	mm	625*775*1150	625*940*1830	765*940*1980	765*940*1980	1545*940*1980
		in	24.4*30.2*44.9	24.4*36.7*71.4	29.8*36.7*77.2	29.8*36.7*77.2	60.3*36.7*77.2
	Packing Dimensions (W*D*H)	mm	720*920*1220	725*985*1940	875*995*2090	875*995*2090	1610*995*2090
		in	28.1*35.9*47.6	28.3*38.4*75.7	34.1*38.8*81.5	34.1*38.8*81.5	62.8*38.8*81.5
Container Load (20'/40'/40'H)		18/38/76	18/35/35	12/26/26	12/26/26	7/14/14	
Alarms	High/Low Temperature	Y	Y	Y	Y	Y	
	Power Failure	Y	Y	Y	Y	Y	
	Sensor Error	Y	Y	Y	Y	Y	
	Low Battery	Y	Y	Y	Y	Y	
	Door Ajar	Y	Y	Y	Y	Y	
	Remote Alarm	Y	Y	Y	Y	Y	
Accessories	Caster	4	4	4	4	4	
	Foot	2	2	2	2	2	
	Porthole	Y	Y	Y	Y	Y	
	Baskets	6	15	24	24	48	
	Shelves/Drawers	0/2	0/5	0/6	0/6	0/12	
Others	USB Interface	Y	Y	Y	Y	Y	
	Temperature Recorder	Y	Y	Y	Y	Y	
	Certification	CE, UL	CE, UL	CE, UL	UL	CE, UL	

Product appearance and specifications are subject to change without notice

Automated Blood Management Refrigerator with LED Display

Product Features **Dual Temperature Control Technology**

- Refrigeration system is designed with an inverter compressor and dual-speed fans, providing an optimal temperature performance of $4\pm 1^{\circ}\text{C}$ inside the cabinet to safeguard stored products.

With Multiple Temperature Control to Guarantee Constant and Precise Temperature

- The inside temperature is constant within $4\pm 1^{\circ}\text{C}$, the digital temperature display resolution at 0.1°C .
- Equipped with 6 high-precision sensors and a mechanical thermostat which enables more accurate air cooling and temperature control to ensure uniform temperature inside the unit, maintained within the specified temperature range.
- The multi-layer inner door design reduces thermal loss after door openings and further ensures the temperature stability inside the cabinet.



HXC-429

**With Multiple Safety Guarantees to Provide Worry-Free Service**

- Equipped with complete alarm function, including alarm on high and low temperature, power failure, door ajar, sensor error, and low battery. Two alarm modes including audible buzzer and visual lights with remote alarm interface.
- Back-up battery design ensures alarm and temperature readings continue to operate in the event of a main power failure.
- NFC swipe card module, with safer storage management.

Standard USB Interface

- Ability to record temperature data for ten years by using the USB.
- Interface, disc temperature recorder is also available.

**NFC Rights Management**

- NFC rights management system is designed with an electromagnetic lock with controllable, checkable and traceable flow direction, providing safer blood management.

Specifications

	Model	HXC-149	HXC-429	HXC-629	HXC-629B	HXC-1369	
Technical Data	Type	Basket-Type	Basket-Type	Basket-Type	Basket-Type	Basket-Type	
	Climate Class	N	N	N	N	N	
	Cooling Type	Forced Air Cooling	Forced Air Cooling	Forced Air Cooling	Forced Air Cooling	Forced Air Cooling	
	Defrost Mode	Auto	Auto	Auto	Auto	Auto	
	Refrigerant	R600a	R600a	R600a	R600a	R600a	
	Sound Level (dB(A))	39	40	40	41	41	
Performance	Temperature Range ($^{\circ}\text{C}$)	4 ± 1	4 ± 1	4 ± 1	4 ± 1	4 ± 1	
	Ambient Temperature ($^{\circ}\text{C}$)	16-32	16-32	16-32	16-32	16-32	
Control	Controller	Microprocessor	Microprocessor	Microprocessor	Microprocessor	Microprocessor	
	Display	LED	LED	LED	LED	LED	
Electrical Data	Power Supply (V/Hz)	220-240/50/60	220-240/50/60	220-240/50/60	115/60	220-240/50/60	
	Power(W)	215	245	255	255	320	
	Electrical Current (A)	1.3	1.5	1.5	3	2	
Dimensions	Capacity (L/Cu.Ft)	149/5.3	429/15.1	629/22.2	629/22.2	1369/48.3	
	Blood Storage Capacity (450ml blood bags)	60	195	312	312	624	
	Net/Gross Weight (approx)	kg	97/125	169/204	187/217	187/217	345/410
		lbs	213.4/ 275	371.8/448.8	411.4/477.4	411.4/477.4	759/902
	Interior Dimensions (W*D*H)	mm	505*560*610	505*680*1315	645*680*1455	645*680*1455	1425*680*1455
		in	19.7*32.3*23.8	19.7*26.5*51.3	25.2*26.5*56.7	25.2*26.5*56.7	55.6*26.5*56.7
	Exterior Dimensions (W*D*H)	mm	625*820*1150	625*940*1830	765*940*1980	765*940*1980	1545*940*1980
		in	24.4*30.2*44.9	24.4*36.7*71.4	29.8*36.7*77.2	29.8*36.7*77.2	60.3*36.7*77.2
	Packing Dimensions (W*D*H)	mm	720*920*1220	725*985*1940	875*995*2090	875*995*2090	1610*995*2090
		in	28.1*35.9*47.6	28.3*38.4*75.7	34.1*38.8*81.5	34.1*38.8*81.5	62.8*38.8*81.5
Alarms	Container Load (20'/40'/40'H)	18/38/76	18/35/35	12/26/26	12/26/26	7/14/14	
	High/Low Temperature	Y	Y	Y	Y	Y	
	Power Failure	Y	Y	Y	Y	Y	
	Sensor Error	Y	Y	Y	Y	Y	
	Low Battery	Y	Y	Y	Y	Y	
	Door Ajar	Y	Y	Y	Y	Y	
	Remote Alarm	Y	Y	Y	Y	Y	
Accessories	Caster	4	4	4	4	4	
	Foot	2	2	2	2	2	
	Porthole	Y	Y	Y	Y	Y	
	Baskets	6	15	24	24	48	
	Shelves/Drawers	2/0	5/0	6/0	6/0	12/0	
	Inner Doors	2	5	6	6	12	
	USB Interface	Y	Y	Y	Y	Y	
Others	Temperature Recorder	Y	Y	Y	Y	Y	
	Certification	CE, UL	CE, UL	CE, UL	UL	CE, UL	

Product appearance and specifications are subject to change without notice



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