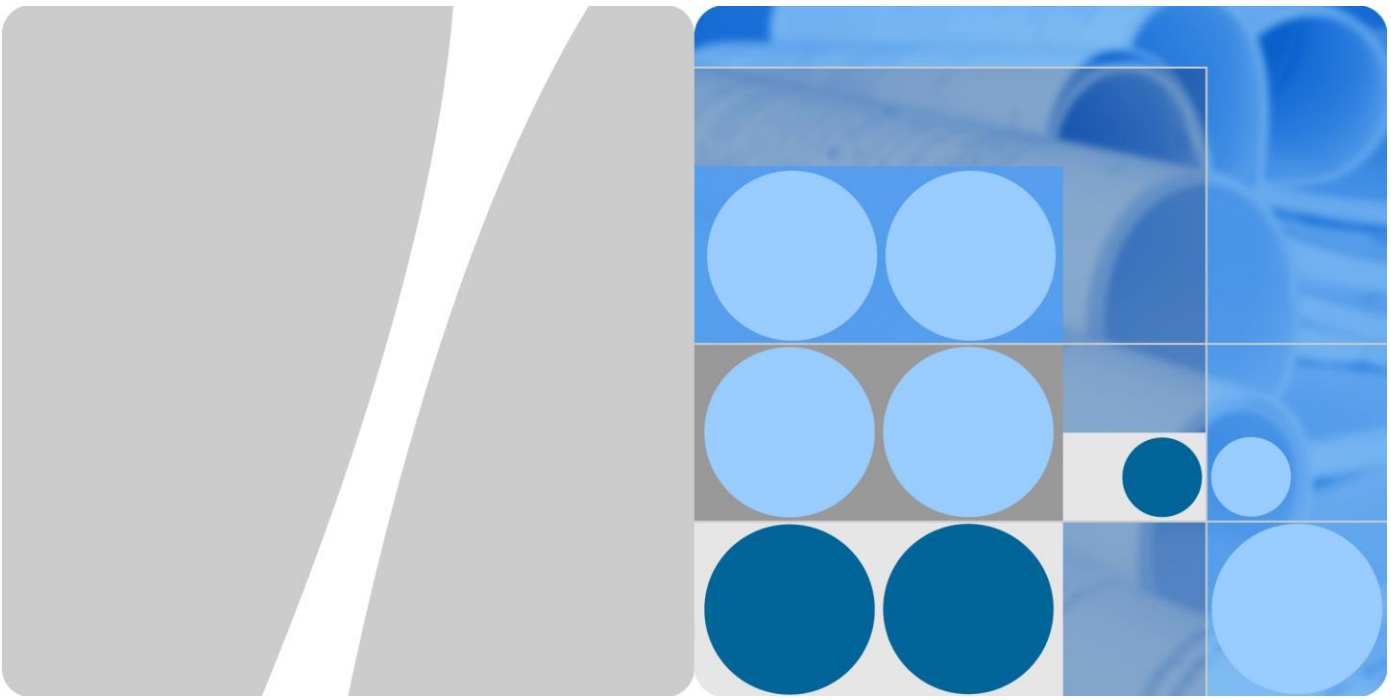


NetCol5000-A020 Air Cooled In-row Precision Air Conditoner V100R002

Product Description

Issue 02

Date 2014-07-04

HUAWEI TECHNOLOGIES CO., LTD.

Trademarks and Permissions


and other Huawei trademarks are trademarks of Huawei Technologies Co., Ltd.

All other trademarks and trade names mentioned in this document are the property of their respective holders.

Notice

The purchased products, services and features are stipulated by the contract made between Huawei and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope. Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied.

The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: http://www.huawei.com

Email: support@huawei.com

About This Document

Purpose

This document describes NetCol5000-A020 In-row precision air conditioner in terms of its model description, positioning, benefits, composition, typical application scenarios, environmental specifications, and technical specifications.

Intended Audience

This document is intended for:

- Sales personnel
- Technical support personnel
- System engineers

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
NOTE	Calls attention to important information, best practices and tips.

Symbol	Description
	NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Issue 02 (2014-07-04)

Modify the figure criterion and add some specifications in chapter 7.

Issue 01 (2013-12-24)

This issue is used for first office application (FOA).

Contents

1 Model Description

Figure 1-1 shows the naming rule for the NetCol5000-A series products.

Figure 1-1 Naming rule for the NetCol5000-A020

NetCol	5000	-	A	020	H	M	1	1	N	1	E	1	2	0	E	0
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

1 Date center Cooling Product

2 Model Range
- 2000- In Cabinet Cooling Product
- 5000- In Row Cooling Product
- 8000- In Room Cooling Product

3 Hyphen

4 System Type
- A - Air Cooled
- W - Water Cooled
- G - Glycol Cooled
- C - Chilled Water
- F - Free Cooling
- P - Air Cooled + Chilled Water
- Q - Water Cooled + Chilled Water
- R - Glycol Cooled + Chilled Water
- T - Air Cooled + Loop Thermal Siphon

5 Cooling Capacity
- 020 - Cooling Capacity 20kW
- 035 - Cooling Capacity 35kW
- 100 - Cooling Capacity 100kW

6 Air Discharge
- U - Up Flow
- D - Down Flow
- H - Horizontal Flow

7 Power Supply
- M- 380-415V,3PH,50Hz
- N- 208-230V,3PH,60Hz
- P- 220-240V,3PH,50Hz
- Q- 380V,3PH,60Hz
- R- 460-480V,3PH,60Hz
- S- 220-240V,1PH,50Hz
- T- 208-230V,1PH,60Hz
- U- 277V,1PH,60Hz
- D- 48VDC
- 1- 200-277V,1PH,50/60Hz
- 2- 200-240V,1PH,50/60Hz
- 3- 200-240V,3PH,50/60Hz
- 4- 380-415V,3PH,50/60Hz
- 5- 380-480V,3PH,50/60Hz

8 Cooling System
- 1- R410A Single System
- 2- R410A Dual System
- 3- R407C Single System
- 4- R407C Dual System
- 5- R22 Single System
- 6- R22 Dual System
- 7- R134a Single System
- 8- R134a Dual System
- A- Chilled Water with Three Way Valve
- B- Chilled Water with Two Way Valve
- C-Others

9 Fan Type
- 1- AC Fan
- 2- EC Fan
- 3- DC Fan

10 Compressor Type
- 0- No Compressor
- N- ON-OFF
- D- DC Inverter

11 Filter Grade
- 0- None
- 1- G3
- 2- G4
- 3- F5

12 Humidifier
- 0- None
- R- Infrared Humidifier
- E- Electrode Humidifier

13 Re-Heating
- 0- None
- 1- Electric Heating 1 Level
- 2- Electric Heating 2 Level

14 Monitoring
- 0- No Card
- 1- Web Only
- 2- 485 Only
- 3-Web&485

15 Sensors
- 0- None
- S- Smoke Temperature
- F- High Temperature
- B-Smoke & High Temperature

16 Packaging
- D- Domestic
- E- Export

17 Order Special Features
- 0- None
- 1- Condensate Pump

2 Positioning

With rapid development of high-density data centers, traditional room-level temperature control products are facing severe challenges in heat dissipation, energy conservation, and environmental friendliness. To meet customer's increasing requirements for new services, Huawei develops NetCol5000-A020, a row-level temperature control system.

The NetCol5000-A020 solves data center problems caused by high density, such as, heat dissipating issues, high power consumption for cooling, and high power usage effectiveness (PUE). In addition, the NetCol5000-A020 is compatible with existing standard cabinets and supports cabinet combination.

The NetCol5000-A020 is a precision environment control system for equipment rooms and data centers. It provides an optimal operating environment for precision equipment, such as sensitive equipment, industrial equipment, communications equipment, and computers.

3 Benefits

The NetCol5000-A020 features efficient cooling, energy efficiency, high adaptability, quick installation, and easy maintenance, and provides multiple power modes, and intelligent monitoring.

Efficient Cooling

- The highly efficient industrial fixed frequency scroll compressor greatly reduces power consumption.
- Fans draw in air with stepless speed adjustment.
- The air supply temperature can be precisely controlled to reduce power consumption.
- The NetCol5000-A020 with optimal configurations adopts highly efficient refrigeration coils and pipes to ensure efficient heat exchange.

Saving Energy and Space

- The brand power-efficient scroll compressor is used, greatly reducing power consumption.
- Compared with a common fan, the indoor fans consume less power, have high efficiency and optimal speed adjustment, and save 30% more energy.
- The highly efficient control logic algorithm implements precise temperature adjustment and control, saving energy.
- NetCol5000-A020 devices are connected over a controller area network (CAN) bus to achieve group control, which efficiently saves energy.
- The NetCol5000-A020 has a small footprint (width: 300 mm), saving space.

High Reliability

- The auto-adaptative hot gas bypass technology greatly reduces NetCol5000-A020 startup and shutdown times, reducing component failures and extending the lifespan of key components.
- The positive temperature coefficient (PTC) heater provides multiple protection mechanisms by manual and automatic reset.
- The electrode humidifier provides stepless adjustment of humidification capacity and precise control of humidity in equipment room.
- The solenoid valve controls refrigerant migration, protecting the compressor. The check valve prevents return of refrigerant, reducing pipe vibration when the unit is powering on or off.

Various Working Conditions

- By integrating a power-efficient scroll compressor and the highly efficient control logic algorithm, it applies to T1 and T3 working conditions.
- The NetCol5000-A020 can work outdoors at a minimum temperature of –15 ℃ and a maximum temperature of 52 ℃.

Multiple Power Modes

The NetCol5000-A020, equipping with various voltage jumpers, is compatible with power supplies of 380 to 415 V in three phases at 50 Hz and 380 V in three phases at 60 Hz, applying to various scenarios in different countries.

High Compatibility

- Structure compatibility: The NetCol5000-A020 cabinet can be combined with 2 m high and 1 or 1.2 m wide cabinets in a data center.
- Function compatibility: Pipes can be routed from the bottom. Heaters and humidifiers can be configured as required.

Intelligent Monitoring

- You can monitor and configure the NetCol5000-A020 on a terminal device.
- The 7-inch true color-sensitive LCD displays the running mode and status of the equipment. You can set parameters through the TFT, achieving friendly man-machine interaction.

Quick Installation

To put the NetCol5000-A020 into use, you only need to adjust leveling feet, connect refrigerating, water inlet and drainage pipeline, power cables, signal cables and communications cables, and vacuumize and charge refrigerant.

Easy Maintenance

- You can maintain main components from the front and rear doors onsite, simplifying maintenance.
- The compressor connects to pipes using RotaLock valves, and the filter drier connects to pipes in a threaded manner, which avoids the welding process.

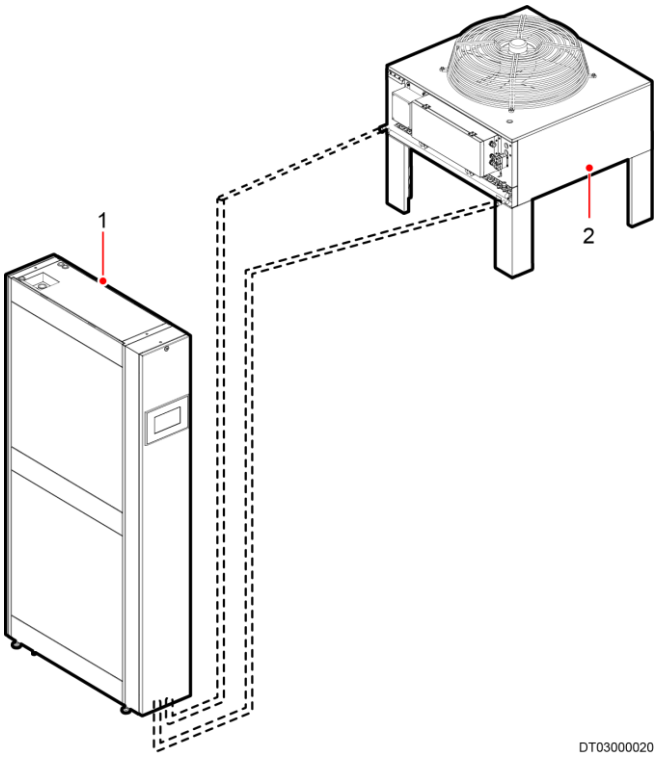
4 Composition

4.1 Overview

The NetCol5000-A020 consists of an evaporator, a fixed frequency compressor, an outdoor air-cooled condenser, throttle device, and pipe valves. The fans draw in indoor hot air and deliver the air to the evaporator with heat transmitted to the refrigerant. The compressor then delivers the refrigerant to the outdoor air-cooled condenser, releasing heat to outdoor environments. The indoor unit and outdoor air-cooled condenser implement heat dissipation through in closed refrigerant pipelines.

Figure 4-1 shows the NetCol5000-A020 composition.

Figure 4-1 NetCol5000-A020 composition



(1) Indoor unit (2) Outdoor unit

4.2 Key Components

4.2.1 Indoor Unit

Appearance

The indoor unit, which can be installed on an electrostatic discharge (ESD) floor, is combined with IT cabinets. It supports underfloor piping or underfloor and overhead cabling.

Figure 4-2 shows the appearance of an indoor unit.

Figure 4-2 Appearance

DT02000030

Composition

The indoor unit consists of a compressor, fan, evaporator, air filter, thermostatic expansion valve, check valve, dry filter, sight glass, the surge protective device (SPD), electric heater (optional), electrode humidifier (optional) , and low-temperature component(optional).

- Compressor

  The indoor unit uses the advanced fixed frequency scroll compressor to adapt to broad working conditions. It features good environment adaptability, precise temperature control, energy conservation, high reliability, low noise, long service time, and easy installation. The indoor unit uses R410A refrigerant, which is environmentally friendly.
- Fan

The indoor curves a fan from a high-end brand conserves 30% more energy than common fans, high reliability, and long service time.

- Evaporator

  The highly efficient finned-tube evaporator is made of threaded copper tubes and a hydrogen-plated layer and adopts the computational fluid dynamics (CFD) to improve heat exchange efficiency.

- Air filter

  The G3 air filter meets requirements for equipment room cleanness.

- Thermostatic expansion valve

  The external equalizer type thermostatic expansion valve automatically balances the refrigerant flow, ensuring efficient heat exchange and system reliability.

- Check valve

  The check valves efficiently controls air or liquid backflow.

- Dry filter

  The dry filter removes water from the refrigerant pipes and filters out foreign matters, which reduces the component damage rate and improves operating efficiency and reliability.

- Sight glass

  The sight glass allows you to observe the refrigerant flow and water capacity for easy maintenance and optimization.

- SPD

  The SPD enhances device security.

- Electric heater

  The positive temperature coefficient (PTC) heater provides multiple protection mechanisms to ensure operating security and reliability. The electric heater features quick start, large heating capacity, and even heating.

- Electrode humidifier

  The electrode humidifier provides stepless adjustment of humidification capacity and precise control of humidity in an equipment room.

- Low-temperature component

  Low-temperature component use intelligent condensing pressure control system to ensure the air conditioner working under -40 ℃. It use pressure stabilizer from a high-end brand, and modularity design makes installation easy.

4.2.2 Outdoor Unit

Model Description

Figure 4-3 shows the naming rule for the outdoor unit.

Figure 4-3 Naming rule for the outdoor unit

NetCol	500	-	A	072	R	C	1	1	E	X
1	2	3	4	5	6	7	8	9	10	11

1 Data Center Precision Air Conditioner

2 Number Series

500 - Outdoor Unit

3 Hyphen

4 System Type

A - Air Cooled

5 Heat Rejection Capacity

032 - Heat Rejection Capacity 32kW
038 - Heat Rejection Capacity 38kW
072 - Heat Rejection Capacity 72kW

6 Power Supply

M - 380-415V,3PH,50Hz
N - 208-230V,3PH,60Hz
P - 220-240V,3PH,50Hz
Q - 380V,3PH,60Hz
R - 460-480V,3PH,60Hz
S - 220-240V,1PH,50Hz
T - 208-230V,1PH,60Hz
U - 277V,1PH,60Hz
1 - 200-277V,1PH,50/60Hz
2 - 200-240V,1PH,50/60Hz
3 - 200-240V,3PH,50/60Hz
4 - 380-415V,3PH,50/60Hz
5 - 380-480V,3PH,50/60Hz

7 Climate

C - Common Ambient Temperature
L - Low Ambient Temperature

8 Cooling System

1 - R410A Single System
2 - R410A Dual System
3 - R407C Single System
4 - R407C Dual System
5 - R22 Single System
6 - R22 Dual System
7 - R134A Single System
8 - R134A Dual System
9 - Others

9 Fan Type

1 - AC Fan
2 - EC Fan
3 - DC Fan

10 Packaging

D - Domestic
E - Export

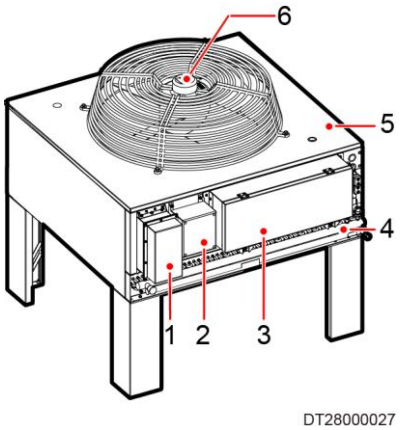
11 Order Special Features

0 - None
X - Non-Standard Feature

Appearance

A NetCol500 consists of a transformer, fan drive, a controller, a condenser, a rack, and fans, as shown in Figure 4-4, Table 4-1 shows the NetCol500 configuration.

Figure 4-4 NetCol500 outdoor unit composition



(1) Transformer (2) Fan drive (3) Controller

(4) Condenser (5) Rack (6) Fan

Table 4-1 NetCol500 configuration

Model	Composition
NetCol500-A0324	Fan drive, controller, condenser, rack, a fan
NetCol500-A0384	Fan drive, controller, condenser, rack, a fan

Technical Parameters

Figure 4-5 shows the dimensions of the NetCol500 series products.

Figure 4-5 Dimensions of the NetCol500 series products

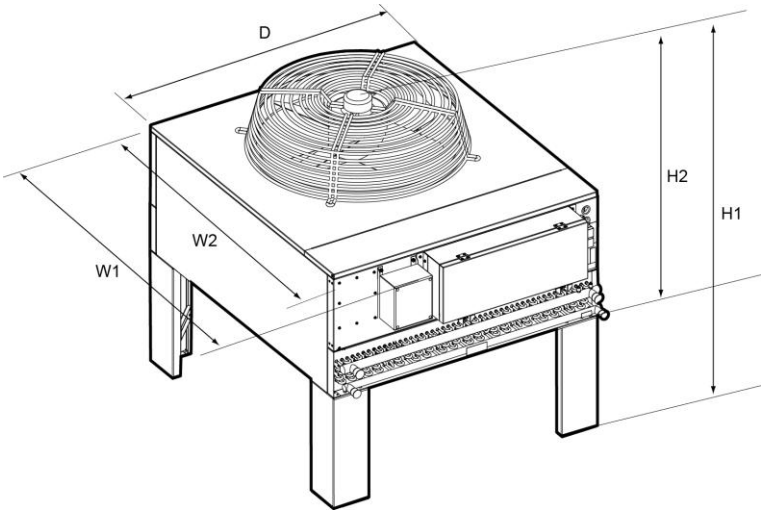


Table 4-2 lists the NetCol500 series products technical parameters.

Table 4-2 Technical specifications of the NetCol500-A038 (032) series products

Item	NetCol500-A0324	NetCol500-A0384
Power supply	380–415 V 3 Ph 50 Hz or 60 Hz	
Voltage tolerance [a]	Rated voltage ±10%	
Frequency tolerance	Rated frequency ±3 Hz	
Maximum current of the outdoor unit	2.5 A	
Air flow of fans	12000 m^3/h	
Number of fans	1	
H1 x W1	1160 × 1350 (1220) × 1094	

Item	NetCol500-A0324	NetCol500-A0384
(W2) x D (mm)		
H2 x W1 (W2) x D (mm)	714 × 1350 (1220) × 1094	
Weight	110 kg	
Certification	SASO, SONCAP, CE, RoHS, REACH	
Operating temperature [b]	–20 ℃ to +45 ℃	–20 ℃ to +55 ℃
Storage temperature	–40 ℃ to +70 ℃	
Storage humidity	5%–95% RH (non-condensing)	
Altitude	0–1000 m. If the altitude exceeds 1000 m, the NetCol500 power is derated Note For the detailed derated data, see the *NetCol Precision Air Conditioner User Manual* that were shipped to the site in a random accessories package.	
a: Recommended to add the voltage regulator in the front end if the power exceeds this range. Otherwise, air conditioner will generate frequency alarms and cannot run. b: The specific operating temperature need to match with the indoor unit.		

4.2.3 Controller

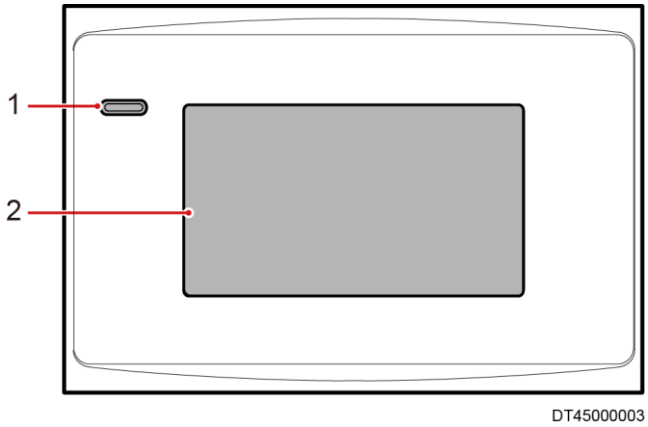
The controller consists of an LCD, main control board, humidification control board, temperature and humidity connection board.

LCD

The LCD is a 7-inch true color touchscreen that allows you to query information, set parameters, monitor the system, and perform maintenance.

Figure 4-6 shows an LCD.

Figure 4-6 LCD



(1) Indicator (2) Screen

Functions

The controller has the following functions:

- If only one NetCol5000-A020 is used, the controller provides logic control of components in the NetCol5000-A020 to meet temperature and humidity requirements.
- The LCD on the controller allows you to set the parameters for the NetCol5000-A020 and query its status.
- If multiple NetCol5000-A020 are used, the controller optimally distributes the heat load to reduce power consumption and provides backup to improve reliability.
- You can monitor, manage, and upgrade one or more NetCol5000-A020 using the remote management terminal.

Features

The controller has the following features:

- The controller provides a touchscreen with a user-friendly interface.
- The controller ensures high precision and quick response of the NetCol5000-A020.
- The multi-level password protection mechanism prevents misoperation.
- The controller protects the NetCol5000-A020 from overvoltage, undervoltage, abnormal power failures, and water leaks, ensuring system reliability.
- The LCD on the controller displays the operating status and time of the components in the NetCol5000-A020 in real time.
- The fault diagnosis system automatically displays the information of the current fault, which facilitates maintenance.
- The NetCol5000-A020 provides various external ports, such as RS232 ports, RS485 ports, fast Ethernet (FE) ports, and Universal Series Bus (USB) ports that are protected by a security mechanism.

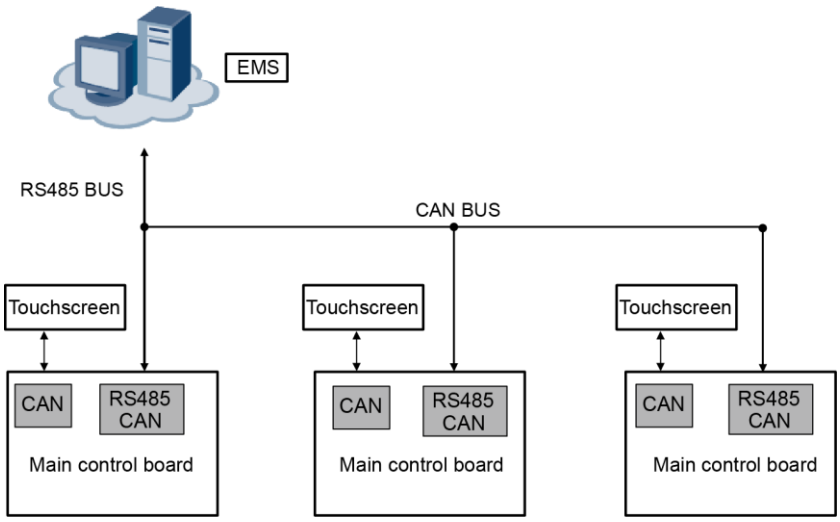
4.2.4 Monitoring System

The monitoring system provides logic control, data collection, control demand delivering, alarm reporting, data storage, user right management, and group control. You can connect your monitoring system to the monitoring system of the NetCol5000-A020 over a northbound port (RS485 or RS232) to perform remote management.

- The main control boards in the NetCol5000-A020 connect to each other over RS485 ports.
- A maximum of 32 NetCol5000-A020s can be connected in group control mode. You can specify a NetCol5000-A020 as the master and connect the master to the monitoring network diagram.

Figure 4-7 shows the network diagram of the NetCol5000-A020 monitoring system.

Figure 4-7 Group control diagram



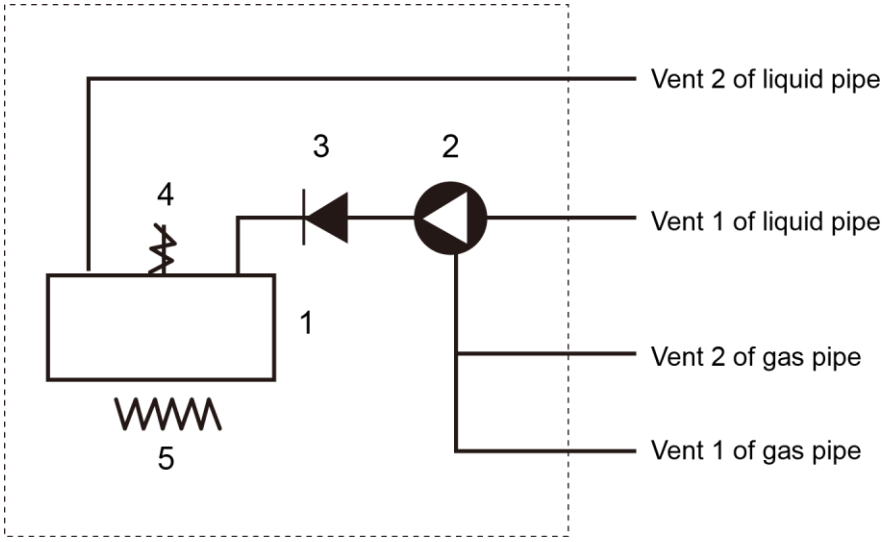
4.2.5 Low-temperature component(optional)

Functions

The condensate temperature is might lower than the safety running system of the compressor in natural heat dissipation, when the environment temperature is lower than the specified running temperature. The low-temperature component is used to increase the reliability of the whole system.

Low-temperature component use intelligent condensing pressure control system to ensure the air conditioner working under -40℃. When detecting the outdoor condensing pressure is too low, the regulator valve will automatically open to bypass hot gas to the reservoir, the condensing pressure is maintained to safe and reliable range. When detecting the condensing pressure is higher than set value, the regulator valve will automatically close.

Figure 4-8 The schematics diagram of low-temperature component



(1) Reservoir (2) Regulator valve (3) Check valve

(4) Safety valve (5) Electric heater

Features

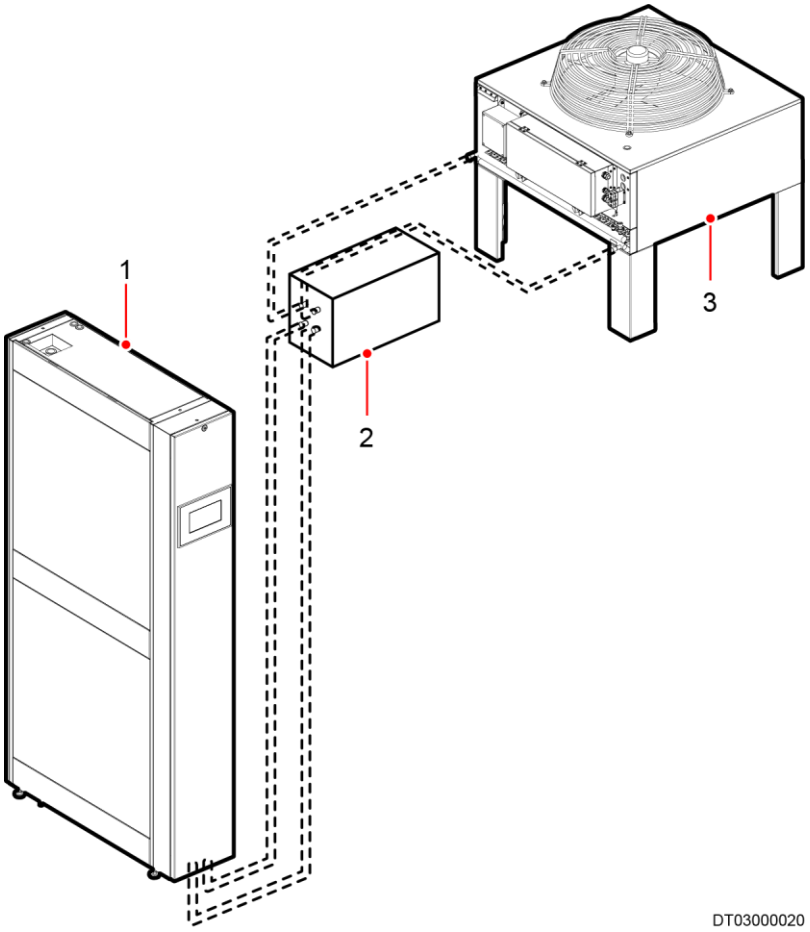
The component has the following features:

- Special design oriented to low temperature environment, can operate at -40℃;
- The condense pressure intelligent control system is adopted to ensure the safety operation under low temperature environment;
- Modular design, easy to install.

Install

Precision air conditioner components including low-temperature component are shown in Figure 4-9.

Figure 4-9 Installation diagram



(1) Indoor unit (2) Low-temperature component (3) Outdoor unit

4.3 Ports

Table 4-3 describes the ports on the NetCol5000-A020.

Table 4-3 Ports

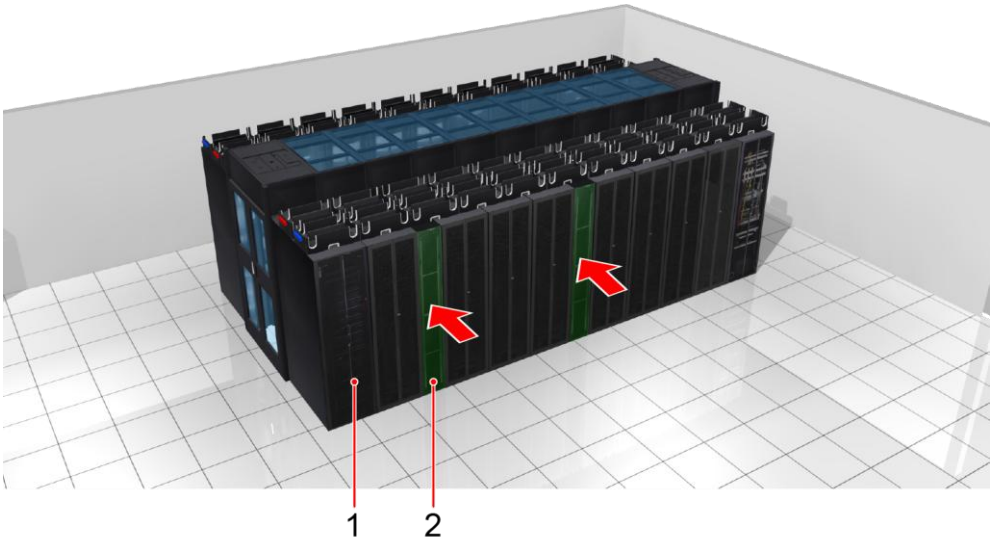
Item	Specifications
Refrigerant liquid pipe	Copper pipe, with an outer diameter of 0.5 inches and thickness of 0.75 mm, withstanding a pressure not smaller than 4.5 MPa, welding
Refrigerant gas pipe	Copper pipe, with an outer diameter of 0.625 inches and thickness of 1.0 mm, withstanding a pressure not smaller than 4.5 MPa, welding
Water injection pipe to the humidifier	Reserved interface: BSPP 0.75-inch thread connection

Item	Specifications
Condensate drainpipe	Reserved interface: copper pipe, with an outer diameter of 0.75 inches
Installation mode	Installed on an electrostatic discharge (ESD) floor
Pipe and cable routing	The cabinet supports overhead and underfloor cabling.

5 Typical Application Scenarios

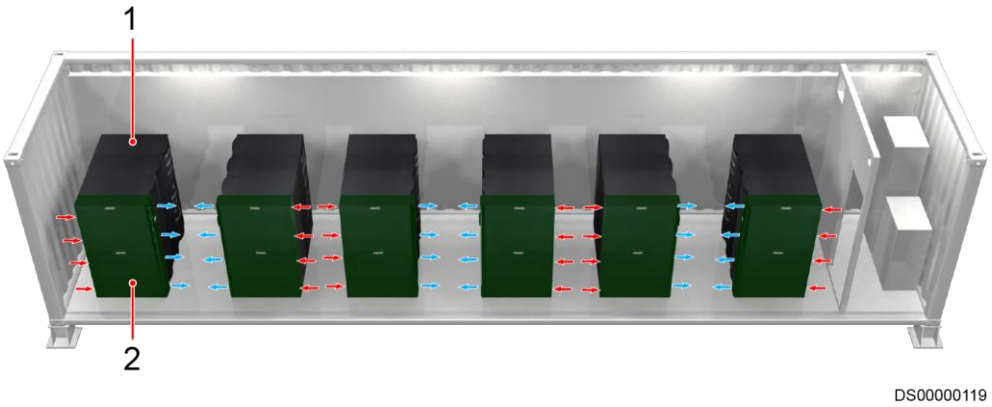
The NetCol5000-A020 applies to container data centers and modular data centers with cold-aisle containment and hot-aisle containment.

Figure 5-1 Modular data center with cold-aisle containment



(1) Equipment (2) NetCol5000-A020

Figure 5-2 Modular data center with hot-aisle containment



(1) Equipment (2) NetCol5000-A020

6 Environmental Specifications

Table 6-1 lists the environmental specifications of the NetCol5000-A020.

Table 6-1 Environmental specifications of the NetCol5000-A020

Item	Specifications
Indoor cooling temperature	18 ℃ to +45 ℃
Operating humidity	20% to 80% RH
Storage temperature	-40 ℃ to +70 ℃
Storage humidity	5% to 95% RH (non-condensing)
Altitude	0 to 1000 m (If the altitude is greater than 1000 m, the cooling performance deteriorates.)
Protection level	Indoor unit: IP20 Outdoor unit: IP54
Installation	Installed on an ESD floor
Pipe and cable routing	Underfloor piping, overhead or underfloor cabling

7 Technical Specifications

Table 7-1 and Table 7-2 list the technical specifications of the NetCol5000-A020.

Table 7-1 Technical specifications of the NetCol5000-A020

Item	NetCol5000-A020
Cooling Mode	Air cooled
Refrigerant	R410A single system
Air supply mode	Horizontal air supply
Air filter	G3 filter
Dimensions (H x D x W)	2000 mm x 300mm x 1000 mm
Net/Gross	230 kg/275 kg

Table 7-2 Technical specifications of the NetCol5000-A020

Item	NetCol5000-A020HM13N10020E0	NetCol5000-A020HM13N1E120E0	NetCol5000-A020HQ13N10020E0	NetCol5000-A020HQ13N1E120E0
Maximum current	16.5A	23A	16.5A	23A
Power supply	380-415V AC 50Hz 3W+N+PE	380-415V AC 50Hz 3W+N+PE	380V AC 60Hz 3W+N+PE	380V AC 60Hz 3W+N+PE
Voltage tolerance[a]	Rated voltage ±10%	Rated voltage ±10%	Rated voltage ±10%	Rated voltage ±10%
Frequency tolerance	Rated frequency ±3 Hz	Rated frequency ±3 Hz	Rated frequency ±3 Hz	Rated frequency ±3 Hz
Reheat	No	Yes	No	Yes

Item	NetCol5000-A020HM13N10020E0	NetCol5000-A020HM13N1E120E0	NetCol5000-A020HQ13N10020E0	NetCol5000-A020HQ13N1E120E0
Humidify	No	Yes	No	Yes
a: Recommended to add the voltage regulator in the front end if the power exceeds this range. Otherwise, air conditioner will generate frequency alarms and cannot run.				

A Appendix

E

EC	electronic commutation

P

PUE	power usage effectiveness

T

TFT	thin film transistor