NetCol5000-A 42 kW Air Cooled In-row Full-sized Variable-Frequency Precision Air Conditioner Training Slides

Product model: NetCol5000-A042

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Objectives

- Upon completion of this course, you will be able to learn the following information about the Huawei NetCol5000-A 42 kW air cooled in-row full-sized variable-frequency precision air conditioner:
  - Basic information
  - Advantages
  - Basic structure
  - Configuration
  - Installation and commissioning
  - Routine maintenance items and methods
  - Methods and procedures for handling common faults

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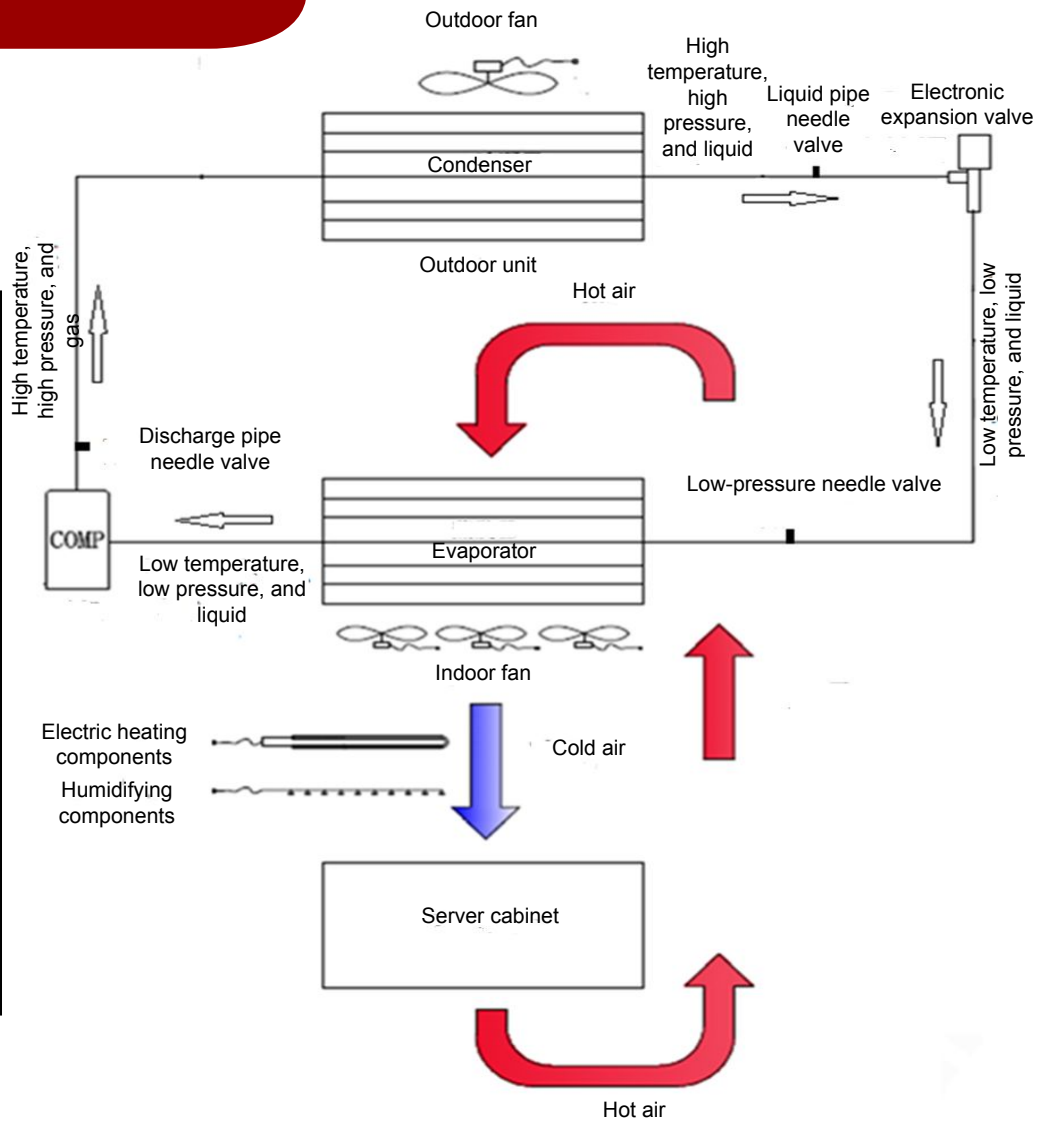
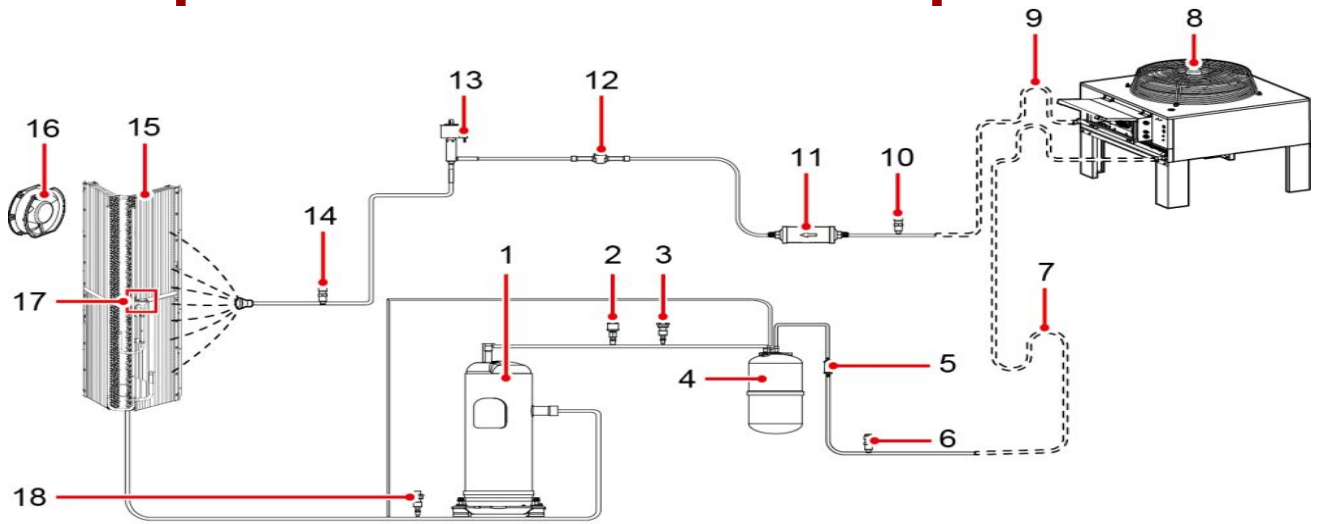
1.1 Cooling Principle

Component	Refrigerant Status	Pressure Change	Temperature Change
Evaporator	Liquid — gas	Low pressure	Low temperature
Compressor	Gas — gas	Low pressure — high pressure	Low temperature — high temperature
Condenser	Gas — liquid	High pressure	High temperature — normal temperature
Electronic expansion valve	Liquid — liquid/gas	High pressure —low pressure	Normal temperature — low temperature



Cooling system conceptual diagram

1.1 Cooling Principle-Without a Low-Temperature Component



(1) Compressor (2) High-pressure switch (3) High-pressure sensor (4) Oil separator

(5) Check valve (6) Discharge pipe needle valve (7) Oil trap (8) Outdoor unit

(9) Inverted trap (10) Liquid pipe needle valve (11) Filter dryer (12) Sight glass

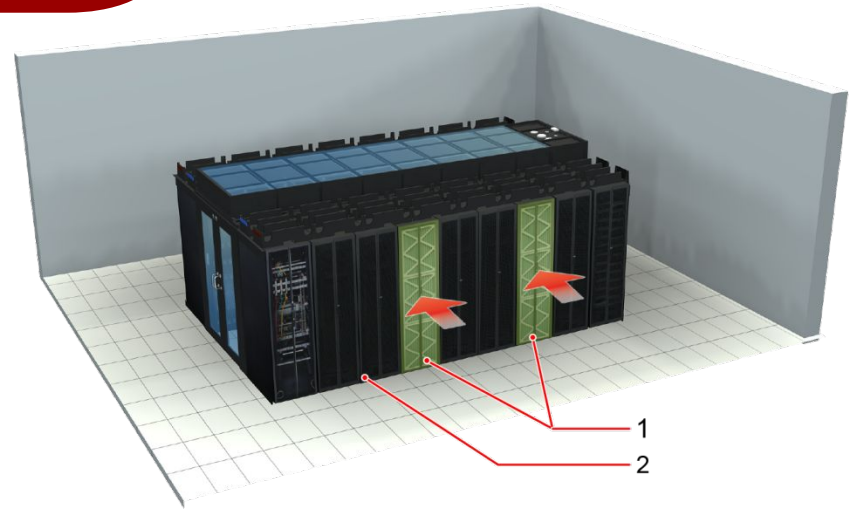
(13) Electronic expansion valve (14) Low-pressure needle valve (15) Evaporator (16) Indoor fan

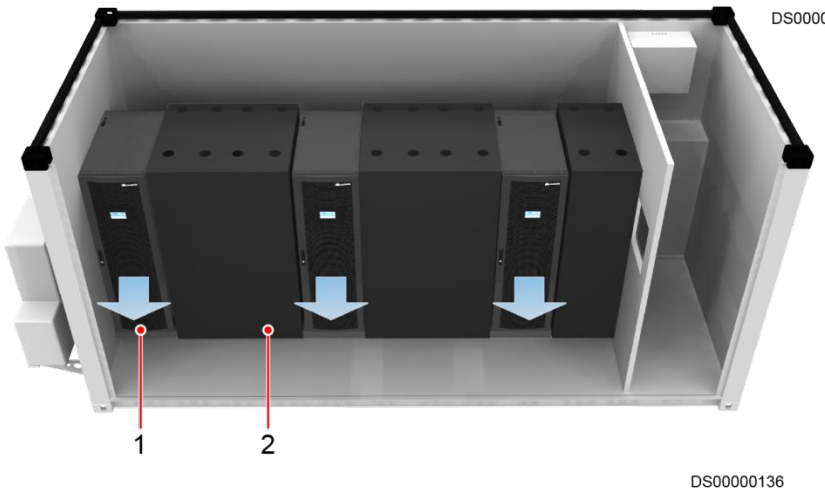
(17) Distributor (18) Low-pressure sensor

1.2 Air Cooled In-row Full-Sized DC Variable-Frequency Precision Air Conditioner

With rapid development of high-density data centers, the amount of heat dissipated by servers or communication equipment in data centers is growing, and traditional in-room air conditioners are facing severe challenges in heat dissipation, energy conservation, and environmental friendliness. To meet increasing customer requirements for new services, Huawei develops NetCol5000-A, a precision in-row temperature control system. The NetCol5000-A can be deployed nearby a heat source to provide an efficient cooling solution. To improve the cooling effect, the NetCol5000-A uses isolated or contained hot and cold aisles to effectively prevent cold air from mixing with hot air.

According to the design of the in-row air conditioner, the horizontal air flow mode is used: cold air is supplied through the cold aisle and then the air is returned through the hot aisle. This effectively prevents cold air from mixing with hot air, ensures even temperature in the server cabinet, and eliminates partial hot spots, thereby increasing the server reliability while effectively reducing unnecessary power consumption.

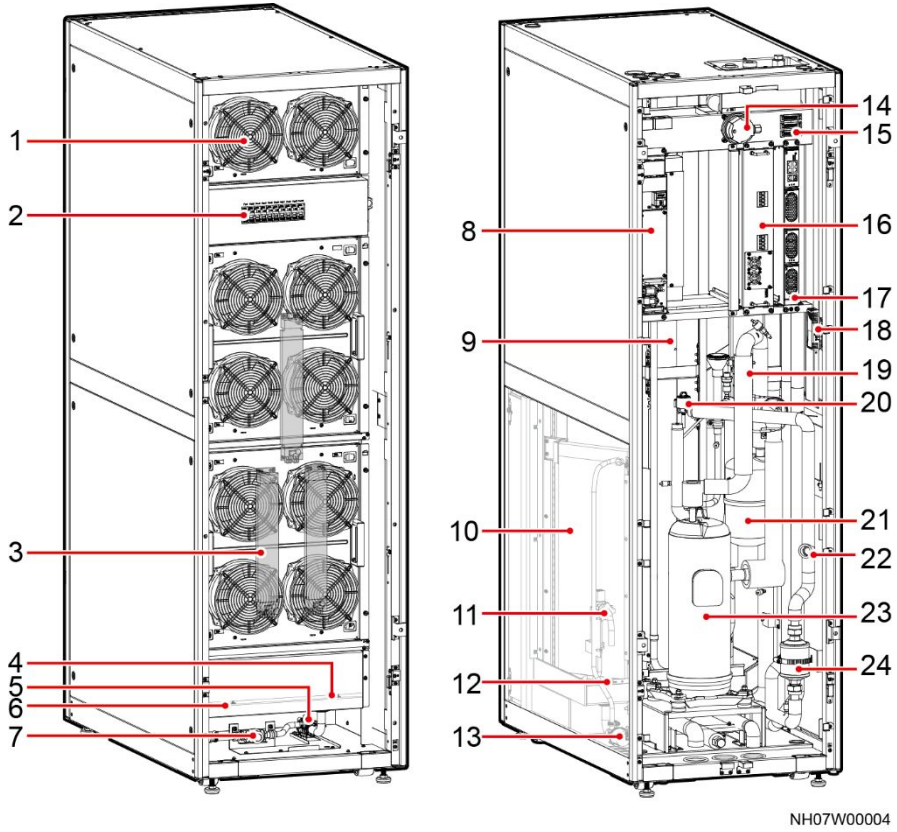




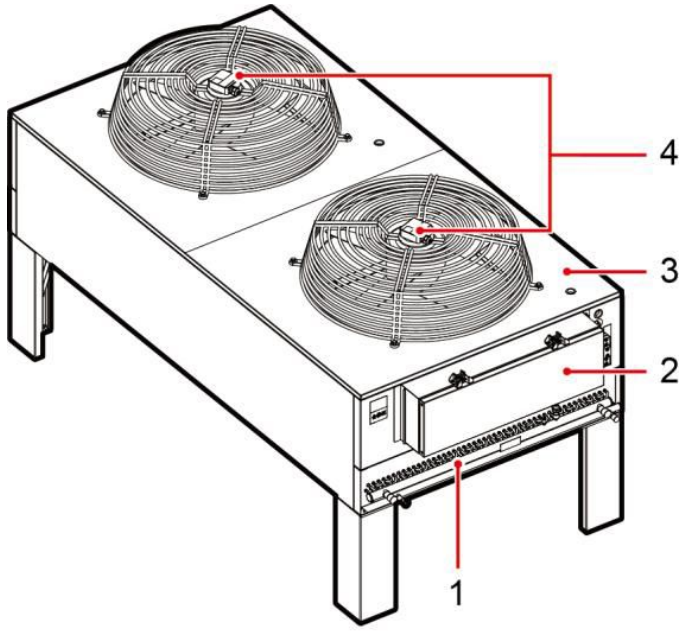
(1) In-row air conditioner (2) Equipment

1.3 Exploded View

(1) Fan	(2) Fan switch	(3) Electric heater	(4) Water pan filter
(5) Condensate pump	(6) Liquid level detector	(7) Drainage check valve	(8) Strong-current box
(9) Evaporator	(10) Wet film humidifier	(11) Water inlet solenoid valve	(12) Humidifier float
(13) Humidifier pump	(14) Differential pressure switch	(15) Signal cable terminal block	(16) Compressor driver
(17) Weak-current box	(18) T/H sensor	(19) Discharge pipe	(20) EEV
(21) Oil separator	(22) Sight glass	(23) Compressor	(24) Filter dryer



1.3 Outdoor Unit Composition



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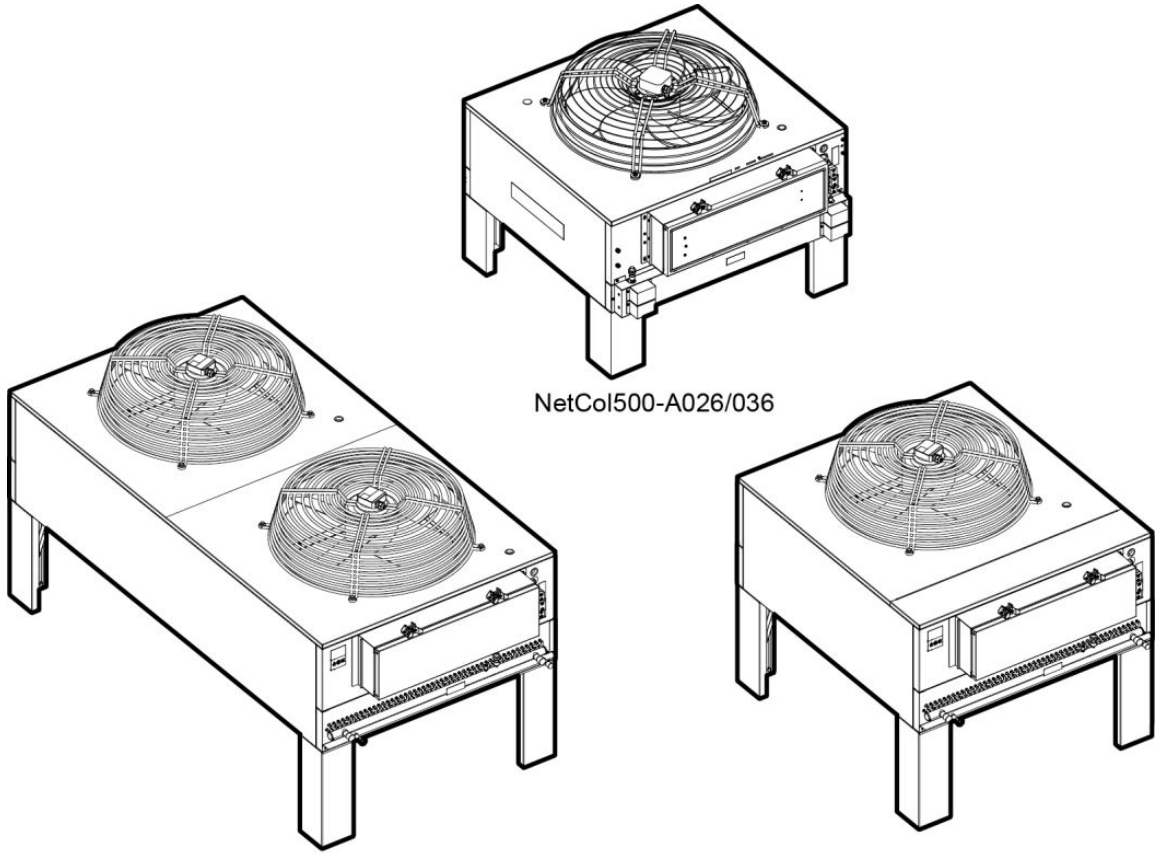
(1) Condenser	(2) Fan driver
(3) Rack	(4) Fans



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1 Basic Information About the Air Conditioner

Summary of This Chapter

This chapter describes basic information about the NetCol5000-A 42 kW air cooled in-row full-sized variable-frequency precision air conditioner, including the cooling principle, basic features, and indoor unit appearance.

Question

1. The NetCol5000-A 42 kW air cooled in-row full-sized variable-frequency precision air conditioner uses _____ air supply mode.

A. Upflow

B. Horizontal

C. Downflow

Contents

2 Features and Parameters

2.1 Features

Operating Range

Works in an environment with an outdoor temperature ranging from –40 °C to +55 °C.

Applies to class A, B, and C environments.

Power System

Supports multiple power systems: 380–415 V (±10% tolerance), 3Ph, 50 or 60 Hz (±3 Hz tolerance).

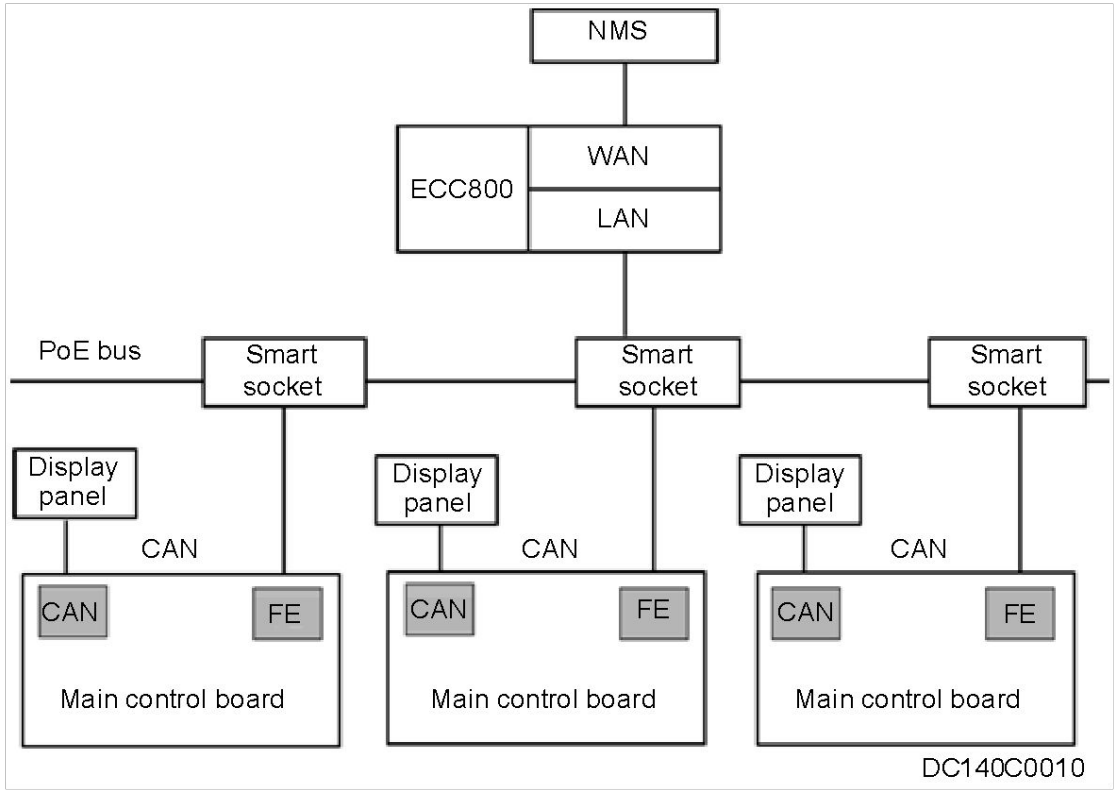
Cooling Adjustment Range

Uses the DC frequency-converting scroll compressor and electronically commutated (EC) fan to support a wide cooling adjustment ranging from 10% to 100%. The compressor rotates at 17 RPS to 90 RPS. The speed adjustment of the EC fan ranges from 30% to 100%.

2 Features and Parameters

Intelligent Control

- When only one NetCol5000-A is running, the controller provides logic control for internal components to meet requirements for indoor temperature and humidity.
- The 7-inch touchscreen allows users to set parameters for the NetCol5000-A and query its status by touch.
- When multiple NetCol5000-As work cooperatively, the controller optimally distributes the heat load to reduce power consumption and provides a backup to improve reliability.
- Users can monitor, manage, and upgrade one or more NetCol5000-As using the remote management terminal.

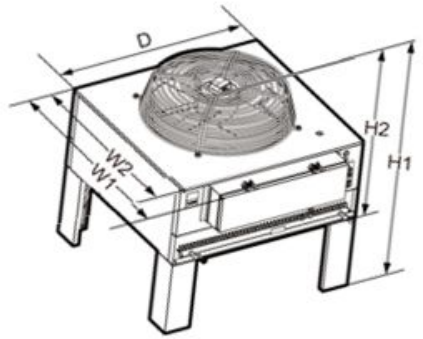


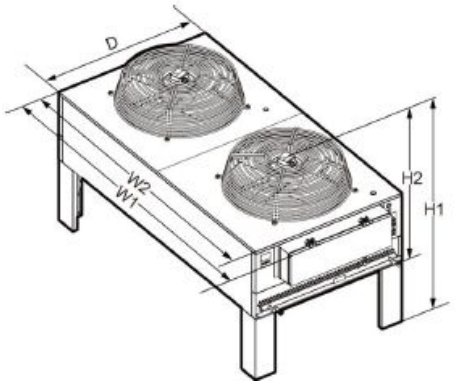
2.2 Indoor Unit Parameter Description

Model	NetCol5000-A042H412D20020E1	NetCol5000-A042H412D2W120E1	NetCol5000-A042H412D20020E2	NetCol5000-A042H412D2W120E2
Power Supply Mode	Single power supply	Single power supply	Dual power supplies	Dual power supplies
Maximum Current	40 A	46 A	Active: 40 A Standby: 40 A	Active: 46 A Standby: 40 A
Power System	380-415 V AC, 50 or 60 Hz, 3Ph+N+PE			
Heating function	Not supported	6 kW	Not supported	6 kW
Humidification Function	Not supported	3 kg/h	Not supported	3 kg/h
Pipe and Cable Routing	Pipes and cables routed from the top or bottom			
Condensate Pump	Provided (maximum lift: 4 m)			

2 Features and Parameters

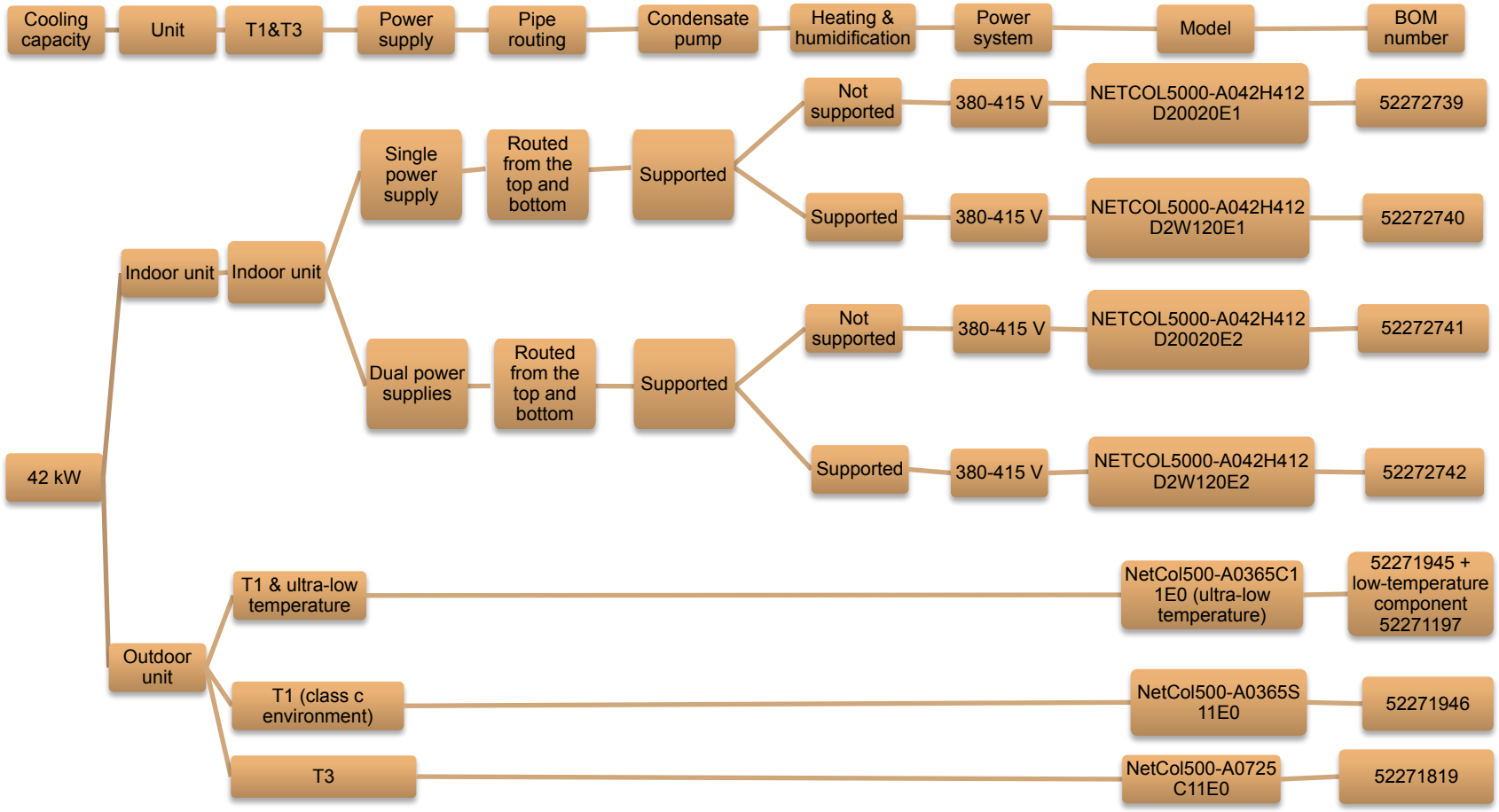
2.3 Outdoor Unit Parameter Description





Model	NetCol500-A0365C11E0	NetCol500-A0365S11E0 (class C anti-corrosion outdoor unit)	NetCol500-A0725C11E0
BOM Number	52271945	52271946	52271819
Power System	380-480 V AC, 3W+PE, 50 or 60 Hz		
Voltage Tolerance	Rated voltage±10%		
Frequency Tolerance	Rated frequency±3 Hz		
Maximum Current of the Outdoor Unit (A)	2.5	2.5	5
Dimensions H1 x W1 (W2) x D (mm)	1160 x 1370 (1220) x 1094	1160 x 1370 (1220) x 1094	1100 x 2200 (2050) x 1094
Dimensions H2 x W1 (W2) x D (mm)	714 x 1370 (1220) x 1094	714 x 1370 (1220) x 1094	1100 x 2200 (2050) x 1094
Operating Temperate (The actual operating temperate depends on the indoor units in use.)	-40℃ to + 45℃ (low-temperature component 52271197 required for the NetCol5000-A 42 kW)	-20℃ to +45℃	-5℃ to +55℃
Altitude	0–4000 m. When the altitude exceeds 1000 m, the power should be derated.		
Net Weight (kg)	126	147	240

2.4 Selecting an Indoor Unit and Outdoor Unit



2 Features and Parameters

Summary of This Chapter

This chapter describes the main features of the NetCol5000-A 42 kW air cooled in-row full-sized variable-frequency precision air conditioner, parameters of indoor and outdoor units, and how to select an indoor unit and an outdoor unit.

Question

How do you select an outdoor unit to work with a 42 kW indoor unit?

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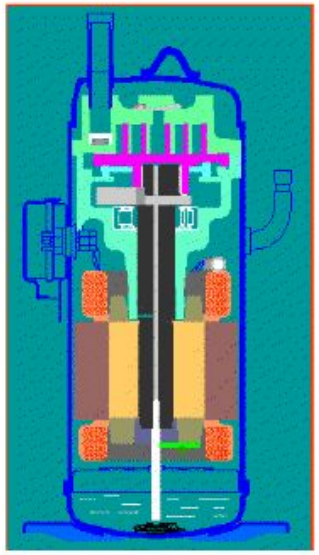
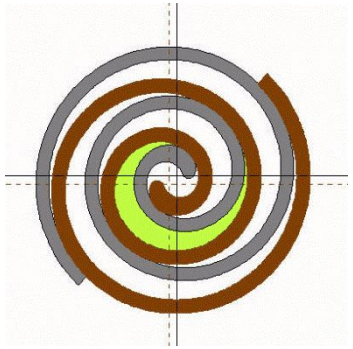
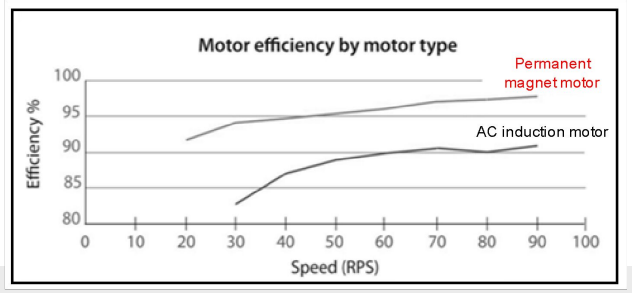
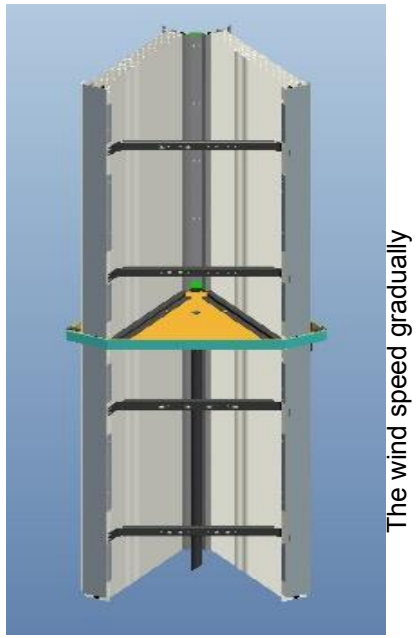
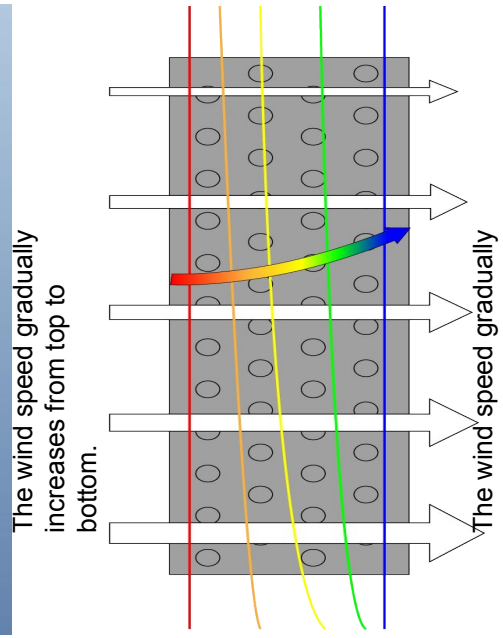
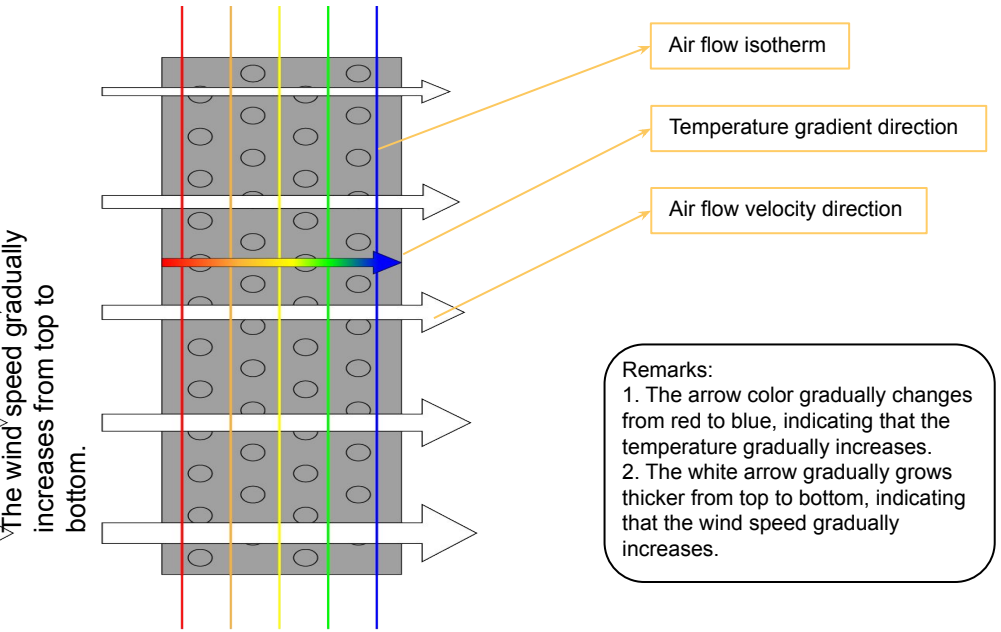
3 Main Components

Compressor	Description
 	An efficient DC frequency-converting scroll compressor from MGC (a famous international vendor). The compressor uses a compact and light-weight structure that is easy to install. It provides low noise, high reliability, good stability, and a long service life. Working principle: A scroll compressor consists of an involute movable plate and a static plate that engage with each other. During the air intake, compression, and exhaust processes, the static plate is fixed on the frame, and the movable plate is driven by an eccentric shaft and rotates round the center of the static plate on a small plane. The refrigerant gas is sucked into the peripheral air intake vent of the static plate due to a pressure difference, rotates round the eccentric shaft, is gradually compressed in crescent-shaped compression chambers formed when the movable plate engages with the static plate, and is continuously exhausted to the air exhaust vent by the central shaft of the static plate.

3 Main Components

DC Frequency-Converting Compressor Driver	Description
	Working principle: The frequency-converting driver changes the electrical frequency and drives the compressor to work by using the permanent magnet synchronous motor inside the compressor. The driver features large starting torque, high efficiency (low loss, high power factor), easy speed adjustment, low noise, high power-volume ratio, high reliability, and long life cycle. • Reduces the power consumption by 10% to 15% when compared with constant-speed and parallel compressor drivers. • Reduces the power consumption by 20% to 25% when compared with digital + constant-speed and parallel compressor drivers. • Improves the comprehensive energy efficiency by 30% when compared with digital scroll compressor drivers in partial load scenarios. • Improves the comprehensive energy efficiency by 10% when compared with AC frequency-converting compressor drivers. 

3 Main Components

Heat Exchanger	 **NetCol5000-A heat exchanger**  Current heat exchangers in the industry: The intersection angle between the velocity direction and temperature gradient direction is not 0, and the heat exchange performance is 70%.  NetCol5000-A heat exchanger: The intersection angle between the velocity direction and temperature gradient direction is 0, and the heat exchange performance is 95%. Remarks: 1. The arrow color gradually changes from red to blue, indicating that the temperature gradually increases. 2. The white arrow gradually grows thicker from top to bottom, indicating that the wind speed gradually increases.
Description	The V-shaped evaporator adopts the synergy field principle and the computational fluid dynamics (CFD) to optimize the flow path design, greatly improving the heat exchange efficiency. Synergy field principle: A smaller intersection angle between the velocity direction and temperature gradient direction indicates better synergy of the velocity field and heat flow field and higher performance of the heat exchanger. Evaporator principle: The evaporator absorbs heat by vaporizing the compressed liquefied refrigerant to reduce the temperature of the surrounding medium and therefore produces a cooling effect.

3 Main Components

EC Fan	Description
	Uses an intelligently controlled and brushless DC motor; features high intelligence, power reservation, and efficiency, provides a long service life with low vibration and noise, and is able to work continuously. Conserves energy by more than 30%, with the fan speed adjustment range being from 30% to 100% and being configurable; not subject to the transmission ratio when being compared with the fan speed control by the belt drive. Not requiring belt replacement and reducing routine checks.
Electronic Expansion Valve	**Description**
	Adjusts the flow area of its valve port by obtaining values of parameters of the cooling system, and performs control using a micro-controller to realize precise control on the volume of refrigerant. Provides more precise control than traditional capillary tubes or thermal expansion valves. Ensures energy-saving, safe, and reliable system running.

3 Main Components

PTC Electric Heater	Description
	Features quick start, compact size, large heating capacity, high safety and reliability. It is easy to use and provides a long service life. In the case of a fan fault, the PTC electric heater can control the temperature to prevent overheat. It is nonflammable, durable, and not oxidized.
Humidifier	**Description**
	The wet film humidifier uses the wet film, water pump, water pipe, and drain pan to create a circulation loop. The return air blows the naturally evaporated water to increase the air humidity, implementing water recycling. The humidifier is free from sparks and requires cost-effective maintenance.

3 Main Components

Filter Dryer	Description
	Provided by a famous vendor and can effectively remove the moisture present in the cooling system. Filters out impurities generated during long-term system running to ensure normal system running.
Sight Glass	**Description**
	Provided by a famous international vendor. Using a sight glass, you can observe the flowing state and gas/liquid content of the refrigerant, so you can maintain and optimize the system status easily.

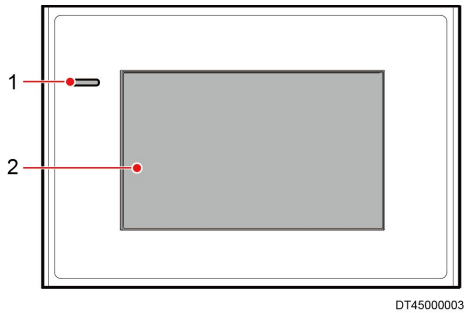
3 Main Components

Check Valve	Description
	Provided by a famous international vendor and can effectively prevent gas/liquid backflows. Prevents starting when being loaded to reduce pipeline vibration. Effectively improves the reliability of the involved unit.
Water Sensor	**Description**
	Detects water through electrode and converts received signals into dry contacts based on the principle of electric conductivity of liquid.

3 Main Components

High- or Low-pressure Sensor	Description
	Provided by a famous international vendor, precisely collects the high- or low-pressure values of the cooling system, and sends the values to the controller, providing a strong guarantee for safe and stable system running.
High Pressure Switch	**Description**
	Provided by a famous international vendor and used to detect the high-pressure value at the air exhaust vent of the compressor. If the pressure value reaches the preset value, the high-pressure switch performs an operation to shut down the refrigerant system. Provides additional protection besides the high- or low-pressure sensors and makes the system more safe and reliable.

3 Main Components

Display Panel	Description
	A 7-inch true color-sensitive LCD that provides a user-friendly interface for you to perform query, settings, monitoring, and maintenance. When only one NetCol5000-A is running, provides logic control of its components to meet temperature and humidity requirements. When multiple units work cooperatively, optimally distributes the heat load to reduce power consumption and provides a backup to improve reliability.
T/H Sensor	**Description**
	Primarily placed in a cold or hot aisle and used to detect the temperature and humidity of the location where it is placed, so the temperature and humidity in the equipment room can be controlled based on the difference between the detected value and the preset value. (Set the DIP switch of a T/H sensor before installing the sensor.)

3 Main Components

Temperature Sensor	Description
	A thermally sensitive semiconductor resistor whose resistance significantly changes with its temperature (negative temperature coefficient), and is used to detect the temperature.
Water Pump	**Description**
	A brushless DC pump, with a lift being more than 4 meters long.
Differential Pressure Switch	**Description**
	Detects the difference between the pressure existing before and after the location where an air filter is installed and determines whether the air filter is dirty or is blocked, with the goal of notifying maintenance personnel of cleaning the air filter in a timely manner to ensure safe and reliable device running.

3 Main Components

Air Filter	Description
	Meets hygienic requirements of data center equipment rooms.
Liquid Level Float Switch	**Description**
 	The white float on the left controls the water pump, and the electric liquid level switch on the right controls the full water alarm signal. The two float switches precisely monitor the water level in the water pan, preventing water overflow in the water pan, protecting the water pump, and improving device reliability.

3 Main Components

Strong-Current Box	Description
	Provides power detection and two-way switching. Implements electrical heating and provides strong currents for the compressor.
Weak-Current Box	**Description**
	Converts strong current to weak current. Controls electrical devices such as fans, water pumps, and electronic expansion valve. Implements logic control.

3 Main Components

Summary of This Chapter

This chapter describes the main components of the NetCol5000-A 42 kW air cooled in-row full-sized variable-frequency precision air conditioner.

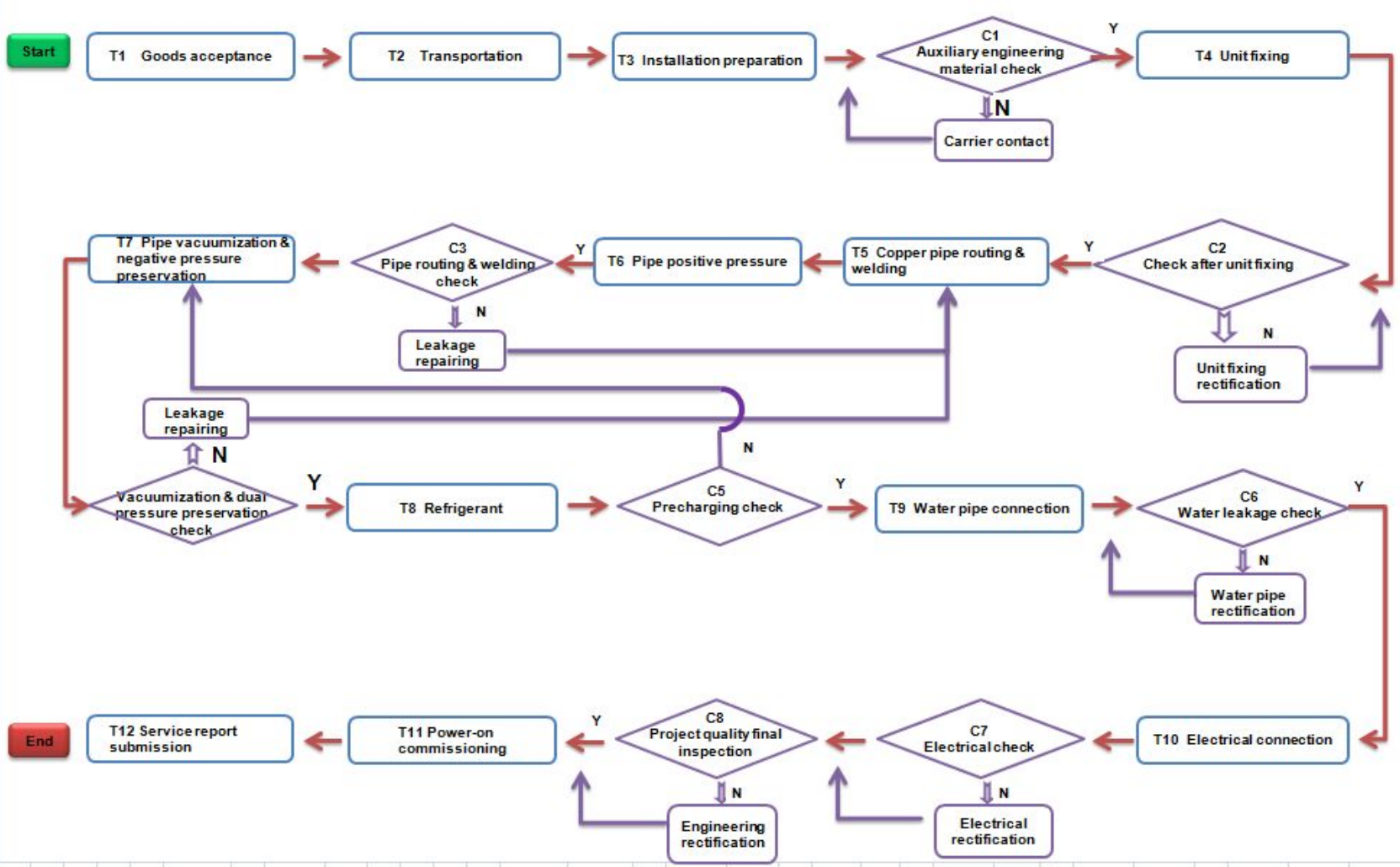
Question

1. When is a low-temperature component required?

Contents

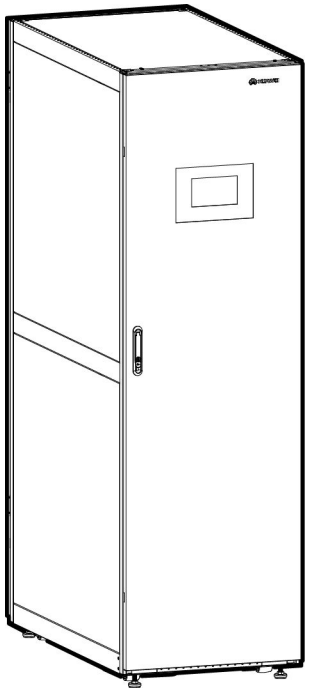
4 Installation and Commissioning

4.1 Installation Process Flowchart



1281 rule (TCR):
12 standard steps (Task)
8 quality control points (Check)
1 commissioning and acceptance report (Report)

4.2 Preparing Materials-Installation Tools



Indoor unit structure

Appearance, specifications, and name			
Adjustable wrench	Phillips screwdriver (M4, M6, and M8)	Flat-head screwdriver (M3 and M4)	Socket wrench (18 mm)
Torque wrench (28 mm)	Solid wrench (18 mm and 13 mm)	Box-end wrench	Diagonal pliers
Combination pliers	Needle-nose pliers	Sealant or seal tape (for thermal insulation foam)[a]	Right angle
Step ladder (2 m)	Torch	Measuring tape	Hammer drill
Marker	Protective glove	Electric screwdriver	N/A
			N/A

Vacuum pump	Lifting rope
	

Pressure gauge	Fluorine injection hose
	

Installation tools

4.2 Preparing Materials-Refrigerant R410A (Optional)

Do not use low-quality refrigerant. Huawei is not responsible for any damage caused by low-quality refrigerant.
Check the refrigerant by following the steps shown in the figure below: Keep the refrigerant indoors at a constant temperature and humidity for 24 hours. Use a thermometer to measure the external surface temperature of the refrigerant container, and connect a pressure gauge to the container to measure its internal pressure. Determine the saturation pressure that corresponds to the measured external surface temperature according to Table 1 and calculate the deviation from the measured internal pressure. If the deviation is more than 0.2 MPa, the refrigerant is not qualified and should be replaced.

Table 1 Mapping between temperatures and R410A saturation pressure

Temperature (°C)	Saturation Pressure-Surface Pressure (MPa)	Temperature (°C)	Saturation Pressure-Surface Pressure (MPa)	Temperature (°C)	Saturation Pressure-Surface Pressure (MPa)
0	0.7	19	1.31	38	2.21
1	0.73	20	1.35	39	2.27
2	0.75	21	1.39	40	2.33
3	0.78	22	1.4	41	2.39
4	0.81	23	1.47	50	2.45
5	0.84	24	1.51	43	2.51
6	0.87	25	1.56	44	2.57
7	0.9	26	1.6	45	2.63
8	0.93	27	1.65	46	2.7
9	0.96	28	1.69	47	2.76
10	0.99	29	1.74	48	2.83
11	1.02	30	1.79	49	2.9
12	1.05	31	1.84	50	2.97
13	1.09	32	1.89	51	3.04
14	1.12	33	1.94	52	3.11
15	1.16	34	1.99	53	3.19
16	1.19	35	2.04	54	3.26
17	1.23	36	2.1	55	3.34
18	1.27	37	2.15	–	–

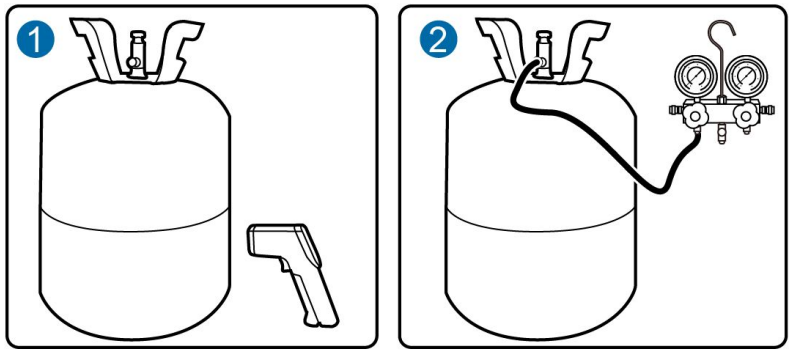


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Table 2 Refrigerant R410A charge amount

Item	Length of the One-Way Connection Pipe (m)		
	0 < L ≤ 10	10 < L ≤ 60	60 < L ≤ 100
Refrigerant charge for the NetCol500-A036 (kg)	9.2	9.2 + (L – 10) x 0.19	9.2 + (L – 10) x 0.25
Refrigerant charge for the NetCol500-A036 Including a Low-Temperature Component (kg)	20.2	20.2 + (L – 10) x 0.19	20.2 + (L – 10) x 0.25
Refrigerant charge for the NetCol500-A072 (kg)	13.2	13.2 + (L – 10) x 0.19	13.2 + (L – 10) x 0.25

4.2 Preparing Materials-Refrigerant Oil (Optional)

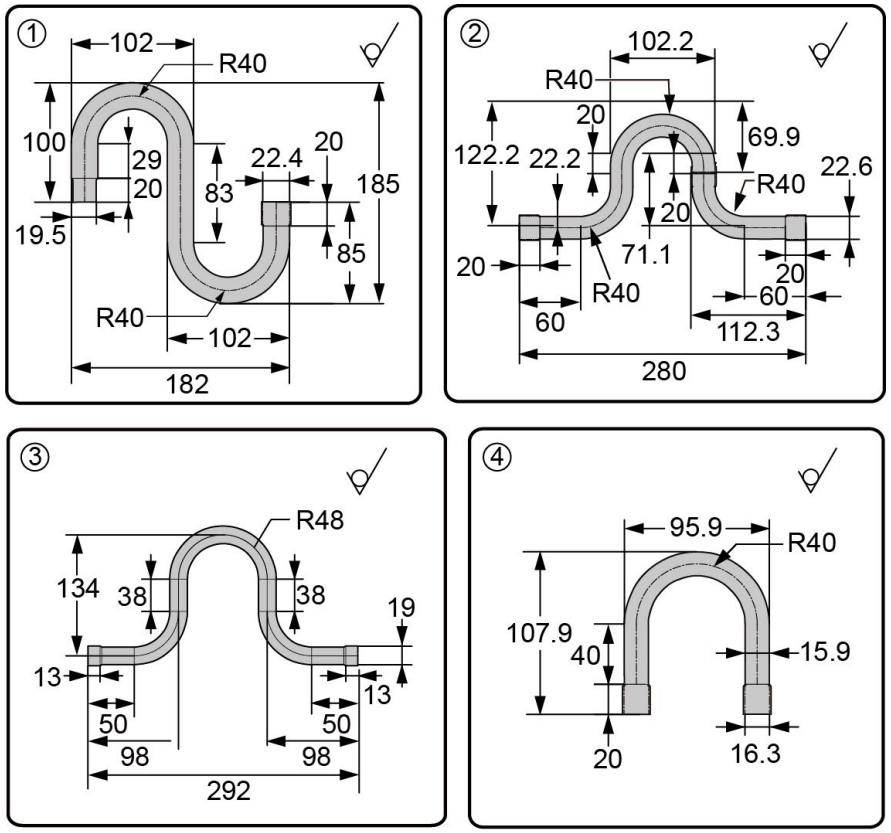
The recommended refrigerant oil is MEL-32. You can purchase it from Huawei or purchase it by yourself after being confirmed by Huawei.

The NetCol5000-A042 has been filled with refrigerant oil for 100 m long pipes before delivery. Additional refrigerant oil is not required during onsite installation. In the case of oil leakage, oil shortage, or compressor replacement, charge additional refrigerant oil.

4.2 Preparing Materials-Oil Trap and Inverted Trap

No.	Name	Configuration	Outer Diameter and Thickness (mm)	Technical Requirement
1	Oil trap	Optional	22.2 x 1.2	Inner diameter at the expanded end of the copper pipe: 22.4 mm Outer diameter at the shrunk end of the copper pipe: 19.5 mm.
2	Inverted trap of gas pipes	Optional	22.2 x 1.2	Inner diameter at the two expanded ends of the copper pipe: 22.6 mm
3	Inverted trap of liquid pipes	Optional	19.0 x 1.0	Inner diameter at the two expanded ends of the copper pipe: 19.0 mm
4	Inverted trap of liquid pipes	Optional	15.9 x 1.0	Inner diameter at the two expanded ends of the copper pipe: 16.3 mm

Note:
After traps are made, verify that the surface is smooth and even, and that there is no bur at the pipe ends.
Pipe bends that are not marked in the figure are 90°.
The tolerance of bent pipes is ±1 mm.



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4.2 Preparing Materials-Copper Pipe

Determine the total equivalent length of refrigerant pipes based on site requirements. Consider the bend resistance. The total equivalent length equals the equivalent length of the bends plus the length of straight pipes between the indoor and outdoor units.

Equivalent pipe length for components (such as bends) that causes pressure loss

Copper Pipe Outer Diameter (in.)	Equivalent Pipe Length (m)			
	45°Bend	90°Bend	180°Bend	T-shaped Three-Way Valve
3/8	0.12	0.2	0.4	0.6
1/2	0.14	0.25	0.5	0.65
5/8	0.17	0.3	0.6	0.7
3/4	0.2	0.35	0.7	0.8
7/8	0.24	0.42	0.8	1.2
1	0.28	0.5	1	1.3
1-1/8	0.32	0.6	1.2	1.4

Pipe assemblies are optional. The following pipe assemblies may be used:

- Liquid pipe:
  - ✔ L ≤ 60 m: R410A copper pipe; outer diameter of 5/8 inch (15.88 mm); wall thickness of 1.0 mm; operating pressure > 4.5 MPa
  - ✔ 60 m < L ≤ 100 m: R410A copper pipe; outer diameter of 3/4 inch (19.05 mm); wall thickness of 1.2 mm; operating pressure > 4.5 MPa
- Gas pipe requirements: R410A copper pipe; outer diameter of 7/8 inch; thickness of 1.2 mm; operating pressure ≥ 4.5 MPa
- Thermal insulation foam: thickness ≥ 9.2 mm

Note: The equivalent length of the one-way pipe should not be longer than 100 m. If the outdoor unit is higher than the indoor unit, the maximum vertical difference between the units is 30 m. If the outdoor unit is lower than the indoor unit, the maximum vertical difference is 8 m.

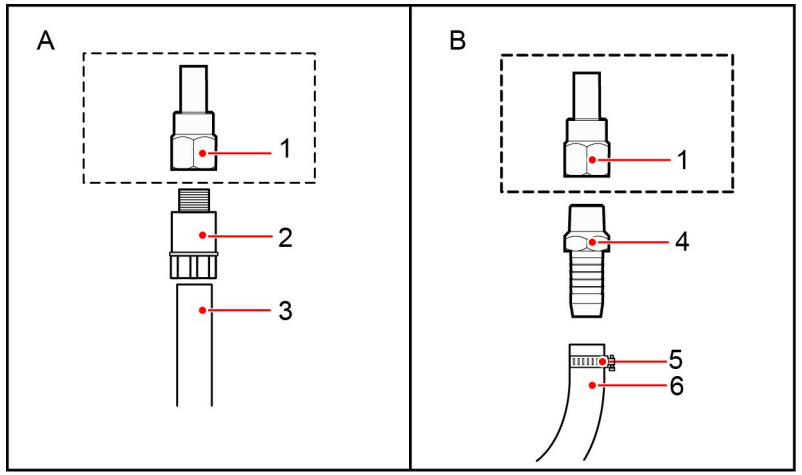
4.2 Preparing Materials-Humidifier Water Inlet Pipe

The water inlet pipe for the humidifier can be connected in two methods:

- Rigid pipe connection: Prepare rigid pipe connectors and rigid pipes shown by components (1) and (2) in method A (right figure).
- Hose connection: Prepare pagoda connectors and hoses shown by components (4) and (6) in method B (left figure).

Determine the pipe connection method based on pipes available.

Installing the water inlet pipe for the humidifier



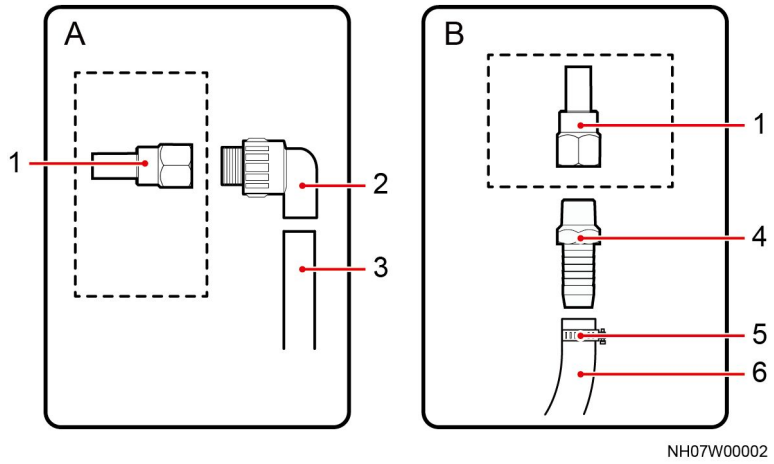
(1) Connector with inner screw threads: G 1/2 inch, delivered with the water inlet pipe for the air conditioner	(2) Rigid pipe conversion adapter: G 1/2 inch; connected to a rigid pipe with outer screw threads
(3) Rigid pipe: made of PP-R or other materials	(4) Pagoda connector: G 1/2 inch; connected to a pagoda connector with outer screw threads
(5) Hose clamp	(6) Hose: made of EPDM or other materials

4.2 Preparing Materials-Connecting the Drainpipe

Drainpipes can be connected by using two methods:

- Routing pipes from the top: See method A or B in the figure.
- Routing pipes from the bottom: See method A in the figure.

Determine the pipe connection method based on pipes available.

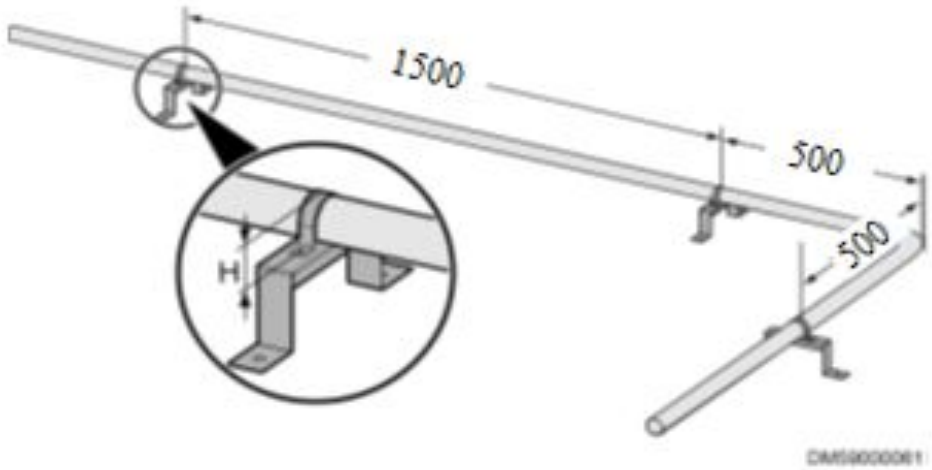


(1) Connector with inner screw threads: BSPP 1/2 inch; delivered with air conditioners	(2) Conversion adapter: BSPT 1/2 inch; connected to a rigid pipe with external threads
(3) Rigid pipe: made of PP-R, C-PVC, or other materials	(4) Pagoda connector
(5) Hose clamp	(6) Hose: inner diameter of 3/4 inch; made of EPDM or other materials

4.2 Preparing Materials-Pipe Support

The figure shows the supports for the refrigerant and water pipes. Select supports based on the onsite conditions.

Pipe supports (unit: mm)



Notes:

The height of a U-shaped pipe clamp equals to the pipe diameter with thermal insulation foam minus 5 mm. The pipe supports are to be purchased by the customer.

The recommended material for pipe supports and clamps is 304 stainless steel.

Install a support every 1500 mm in the straight sections of pipes, and 500 mm away from each bending point in the turning section.

4.2 Preparing Materials-Cables

Installation Scenario	Item	Specifications	Remarks
Indoor unit	Power cable (optional)	Electrical power cable, 600 V/1000 V, ZA-YJV, 5 x 10 mm^2, black (5 cores: brown, black, gray, blue, and yellow/green), 80 A, CE	The length is determined based on site survey. • Dual power supplies: 2 PCS • Single power supply: 1 PCS
	OT terminal	Naked crimping terminal, OT, 10 mm^2, M6, 60 A, tin plating, naked ring terminal	Delivered with the fittings
Outdoor unit	Power cable (optional)	Electrical power cable, 600 V/1000 V, ZA-RVV, 5 x 2.5 mm^2, black (five cores: brown, black, gray, blue, and yellow/green), 27 A, outdoor cable, CE	The length is determined based on site survey.
	OT terminal	Naked crimping terminal, OT, 2.5 mm^2, M6, 27 A, tin plating, 16–14 AWG, blue	Delivered with the fittings
	Cord end terminal	Naked crimping terminal, single-wire cord end terminal, 2.5 mm^2, 12.5 A, tin plating, insertion depth 8 mm, blue	Delivered with the fittings

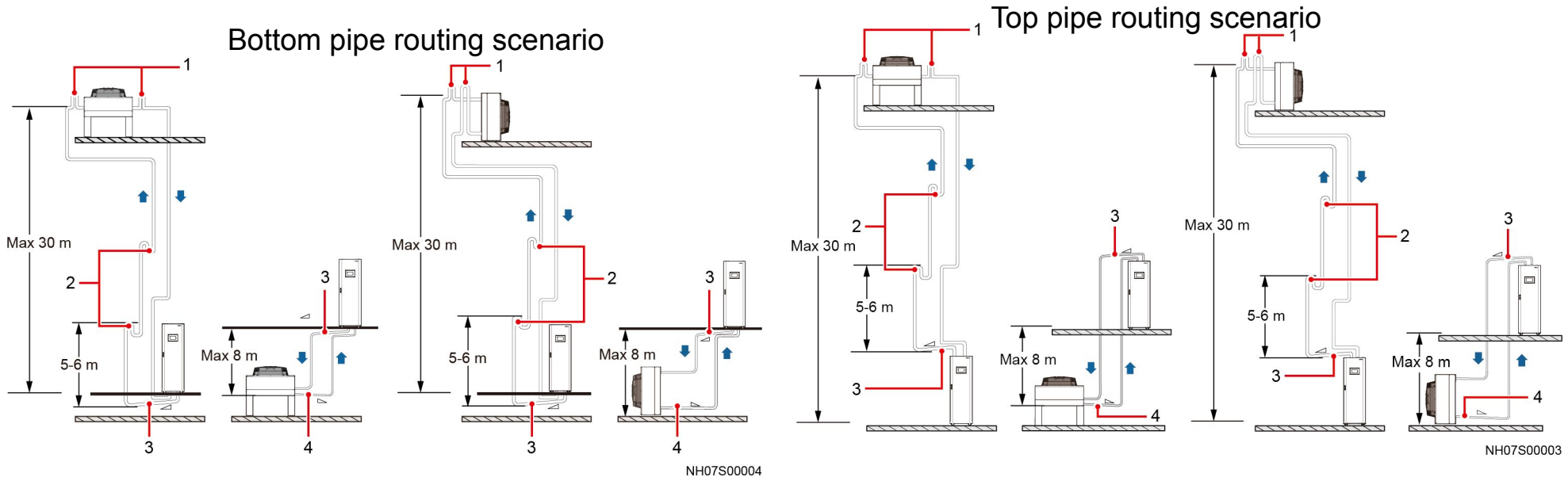
4.2 Preparing Materials-Cables

Installation Scenario	Item	Specifications	Remarks
Indoor and outdoor units	Signal cable to the indoor and outdoor units (optional)	Electrical power cable, 300 V, SJTW, 3 x 16 AWG, black (three cores: black, white, and green), 10 A, shielded outdoor cable, UL	The cable applies to the RS485 communication connection. The length is determined based on site survey.
	Signal cable to the indoor and outdoor units (optional)	Electrical power cable, 450 V/750 V, H07RN-F, 2 x 1 mm^2, black (two cores: brown and blue), 10 A, rubber power cable, VDE	The cable applies to the dry contact connection. The length is determined based on site survey.
	Cord end terminal for the cable	Naked crimping terminal, single-wire cord end terminal, 1.5 mm^2, 7.5 A, tin plating, insertion depth 8 mm, red	Delivered with the fittings
Teamwork control	Teamwork control network cable (optional)	Symmetric twisted-pair cable, 100 ohm, enhanced category 5 cable, aluminum foil shield, 0.52 mm, 24 AWG, eight cores, four pairs of PANTONE 430U, equipped with plug	1 PCS (10 m)
Water sensor monitoring	Water detection cable	Electrical power cable, 5 m, 22 AWG, black, (2 x T0.52, orange), (2 x 22UL1007, black), (2 x T0.52, orange)	Delivered with the fittings

4.3 Layout Principle

The layout principles are as follows:

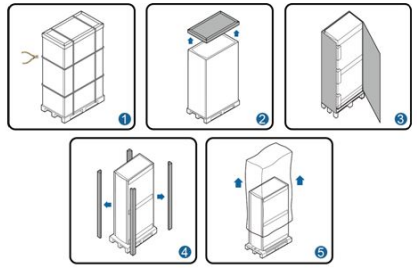
- If the outdoor unit is placed higher than the indoor unit, the vertical distance between them should be less than or equal to 30 m. An oil trap should be installed every 5 m to 6 m in the vertical direction along gas pipes to ensure system reliability.
- If the indoor unit is placed higher than the outdoor unit, the vertical distance between them should be less than or equal to 8 m.



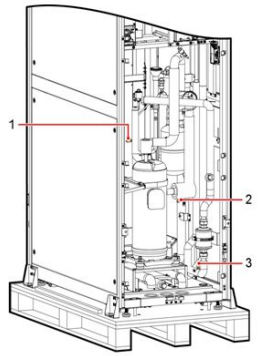
1. Inverted U-shaped trap
2. Oil trap
3. Tilted gas pipe
4. Tilted liquid pipe

4.4 Installation Process

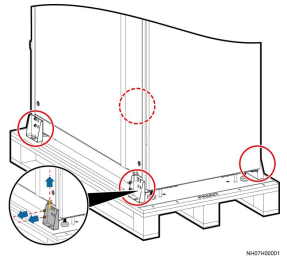
1. Transport a NetCol5000-A to a desired site.



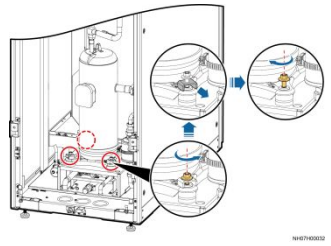
2. Unpack and accept the unit.



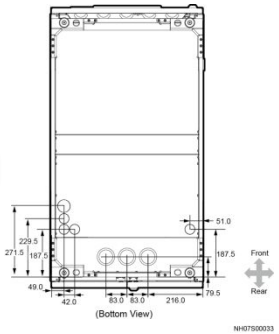
3. Perform an air tightness test.
   a. Unscrew the bonnet of the needle valve counterclockwise.
   b. Use the top of the bonnet to poke the needle valve plug.
   c. If air is exhausted from the needle valve, fasten the bonnet.



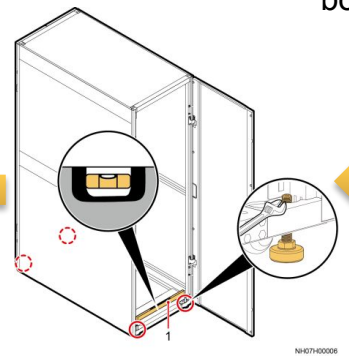
4. Remove the pallet.
a. Remove the eight screws securing the fasteners to the cabinet.
b. Remove the four screws securing the fasteners to the pallet.



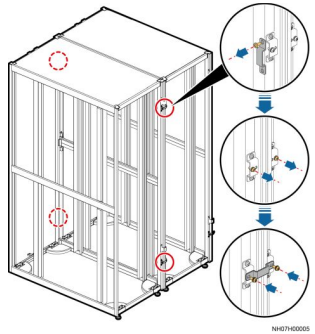
5. Remove the transport fixing sheet metals.
a. Remove the transport fasteners from the compressor.
b. Remove the water pan cover.
c. Remove the liquid level detector fastener.
d. Remove the cabinet fastener bolts.



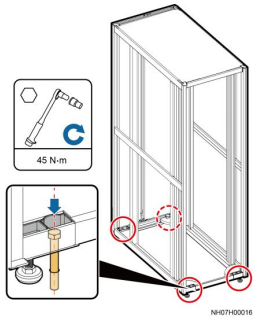
6. Make cable holes (when there is a base).



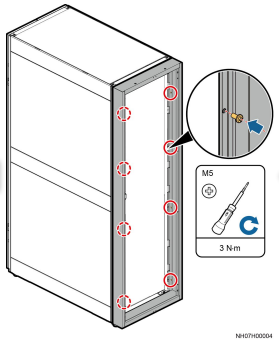
7. Level cabinets (when there are cabinets to be combined).



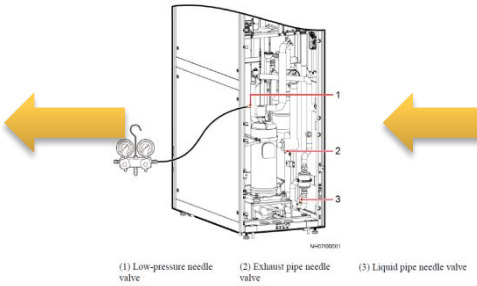
8. Combine the cabinets.



9. Secure the cabinets.

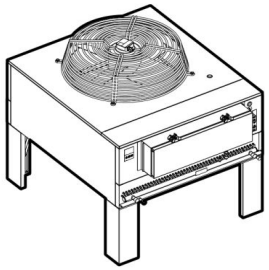


10. Install an enclosure frame (optional).



11. Exhaust nitrogen.

4 Installation and Commissioning



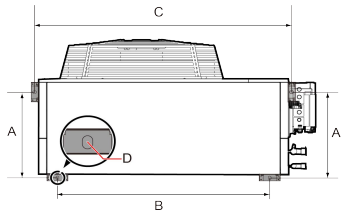
12. Install an outdoor unit.

In the case of a horizontal installation:

a. Install the four legs of the outdoor unit.

b. Put the four legs on the floor, with the fan facing upwards.

c. Secure the four legs to the floor.



In the case of a vertical installation:

Secure the corner fittings on the side panels of the outdoor unit to the floor.

13. Weld the pipes between the indoor unit and outdoor unit.

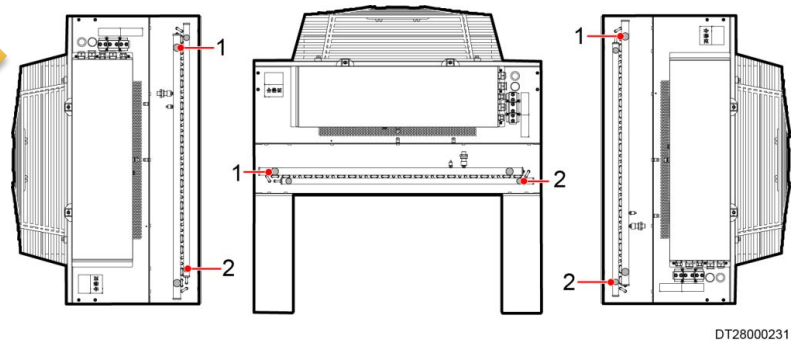
Before the welding, take measures to protect needle valves (discharge pipe needle valve) within *500 mm* from the welding position by removing the valve plug or wrapping the valve with a piece of wet cloth. During the welding, avoid burning peripheral materials, and blow nitrogen into the pipes to prevent the pipes from being oxidized. After the welding, clean the loop to ensure that there are no welding slags left.

14. Connect refrigerant pipes of the outdoor unit.

a. Heat the refrigerant pipes using a welding torch to remove the plug at the gas inlet and liquid outlet.

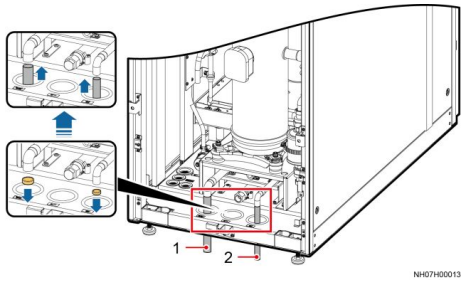
b. Weld the gas and liquid pipes.

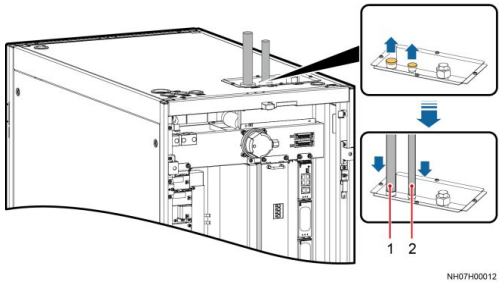
c. Wrap the pipes with thermal insulation foam.



(1) Gas inlet 7/8 in	(2) Liquid outlet 5/8 in

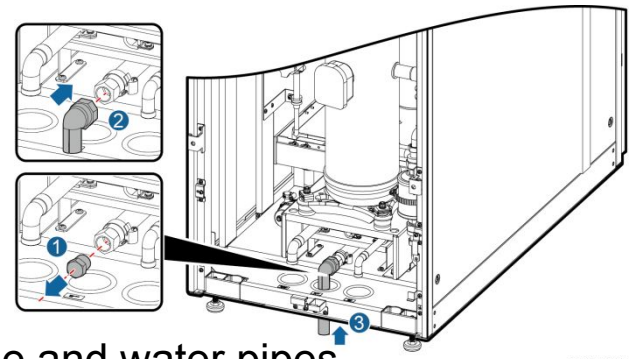
4 Installation and Commissioning





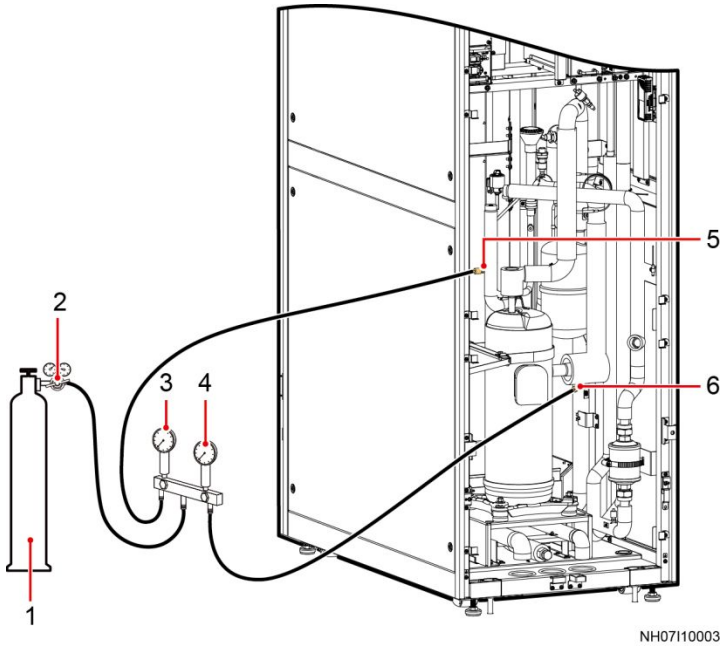
15. Connect refrigerant pipes of the indoor unit.

a. Determine the pipe routing method: routed from the top or bottom.
b. Heat the refrigerant pipes using a welding torch to remove the plug.
c. Weld the pipes.
d. Wrap the pipes with thermal insulation foam.



16. Connect the drainpipe and water pipes.

a. Drainpipe: Remove the drainpipe plug. Install the water pipe conversion adapter and seal it with sealant. Cut a cross in the rubber ring using a utility knife and route the pipe wrapped with the thermal insulation tube through the hole. Connect the PPR water pipe using a hot melt gun.
b. A drainpipe and a water inlet pipe for a humidifier can be routed from the bottom or top. Determine the pipe routing method based on onsite conditions.
c. The hose connected to the water inlet solenoid valve is the water inlet pipe of the humidifier. When installing a hose, expand it, route it along the post on the right side in the cabinet, and fasten it onto the post using cable ties.



17. Inject nitrogen and preserve pressure.

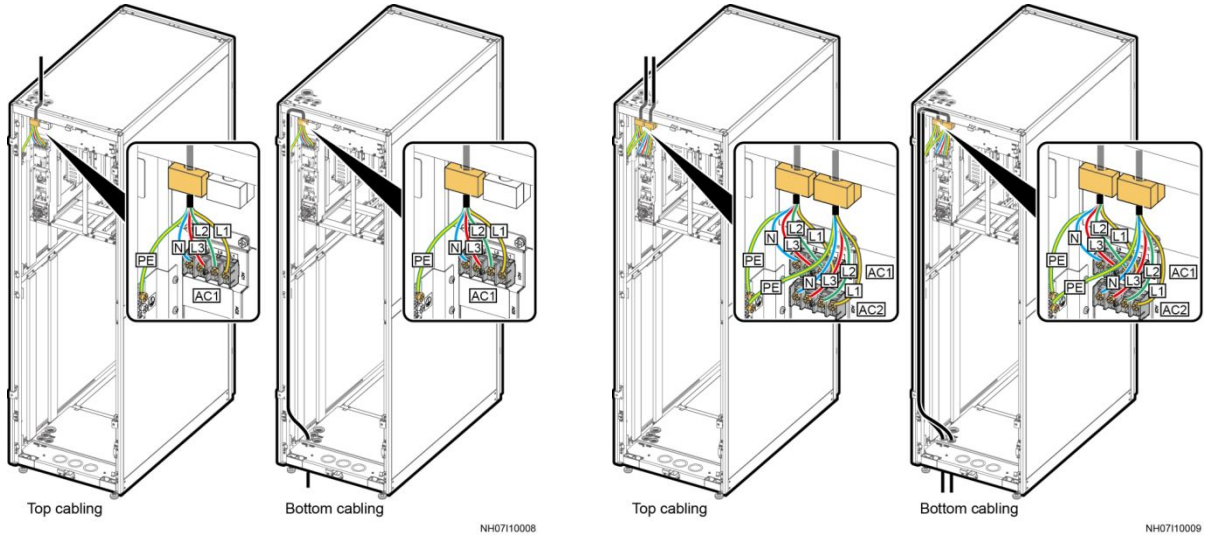
a. Connect the pressure gauge, leather hose, and nitrogen cylinder. A reducing valve must be installed on the head of the nitrogen cylinder. The outlet pressure of the reducing valve must not exceed 3.0 MPa.

b. Inject nitrogen until the pressure reaches 3.0 MPa. Verify that the pressure does not decrease after 24 hours in a stable environment.

18. Connect power cables to the indoor unit.

Power cable routing for single power supply

Power cable routing for dual power supplies



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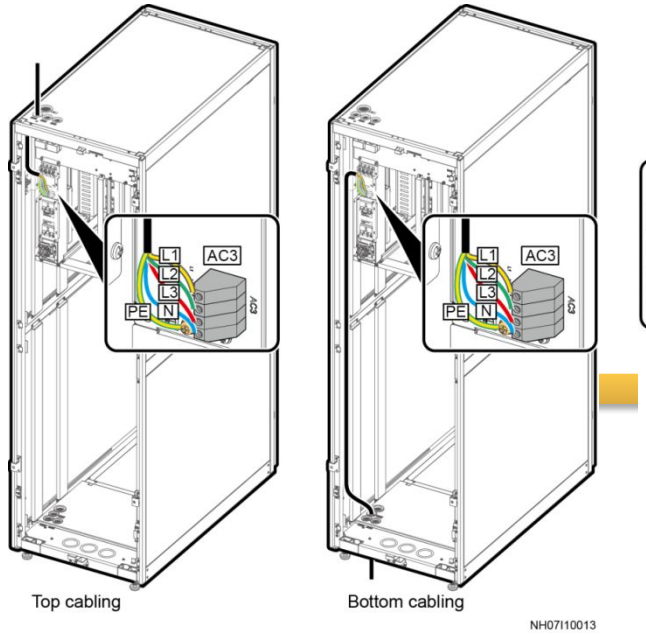
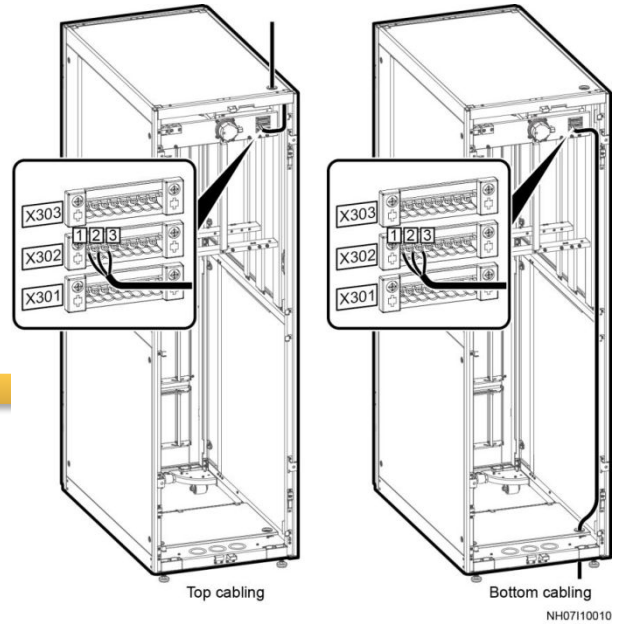
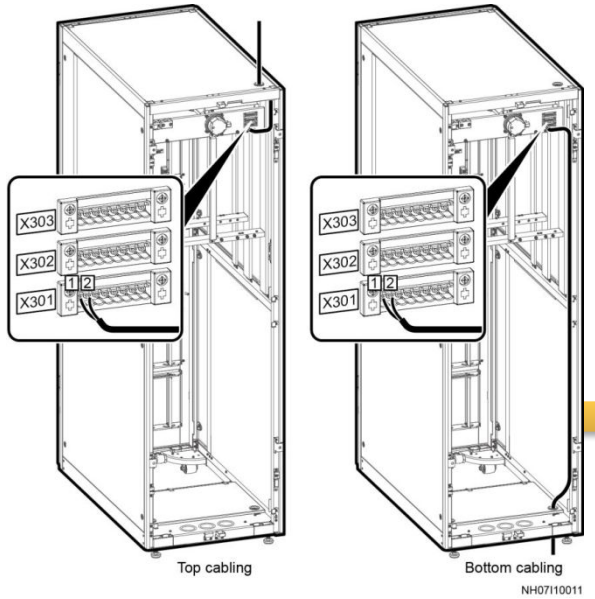
19. Connect the power cable to the outdoor unit.



20. Connect signal cables.

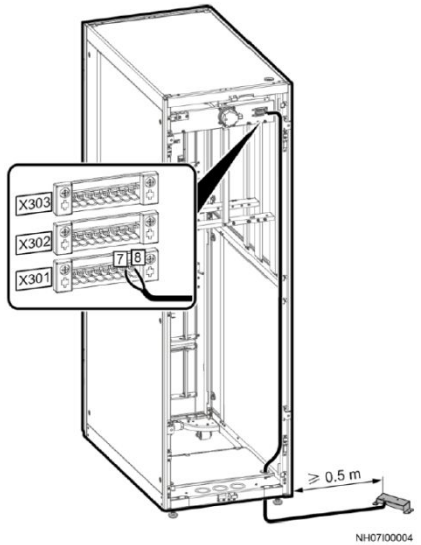


(RS485 connection) Connect one end of the cable to points 1, 2, and 3 on the external signal port X302 and the other end to ports 3, 4, and 5 on the outdoor unit.



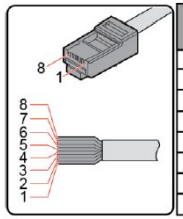
(Dry contact connection) Connect one end of the cable to points 1 and 2 on the external signal port X301 and the other end to ports 1 and 2 on the outdoor unit.

21. Connect the water sensor.



Connect a cable to the water sensor.

Installation and Commissioning



PIN	Color	CAN network cable for teamwork signal attribute	Northbound RS485 network cable signal attribute	FE network cable signal attribute
1	white-orange	RS-485 T+(D+)	RS-485 T+(D+)	FE_TX+
2	orange	RS-485 T- (D-)	RS-485 T- (D-)	FE_TX-
3	white-green	N/A	N/A	FE_RX+
4	blue	RS-485 R+	RS-485 R+	N/A
5	white-blue	RS-485 R-	RS-485 R-	N/A
6	green	N/A	N/A	FE_RX-
7	white-brown	CANH	N/A	N/A
8	brown	CANL	N/A	N/A

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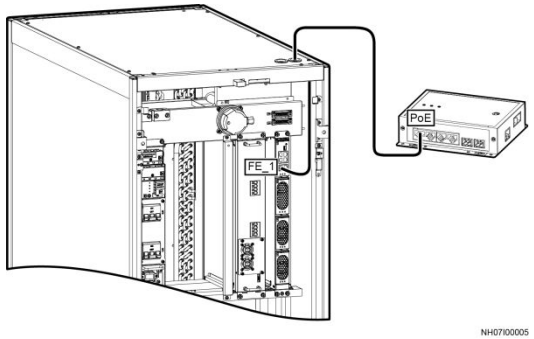
Pin sequence of network cables



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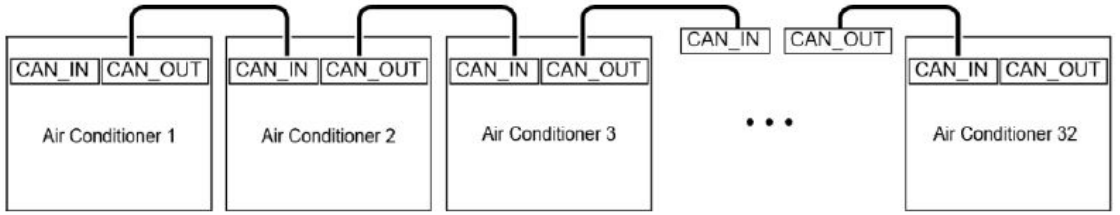
Connecting the FE teamwork network cable



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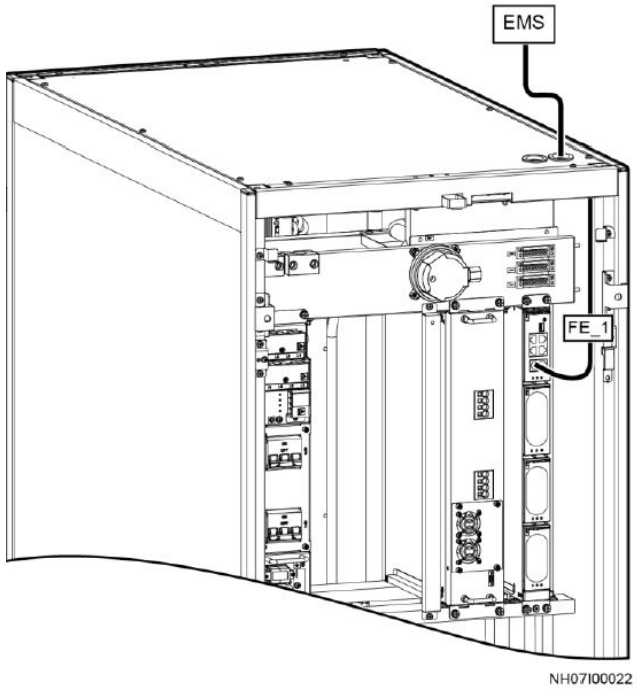
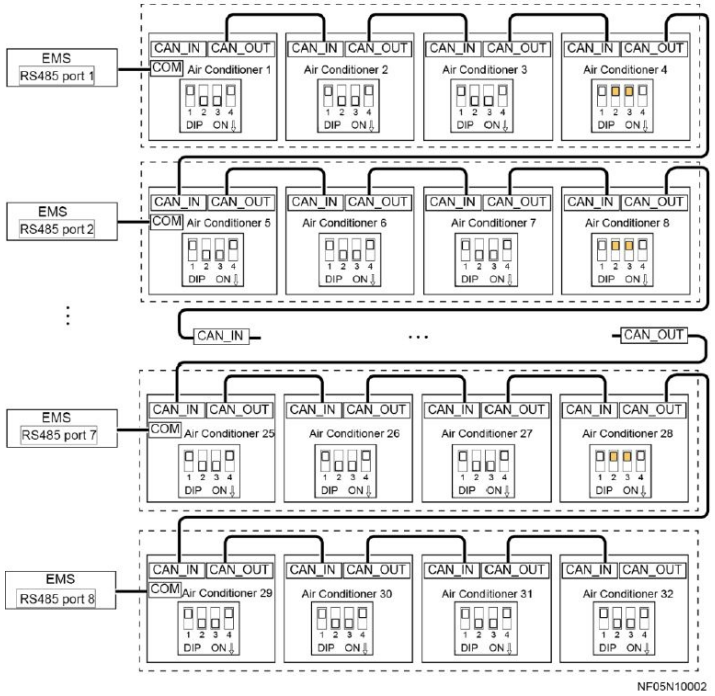
Networking mode 1: FE teamwork network. The FE teamwork network cable connects the POE port on the smart ETH gate to the air conditioner cabinet.

Network mode 2: CAN teamwork network. In CAN networking, a maximum of 32 air conditioners can be teamworked. If CAN networking is required, set Teamwork CAN resistor enable on Teamwork Settings of the first and last air conditioners to Yes. The CAN teamwork network cable connects the CAN_OUT port of each air conditioner to the CAN_IN port of the following air conditioner.

22. Connect the teamwork network cable.



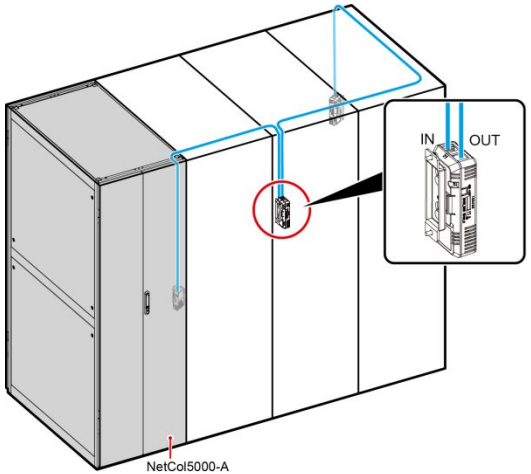
Monitoring mode 1: FE monitoring network cable (using the SNMP or Modbus-TCP protocol). Connect one end of the monitoring network cable (standard network cable; prepared by the customer onsite) to the FE port on the main control module, and connect the other end to the monitoring device.



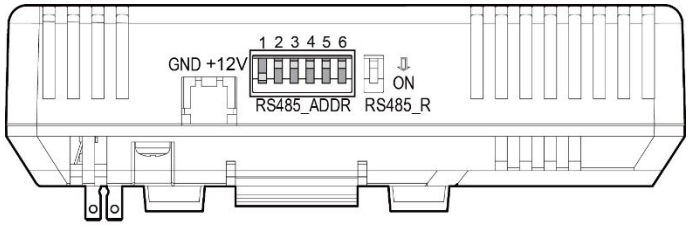
Monitoring mode 2: RS485 monitoring network cable (using the Modbus-RTU protocol). When the CAN teamwork networking is used inside the air conditioners, connect the external monitoring network cable to the RS485 port on the air conditioner. To use the northbound RS485 monitoring, the communications protocol should be Modbus-RTU.

23. Connect the monitoring network cable.

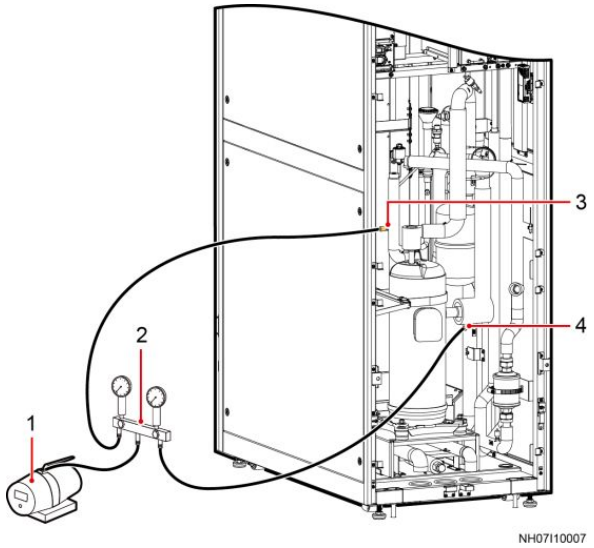
4 Installation and Commissioning



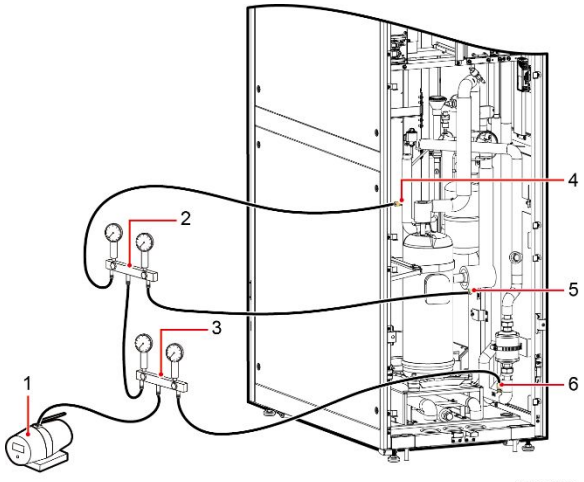
1. Connect the T/H sensors outside the cabinet and the T/H sensors at the return air side in series. (T/H sensors outside the cabinet can be flexibly installed on the server cabinet based on onsite situation. It is recommended that the T/H sensors be deployed near heat sources in the hot aisle. Binding straps can be used to fasten the sensors.)
2. Set the DIP switches of the T/H sensors.



24. Connect the T/H sensor outside the cabinet.



Without a low-temperature component

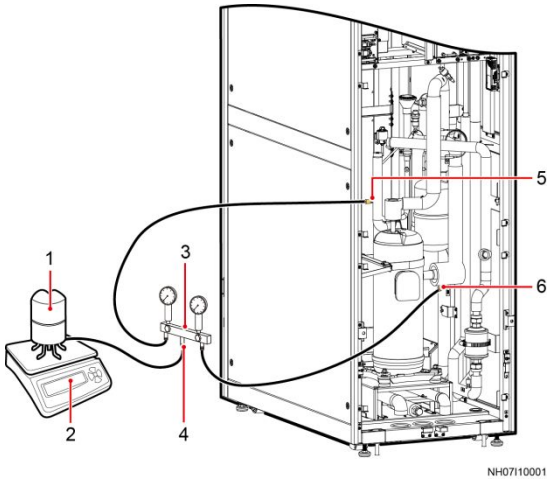


With a low-temperature component

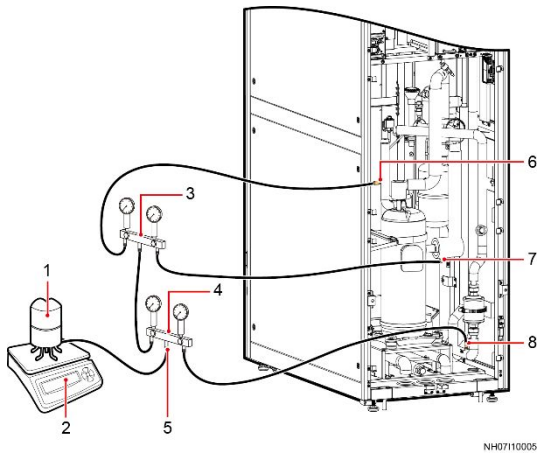
When a low-temperature component is not used, vacuumize the cooling system at the discharge pipe and low-pressure needle valves simultaneously to ensure that the pressure is lower than or equal to 60 Pa (absolute pressure). (If the precision of the pressure gauge is too low to display 60 Pa (absolute pressure), ensure that the pressure gauge pointer stays at the minimum scale while vacuumizing the cooling system. Preserve the pressure for 1 hour, and ensure the displayed pressure does not increase obviously.) Close all the pressure gauge valves and the vacuum pump after vacuumizing the cooling system. Preserve the pressure for 10 minutes without disconnecting the connection. The pressure should be lower than or equal to 90 Pa (absolute pressure).

25. Vacuumize the cooling system.

4 Installation and Commissioning



Without a low-temperature component



With a low-temperature component

The amount of refrigerant precharged must be more than half of the total charge amount calculated and less than the total charge amount. If refrigerant is not charged to the total amount in the precharging process, charge the remaining amount of refrigerant during wizard commissioning. (Preheating must be performed before startup.)

26. Precharge refrigerant.

27. Prepare for power-on. Verify that the circuit breakers, cables, and water inlet and outlet pipes are properly connected.
28. Power on the air conditioner for preheating.
29. Close the discharge pipe needle valve. Charge the remaining refrigerant from the low-pressure needle valve of a refrigerant pipe in small flows or in an intermittent manner. Ensure that the refrigerant is fully charged.

30. Perform the wizard startup, and check the items as required after commissioning.

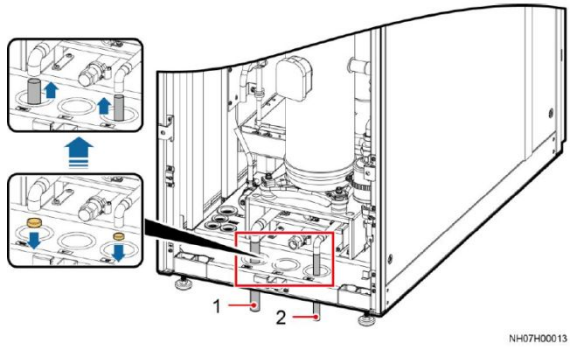
31. Power off the air conditioner.

Check Item	Result
The temperature and humidity are properly set.	□ Passed □ Failed
No oil stain exists on the copper pipe thermal insulation foam or bottom plate, or it has been cleaned.	□ Passed □ Failed
The needle valve plug is secured, and valve bonnet is tightened.	□ Passed □ Failed
The foreign matter inside the water pan and bottom plate is cleaned up.	□ Passed □ Failed
The air filter is correctly installed according to the air flow direction on the frame.	□ Passed □ Failed

4.5 Installation Precautions

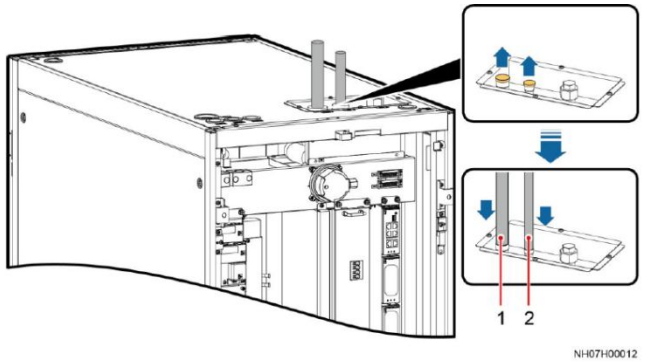
Pipe Welding

- Before the welding, take measures to protect needle valves (discharge pipe needle valve) within 500 mm from the welding position by removing the valve plug or wrapping the valve with a piece of wet cloth.
- During the welding, use a rubber hose to connect the nitrogen cylinder, which has connected to the reducing valve, to one end of the gas pipe at the indoor side, and then fill nitrogen at 0.03–0.05 MPa into the copper pipe. Feel slight nitrogen flows from the welded side of the gas pipe with your hand.
- During the welding, avoid burning the bottom panel, top panel, side panel, and other components, especially thermal insulation foam, labels, water pipes, and cables on the side panel.
- During the welding, avoid exposing the refrigerant pipes for over 15 minutes. Otherwise, system reliability is affected.
- To avoid leakage of air channels and damage to copper pipes, seal the holes after the pipes are routed through the bottom panel. Seal the top of the copper pipes to prevent foreign matter from entering the refrigerant pipes.
- The refrigerant pipe should be wrapped with thermal insulation foam.
- Avoid elbows and ensure that the connection between the indoor and outdoor units is the shortest.



(1) Gas pipe (2) Liquid pipe

Bottom pipe routing



(1) Gas pipe (2) Liquid pipe

Top pipe routing

4.5 Installation Precautions

Foreign Matter Discharge for Pipes

Foreign matter discharge for an air pipe (the procedure is similar for discharging foreign matter from a liquid pipe):

1. Connect one end of the leather hose to the nitrogen cylinder with a reducing valve, and connect the other end to the refrigerant air pipe in the unit in a higher position (if the outdoor unit is higher than the indoor unit, connect the hose to the outdoor unit; otherwise, connect the hose to the indoor unit).
2. Block the other end of the refrigerant air pipe using hands.
3. Adjust the nitrogen reducing valve to set the nitrogen pressure to 1 MPa, and add pressure to the copper pipe.
4. Remove the hand that blocks the end of the air pipe quickly so that the foreign matter inside the pipe can be discharged with the impact of airflow.
5. Repeat steps 2 to 4 for multiple times until no foreign matter is discharged.
6. After discharging foreign matter, remove the leather hose that connects to the air pipe and seal the two ends of the pipe using tape to prevent foreign matter from entering the pipe again.

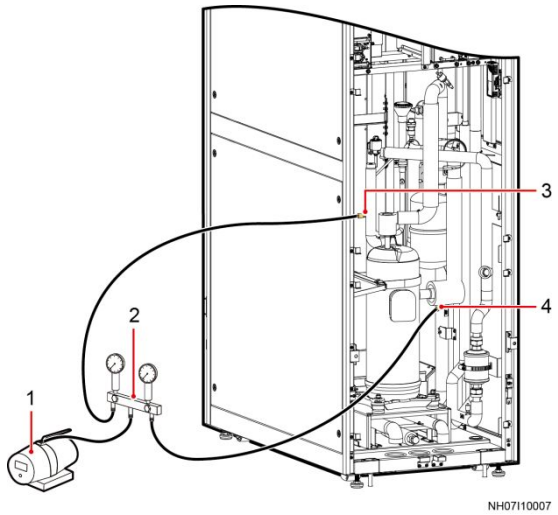
Note:

- The plug cannot directly point to people during nitrogen charging.
- The end of the leather hose that connects to the refrigerant air or liquid pipe must have favorable sealing performance.
- Direction of foreign matter discharge: Charge nitrogen from the higher end of the air or liquid pipe and discharge foreign matter from the lower end of the pipe to avoid being affected by the gravity of the foreign matter.
- After foreign matter drainage, seal the two ends of the pipe properly to prevent foreign matter from entering the pipe again.

4.5 Installation Precautions

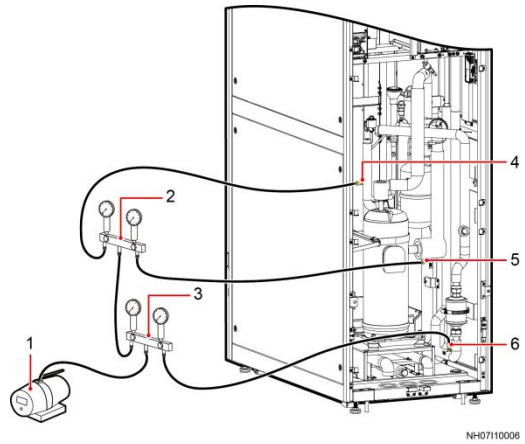
Vacuumizing

- After checking that the cooling system does not leak, vacuumize the cooling system and ensure that the pressure displayed on the vacuum pump is less than or equal to 60 Pa (absolute pressure). Pump for another 30 minutes, and ensure that the reading of the pressure gauge does not change and the indication of sight glass is dry (green).
- After vacuumizing the cooling system, close all the pressure gauge valves and the vacuum pump. Preserve the pressure for 10 minutes without disconnecting the connection. The pressure should be lower than or equal to 90 Pa (absolute pressure).



Vacuumizing the system without a low-temperature component

(1) Vacuum pump
(2) Pressure gauge
(3) Low-pressure needle valve
(4) Discharge pipe needle valve



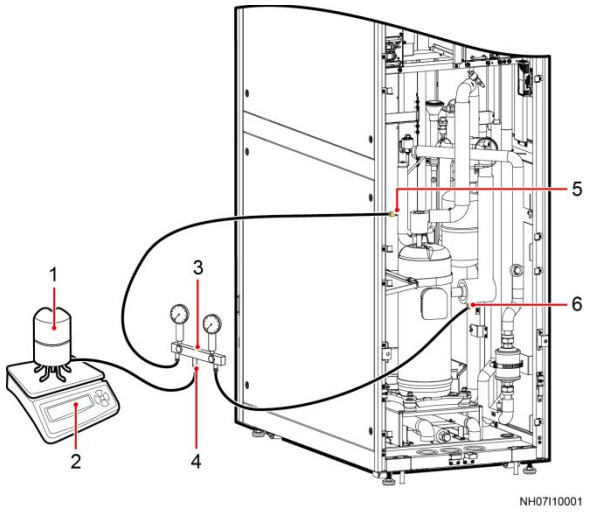
Vacuumizing the system with a low-temperature component

(1) Vacuum pump
(2) Pressure gauge 1
(3) Pressure gauge 2
(4) Low-pressure needle valve
(5) Discharge pipe needle valve
(6) Liquid pipe needle valve

4.5 Installation Precautions

Refrigerant Charging

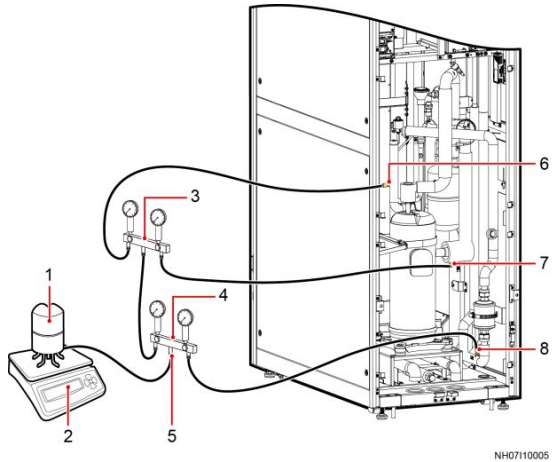
- Remove the vacuum pump from the vacuumizing equipment, and replace the vacuum pump with a refrigerant cylinder.
- Slightly open the refrigerant cylinder valve and loosen the connection nut of the pressure gauge. Tighten the nut when cold air escapes out of the nut.
- Put the refrigerant cylinder upside down on the electronic scale. Clear the reading on the balance.
- Open all the valves to charge refrigerant. The amount of refrigerant precharged must be more than half of the total charge amount calculated and less than the total charge amount. If refrigerant is not charged to the total amount in the precharging process, charge the remaining amount of refrigerant during wizard commissioning. (Preheating must be performed before startup.)
- After charging refrigerant, close the pressure gauge valves and refrigerant cylinder valve.



Charging refrigerant into the system without a low-temperature component

(1) Refrigerant cylinder (2) Electronic scale (3) Pressure gauge

(4) Connection nut (5) Low-pressure needle valve (6) Discharge pipe needle valve



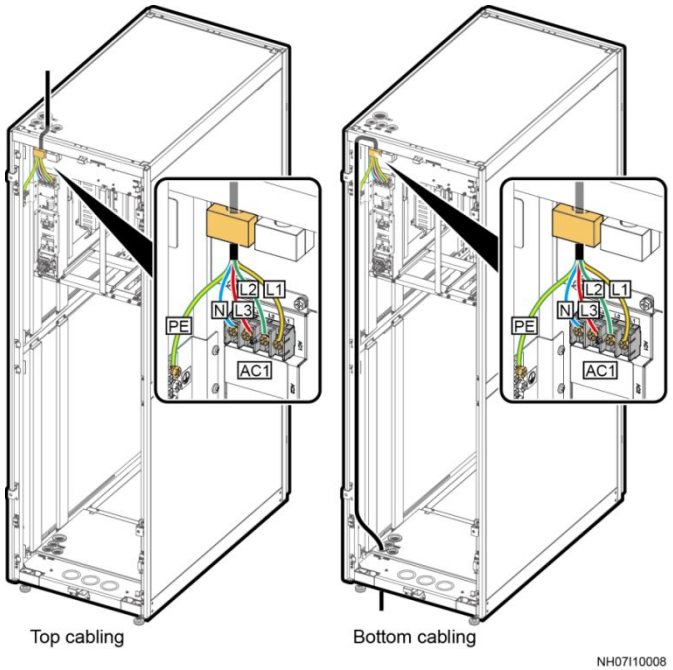
Charging refrigerant into the system with a low-temperature component

(1) Refrigerant cylinder (2) Electronic scale (3) Pressure gauge 1 (4) Pressure gauge 2

(5) Connection nut (6) Low-pressure needle valve (7) Discharge pipe needle valve (8) Liquid pipe needle valve

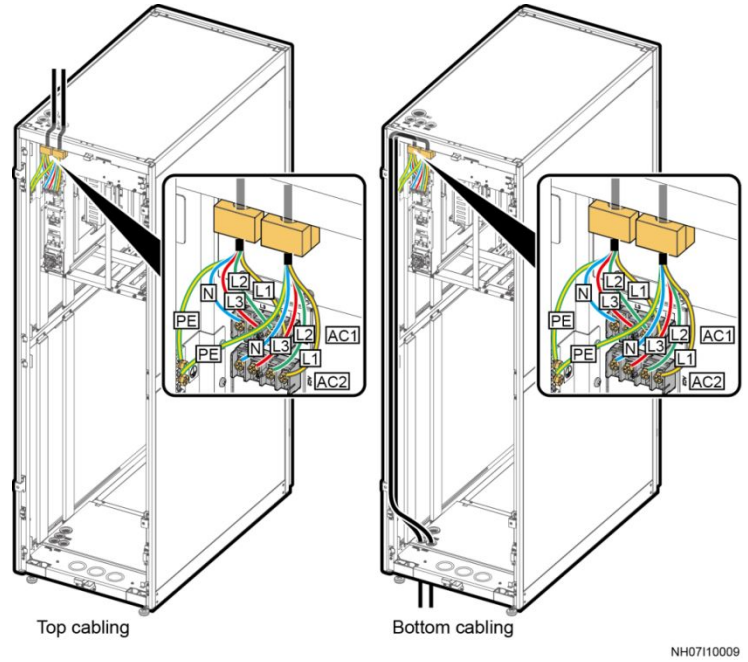
4.5 Installation Precautions

Cable Connections for Indoor Units



Routing cables for an indoor unit with single power supply

Route the external power cable through the cabinet cable hole to the L1, L2, L3, and N ports of the AC1 terminal on the indoor unit. Then connect the PE cable to the cabinet ground bar.



Routing cables for an indoor unit with dual power supplies

Route the external power cable through the cabinet cable hole to the L1, L2, L3, and N ports of the AC1 and AC2 terminals on the indoor unit. Then connect the PE cable to the cabinet ground bar.

4 Installation and Commissioning

4.5 Installation Precautions

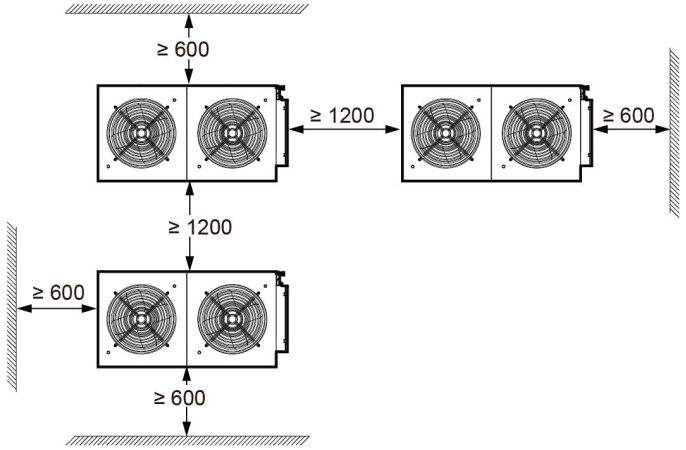
Outdoor Unit

- Connecting pipes for the outdoor unit:
  Before welding pipes, take measures to protect nearby cables and components from being burnt.
- Connecting cables:
  The connection of all power cables, control cables, and ground cables must comply with local electrical regulations and cable specifications should comply with local cabling rules.
  Electrical connection can be performed only by trained professionals.
  Before connecting power cables, use a voltmeter to measure the input voltage and ensure that the power supply is disconnected.
- Connecting power cables:
  Before connecting power cables, use a voltmeter to measure the input voltage and ensure that the power supply is disconnected.
- Connecting signal cables:
  The outdoor unit signal cable can connect to a dry contact or RS485 port. Determine the connection mode based on that of the indoor unit. (RS485 is used by default.)

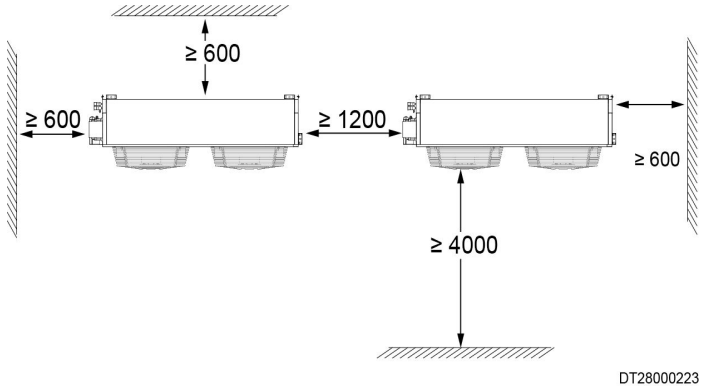
4.5 Installation Precautions

Outdoor Unit Installation Space

Space requirements for horizontal installation (top view)



Space requirements for vertical installation (top view)



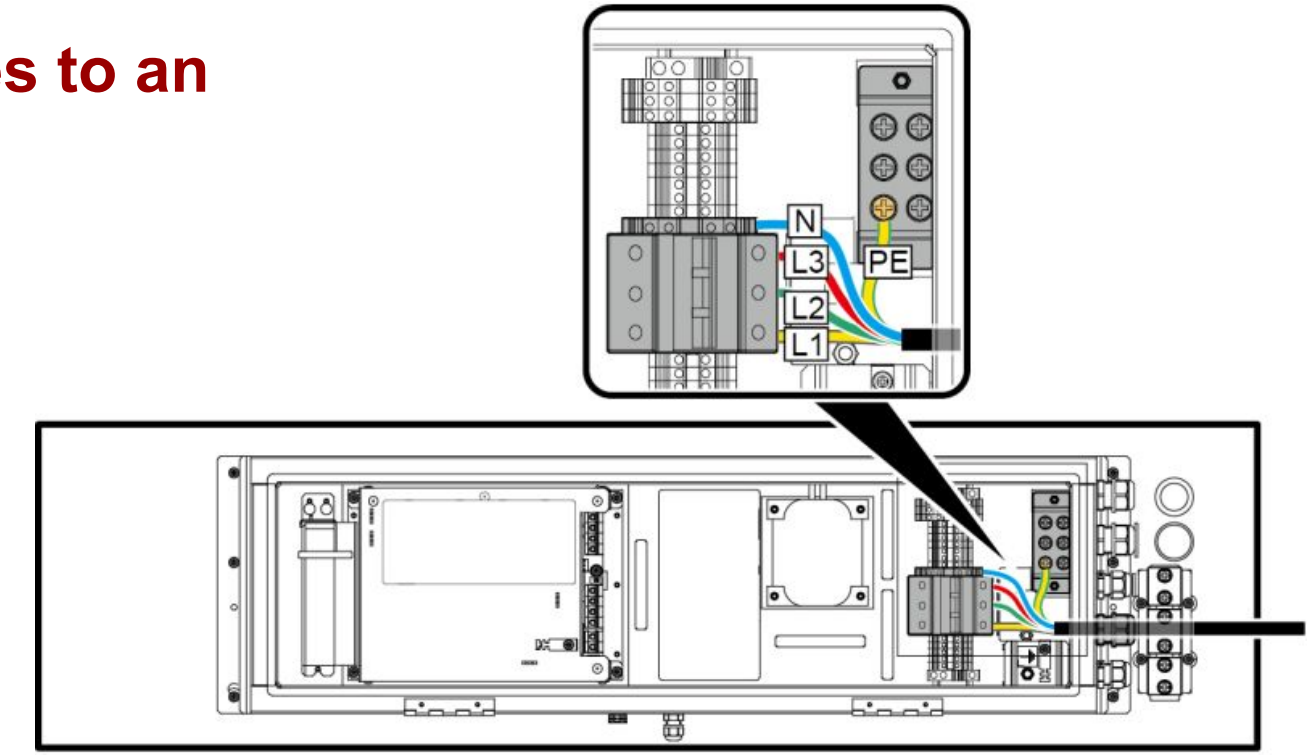
Note:

- The shaded parts in the figures are obstacles. The distances marked are the minimum distances required between an outdoor unit and obstacles. The outdoor unit is free of barriers above.
- When you install the outdoor unit, ensure that air smoothly flows into and out of the condenser. If you install the outdoor unit vertically, ensure that the air produced by fans flows in and out is in the same direction as the monsoon.
- In high-temperature areas, avoid exposing the outdoor unit to direct sunshine. Take thermal insulation measures for indoor and outdoor connecting pipes.
- Install the outdoor unit in a clean area far from residential areas, deserts, and windy and sandy areas. Prevent sands from entering the condenser.
- When moving the outdoor unit, do not use copper pipes or electrical control box as force bearing points and keep the fins intact.
- The device is nitrogen loaded before delivery. If no nitrogen is discharged, contact Huawei technical support.

4.5 Installation Precautions

Power Cable Connection

—Connecting Power Cables to an Outdoor Unit



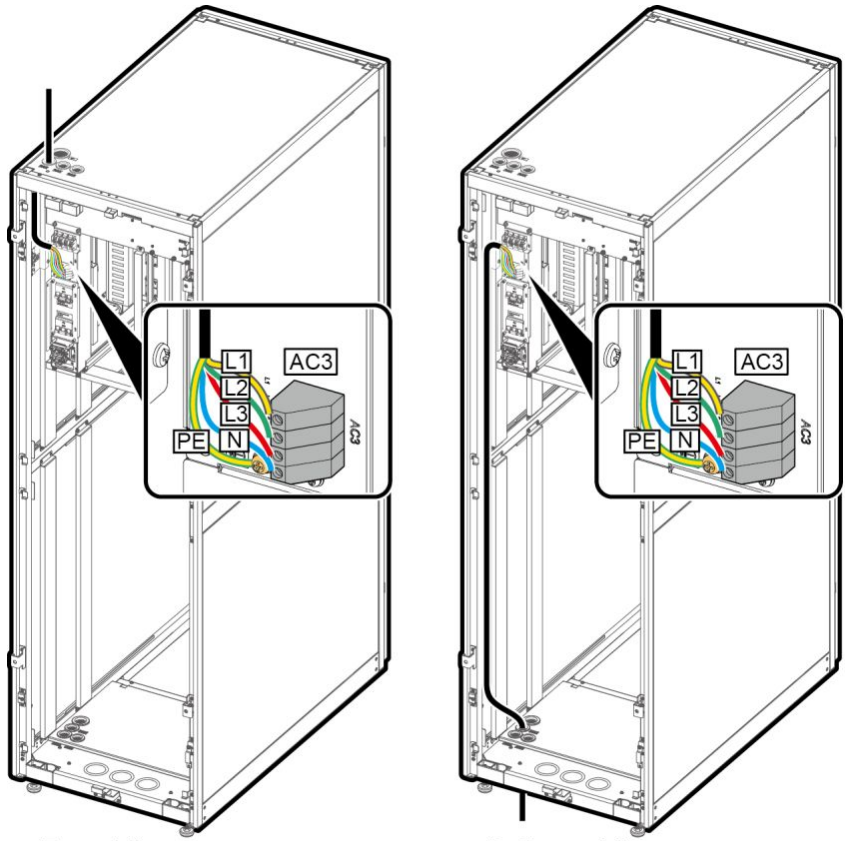
4.5 Installation Precautions

Power Cable Connection — Outdoor Unit

Obtaining Power from the Indoor Unit

Route the outdoor unit power cable through the cabinet cable hole to the L1, L2, L3, and N ports of the AC3 terminal on the indoor unit. Then connect the PE cable to the PE bar on the right of the AC3 terminal.

Note:
The figure shows how to connect the outdoor unit power cable AC3 in the single power supply scenario. The cable connection method is the same when there are two power supplies.



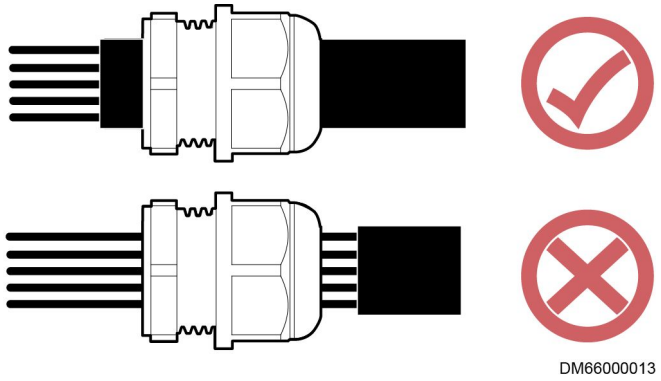
Top cabling

Bottom cabling

NH07I10013

4.5 Installation Precautions

Power Cable Connection



Installing a PG connector

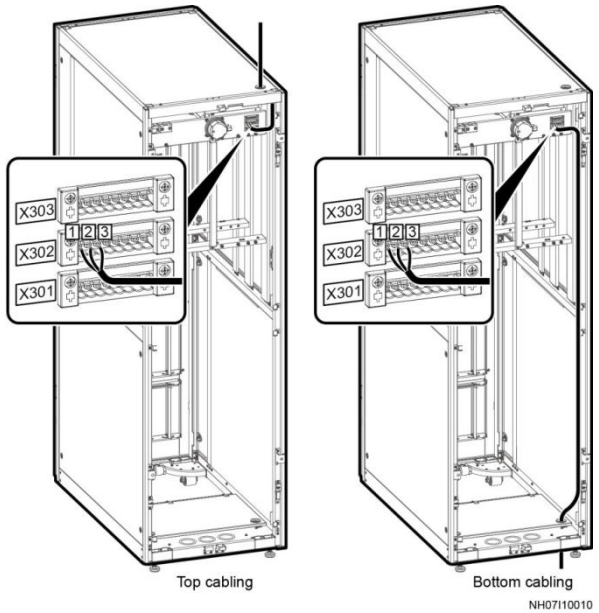
Cable Type	Name	Specifications	Description
Power cable	NetCol500-A026SC11E0 power cable (optional)	220–240 V: power cable, 300 V, 3 x 2.5 mm^2, 21 A, three cores, outdoor cable	220–240 V: L/N/PE Cable outer diameter: 10–13 mm
	Power cable for other types of outdoor units (optional)	380–480 V: power cable, 600 V/1000 V, ZA-RVV, 2.5 mm^2, 27 A, five cores, outdoor cable	380–480 V: L1/L2/L3/N/PE Cable outer diameter: 13–15 mm
Signal cable	Signal cable (optional)	Power cable, 300 V, SJTW, 3 x 16 AWG, black (three cores: black, white, and green), 10 A, shielded outdoor cable, UL, equipped with plug 14170097	Used to connect dry contacts and RS485 ports. Cable outer diameter: 7–9 mm
	Signal cable terminal (standard)	Bare crimp terminal, single cord end terminal, 1.5 mm^2, 7.5 A, tin plated, 8 mm insertion depth, red	-

Note:

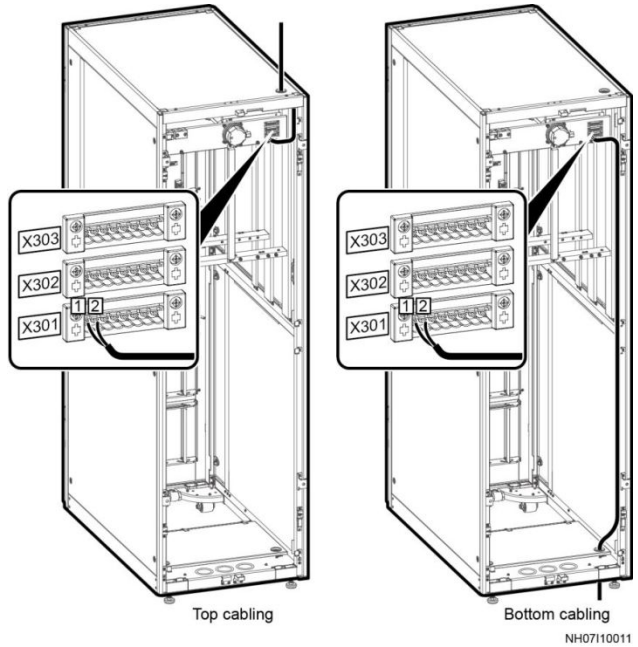
1. Tighten the PG connector securely. Otherwise, water may seep into the electric control box, burning out the controller.
2. Tighten the screws on the electric control box of the outdoor unit.
3. Select cables for the outdoor unit based on required cable diameters. Otherwise, the PG connector cannot be tightened, and water may seep into the electric control box.
4. Ensure that the PG connector is properly insulated. Otherwise, the electric control box may be burned out.

4.5 Installation Precautions

Signal Cable Connection



(RS485 connection) Connect one end of the cable to points 1, 2, and 3 on the external signal port X302 and the other end to ports 3, 4, and 5 on the outdoor unit.



(Dry contact connection) Connect one end of the cable to points 1 and 2 on the external signal port X301 and the other end to ports 1 and 2 on the outdoor unit.

Generally, connect the outdoor unit signal cable to an RS485 port. (**Outdoor fan control mode** is set to **Communicate** by default.) To connect the signal cable to a dry contact, set **Settings > System Settings > Outdoor Fan > Outdoor fan control mode** to **Dry contact**.

Note

- Signal cables with strong power must be separated from signal cables with weak power.
- Signal cables are shielded communications cable.

4.6 Verifying the Installation

Expected Result	Actual Result
Ports are connected correctly. The pipelines have oil trap, inverted traps, gradients (of refrigerant pipes), and pipe supports.	□ Passed □ Failed
The hose clamps and cable ties of the condensate water pipe are reliably secured.	□ Passed □ Failed
All pipes are secured reliably and steadily.	□ Passed □ Failed
All pipes are wrapped with thermal insulation foam, and the insulation foam is intact.	□ Passed □ Failed
The water pipe joints are sealed by sealant.	□ Passed □ Failed
Check that the needle valve plug is secured (torque of 0.45±0.05 N•m), and valve bonnet is tightened.	□ Passed □ Failed
The pipes are not seriously bent.	□ Passed □ Failed

Expected Result	Actual Result
Cables are intact and not over-bent.	□ Passed □ Failed
No open or short circuits, or incorrect connections occur in electrical loops.	□ Passed □ Failed
The power cables for the indoor and outdoor units, signal cable, teamwork cable, and T/H sensor cable are connected as required.	□ Passed □ Failed
The rated specifications of the upstream general circuit breaker meet the maximum current requirement.	□ Passed □ Failed
All cables, connectors, and screws are secured.	□ Passed □ Failed
Devices are properly grounded.	□ Passed □ Failed

Check Item	Expected Result	Actual Result
Cabinet	The cabinet is installed properly, without any tilts.	□ Passed □ Failed
	The cabinet is secured to the bottom base using bolts as required.	□ Passed □ Failed
	The foreign matter inside the cabinet such as cable ties and stubs is cleaned up.	□ Passed □ Failed
EC fan	The fan is secured.	□ Passed □ Failed
	The fan has no foreign matter inside.	□ Passed □ Failed
	The fan blades rotate properly.	□ Passed □ Failed
Wet film humidifier	The water inlet solenoid valve is secured reliably and steadily.	□ Passed □ Failed
	The humidifier water pump is secured reliably and steadily.	□ Passed □ Failed
	The wet film is secured reliably and steadily.	□ Passed □ Failed
	The humidifier float is secured. The fasteners for the humidifier float are secured.	□ Passed □ Failed
	Water inlet pipes are connected securely without leaks.	□ Passed □ Failed
Compressor	The sheet metal for transporting the compressor is removed.	□ Passed □ Failed
	The bolts on the compressor are tightened.	□ Passed □ Failed
Condensate pump	The water inlet pipes and drainpipes of the water pump are securely connected without leaks.	□ Passed □ Failed
	The condensate pump is securely connected to its base.	□ Passed □ Failed
Liquid level detector	The liquid level detector is secured.	□ Passed □ Failed
	The fasteners for the liquid level detector are secured.	□ Passed □ Failed
	The low liquid level detector functions flexibly.	□ Passed □ Failed
Water pan	The foreign matter inside the water pan is cleaned up, and water pan filter is not blocked.	□ Passed □ Failed
Differential pressure switch	The cable ties on the differential pressure tubes are secured.	□ Passed □ Failed
	There is no foreign matter in the differential pressure tubes. The differential pressure tubes are not seriously bent.	□ Passed □ Failed
Air filter	The air filter is correctly installed according to the air flow direction on the frame.	□ Passed □ Failed

4.7 Power-On Commissioning

Preparing for Power-On

1. Verify that the air conditioner switch in the upstream power distribution cabinet (PDC) is OFF.
2. Verify that the input voltage meets the requirement.
3. Ensure that there is no reverse or open phase for the input power cable of the air conditioner. Otherwise, the air conditioner may be damaged beyond repair.
4. Verify that the L1, L2, L3, N, and PE wires are connected to the indoor and outdoor units in correct phase sequence.
5. Verify that the signal cable between the indoor and outdoor units is properly connected.
6. Verify that the water sensor is properly installed.
7. If teamwork networking is required, verify that the teamwork cable is correctly connected.
8. Verify that the cable connections and DIP switch settings of the T/H sensors are correct.
9. If humidifier is required, verify that the main water inlet valve is open.
10. Verify that the humidifier water inlet pipe and drainpipe are correctly connected, refrigerant pipes are connected, and refrigerant has been precharged.
11. Verify that fan switches Fan1–Fan10 are turned on.

Powering On the Device

- Turn on the air conditioner switch in the upstream PDC.
- Verify that the switch QF3 that controls the outdoor unit and compressor, and switch QF4 that controls the electric heating are switched on.
- Verify that fan switches Fan1–Fan10 are turned on.
- After the system is powered on for the first time, the **Quick Settings** screen is displayed. Set the parameters.
- Select the language: English or Chinese.
- Set the time and date: date format, date, time, and time zone.
- Select the monitoring mode.
- Check whether the voltage is correct.

- On the home screen of the controller, tap **Settings > System Settings > T/H Sensor.** Then, on the displayed screen, select the control type and set point and set parameters.

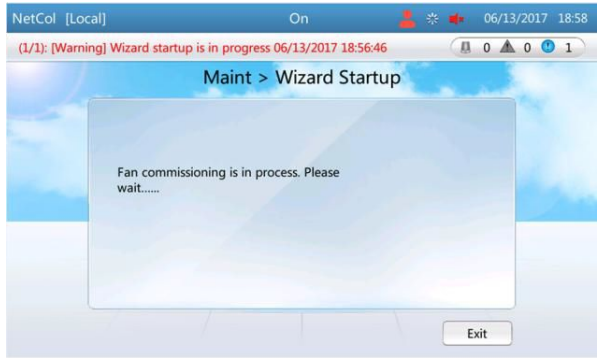
Wizard Start Commissioning

1. On the home screen, tap **Maint** > **Wizard**, and tap **Yes**.

2. Tap **Yes** to perform check before startup.

3. Tap **Yes** until all check items have been checked.

4. Select commissioning items as expected. If water is unavailable, do not select **Humidifier commissioning**.



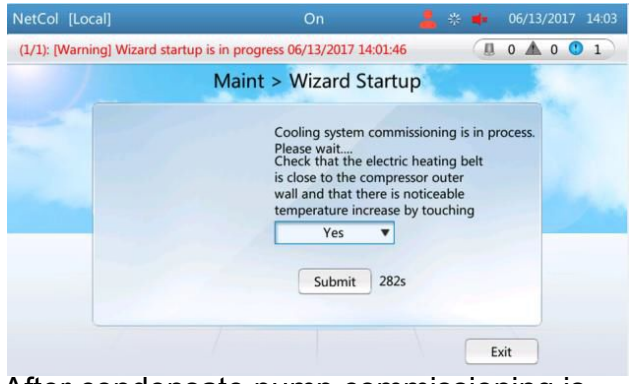
5. Tap **Yes**. Fan commissioning is started.

6. After fan commissioning, electric heater commissioning is started. Read L1, L2, and L3 current from the clamp meter in the input end.

Wizard Start Commissioning

7. After electric heater commissioning is complete, humidifier commissioning is started. Check whether the humidifier pipes and the solenoid valve leak.

8. After humidifier commissioning is complete, condensate pump commissioning is started. Check whether the condensate pump vibrates and generates operating sound



9. After condensate pump commissioning is complete, cooling system commissioning is started. Check whether the electric heating belt is firmly attached to the compressor outer wall and whether there is noticeable temperature rise by touching the belt surface.

10. View the commissioning result. The first figure indicates that commissioning succeeds, and the other two figures indicate that commissioning fails.

Precautions for Wizard Startup

1. Ensure that refrigerant is fully charged before performing the wizard startup.
2. Tapping **No** or **Exit**, submission timeout, and system exception all result in commissioning failures. Tap **Maint** > **Wizard Startup** to enter the **Wizard Startup** screen for new commissioning.
3. If the system is not configured with the electric heater and humidifier components, the electric heater and humidifier commissioning items will not appear on the screen.
4. If the heating function and humidification function are disabled, you cannot select the electric heater and humidifier items.
5. All the items are selected by default if you first enter the screen where you select commissioning items. Except that the indoor fan item is mandatory, you can clear other commissioning items that are not required.

Check After Commissioning

Check Item	Check Result
The temperature and humidity are properly set.	□Passed□Failed
No oil stain exists on the copper pipe thermal insulation foam or bottom plate, or it has been cleaned.	□Passed□Failed
The needle valve plug is secured, and valve bonnet is tightened.	□Passed□Failed
The foreign matter inside the water pan and bottom plate is cleaned up.	□Passed□Failed
The air filter is correctly installed according to the air flow direction on the frame.	□Passed□Failed

Powering Off the Device

- Excise caution as the device is still powered on.
- When replacing or maintaining an air conditioner component, you must power off the air conditioner by switching off the air conditioner circuit breaker in the upstream PDC.

- Tap **Shutdown** on the LCD home screen.
- Switch off all switches in the electric control box of the air conditioner.
- Switch off the air conditioner circuit breaker in the upstream PDC.

----End

Outputting Commissioning Report

Power-On Commissioning Report on the Air-Cooled Precision Air Conditioner

Customer name:_____Contract No.:_____
Address:_____

Contact person:_____Phone number: _____Fax number:_____

Indoor unit model:_____

Indoor unit number:_____

Outdoor unit model:_____

Outdoor unit number: _____

Commissioning start date:_____

Warranty period:_____to _____

Remarks:_____
_____
_____
_____
_____

Commissioning engineer (sign or stamp here): Customer (sign or stamp here):

Date: _____ Date: _____

Power-On Commissioning Procedure

1. **For an air-cooled unit, check the nitrogen preservation of the refrigerant pipes.**
   Before pressure preservation: indoor unit pressure:_____MPa; ambient temperature:_____°C;
   Pressure reservation period: _____hour;
   After pressure preservation: indoor unit pressure:_____MPa; ambient temperature:_____°C;
   Note: When high-pressure nitrogen is used for pressure preservation, use 3.0 MPa pressure for preservation for at least 24 hours. If the ambient temperatures before and after the pressure preservation test are similar, the recorded pressures should be the same.
2. **For an air-cooled unit, check that the equivalent length of the one-way pipe exceeds 60 m. (For the NetCol5000-A025 and NetCol5000-A021, the equivalent length does not exceed 80 m.) □ Yes □ No**
   Gas pipe diameter:_____; liquid pipe diameter:_____;
   The outdoor unit is _____m □ higher/□ lower than the indoor unit. Equivalent length of the one-way pipe:_____m;
   Number of oil traps:_____
   Is an inverted trap reserved for the inlet and outlet of the outdoor unit? □ Yes □ No
3. **Perform vacuum pumping for the cooling system by following the instructions in the corresponding quick installation guide. Start vacuum pumping from the required needle valve positions and hold the pumping for at least 80 minutes until the system vacuum degree reaches below 60 Pa (absolute pressure). Then, preserve the pressure for 10 minutes. Check that the pressure does not rise to more than 90 Pa.**
   Is the low-temperature component used? □ Yes □ No
   Needle valve 1 for vacuum pumping:_____;
   Needle valve 2 for vacuum pumping:_____;
   Needle valve 3 for vacuum pumping:_____;
   Vacuum pumping duration:_____min;
   Vacuum degree when pressure preservation starts:_____Pa; vacuum degree when pressure preservation ends:_____Pa
   Note: If the minimum reading of the pressure gauge is greater than 60 Pa, ensure that the pointer stays at the smallest scale of the pressure gauge when performing vacuum pumping and preserve the pressure for 10 minutes. Then, check whether the pressure displayed on the gauge has an obvious increase.
4. **Charge refrigerant oil.**
   Is the low-temperature component used? □ Yes □ No
   Is refrigerant oil added to the compressor? □ Yes □ No
   Model of the added refrigerant oil:_____; amount of added refrigerant oil:_____ml;
   Note: Fill the refrigerant oil according to amount requirements in the quick guide or user manual.
5. **Partially fill refrigerant.**
   Partially fill refrigerant at the required needle valve ports and record the positions of needle valves used for filling refrigerant and the amount of filled refrigerant.
   Needle valve 1 for filling:_____;
   Needle valve 2 for filling:_____;
   Needle valve 3 for filling:_____;
   Amount of partially filled refrigerant:_____kg;
   Note: The amount of the partially filled refrigerant must be at least half of the total filling amount and less than the total filling amount.
6. **Check the electrical loop.**
   Check that the air conditioner is installed: □ Yes □ No
   Check that the control cables and power cables are connected properly: □ Yes □ No
   Secure all electrical connections. Check that the circuit is well-insulated and without any short circuit or open circuit.
   □ Yes □ No □ N/A
7. **Switch off the circuit breakers for each component and switch on the general circuit breaker and control circuit breaker.**
   □ Yes □ No □ N/A
   Record unit supply voltages:
   Main input: L1–L2 V L2–L3: V L1–L3: V
   Backup input: L1–L2: V L2–L3: V L1–L3: V
   Note: The voltage of main and backup inputs should be within the range of rated voltage±10%.
8. **Check the indoor fan.**
   Enter the diagnostic mode, start the fan, and check that the fan rotates properly.
   □ Yes □ No □ N/A
   Change the output percentage of the fan (0, 50%, 80%), and check that the air exhaust changes greatly.
   □ Yes □ No □ N/A
9. **Check the electric heater (optional).**
   Start the electric heater in diagnostic mode and check that hot air flows out of the heater outlet.
   □ Yes □ No □ N/A
10. **Check the humidifier (optional).**
    Start the humidifier in diagnostic mode, adjust the output to 50%, and check that:
    Water leakage does not occur in the water inlet and outlet pipes. □ Yes □ No □ N/A
    Water drainage is smooth. □ Yes □ No □ N/A
    Water flows into and out of the humidifier properly. □ Yes □ No □ N/A
    The humidifier performs humidification successfully (the humidifier cylinder becomes hot and the water boils) in less than 30 minutes after water is supplied.
    □ Yes □ No □ N/A
11. **Check the water pump (optional).**
    Lift the low liquid level detector and check that you can hear the water pump operating sound after 30 seconds.
    □ Yes □ No □ N/A
    Lay down the low liquid level detector and shut down the water pump. Check that:
    Water leakage does not occur in the water inlet and outlet pipes. □ Yes □ No □ N/A
    Water drainage is smooth. □ Yes □ No □ N/A
12. **Check the outdoor unit.**
    Check that the outdoor unit is installed properly. That is, check that power cables and signal cables are connected correctly and secured properly, that the fan blades do not rub against the deflector edges, and that foreign matters near the outdoor unit are cleaned up.
    □ Yes □ No
    Check that the fan rotates properly, and measure the input voltage of the outdoor unit.
    L1–L2: V L2–L3: V L1–L3: V
    Note: Record the input voltage for the outdoor unit with three-phase power input. The voltage should be within the range of rated voltage±10%.
    L–N: V
    Note: Record the input voltage for the outdoor unit with single-phase power input. The voltage should be within the range of rated voltage±10%.
    Check the operating current of each phase of the outdoor unit. / / A
    Note: The current must be less than the maximum current of the outdoor unit listed in the outdoor unit user manual. For the single-phase outdoor unit, you can record the single-phase current only.
13. **Check the low-temperature component (optional).**
    Check that the low-temperature component is installed properly. That is, check that the cable connection is correct and secure, that the pipe connections to the indoor and outdoor units are correct, that there is a support or concrete base. □ Yes □ No
14. **Check that the heating belt has been preheated for more than 12 hours.**
    □ Yes □ No □ N/A
15. **Start the cooling system and fill refrigerant.**
    For an air conditioner other than NetCol5000-A020, adjust the compressor rotational speed to 3000 RPM on the diagnostic mode screen.
    Record: suction pressure_____ MPa; discharge pressure _____ MPa
    Actual total refrigerant amount:_____ kg
    Note: For details on the allowed ranges of suction pressure and discharge pressure, see the corresponding quick guide or user manual.
16. **Check the operating parameters of the cooling system.**
    Indoor return air temperature and humidity: _____°C/ _____% RH
    Outdoor ambient temperature: _____ °C
17. **Check the operating current of each phase of the indoor unit. / / A**
    Note: The current must be less than the maximum current of the indoor unit listed in the indoor unit user manual.
18. **Check the oil level (except the models without oil sight glass: 25 kW and 21 kW half-sized variable-frequency air conditioners, 20 kW half-sized constant-frequency air conditioners, and 11 kW rack-mounted air conditioners) and liquid sight glass color when the compressor is running properly.**
    Oil level: (proportion of oil height to the sight glass height)
    Note: The oil level test is not required for 25 kW and 21 kW half-sized variable-frequency air conditioners, 20 kW half-sized constant-frequency air conditioners, and 11 kW rack-mounted air conditioners.
    Liquid sight glass: (yellow or green)
    Note: After the compressor runs for 20 min, the oil level of the oil sight glass should be over 1/3 and there is no foreign matter and turbidity. The liquid sight glass should be green.
19. **Set all parameters to the required values and train the maintenance personnel from the customer onsite.**
    □ Yes □ No

Commissioning engineer (sign here): Customer representative (sign here):

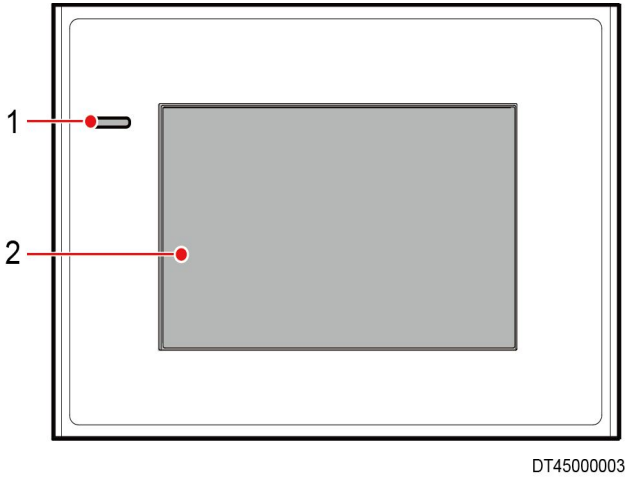
Date: Date:

Screen Description

Start screen

- 7-inch true color touchscreen
- The standby screen becomes dark if no button is pressed during a period of 3 minutes.

- The startup process requires about 90s.
- After the NetCol5000-A is powered on for the first time, the LCD displays the **Quick Settings** screen. Set parameters based on instructions, such as **Language**, **Date**, **Time**, **Time zone**, **Monitoring mode**, and **Energy-saving mode**.



Indicators

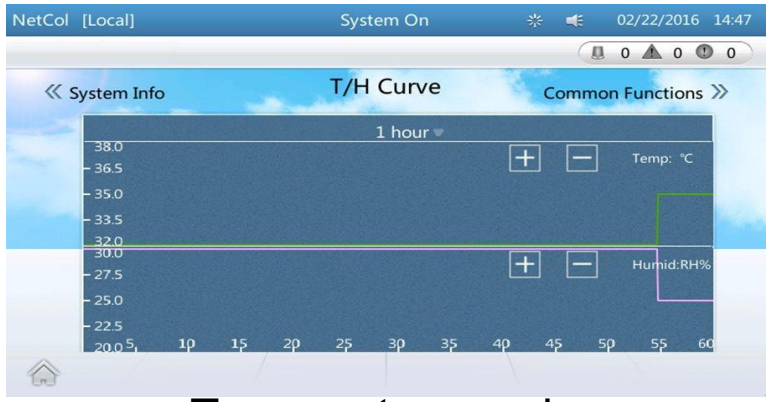
Indicator	Alarm Status
Green indicator	The device is operating properly, or a warning is generated.
Yellow indicator	A major alarm is generated.
Red indicator	A critical alarm is generated.

If multiple alarms are generated, the indicator enters the status that represents the severest alarm.

Screen

Home screen

- The upper bar displays the status.
- The bar below the status bar displays alarms.
- On this screen, you can start or stop the air conditioner and learn the basic operating status of the air conditioner.



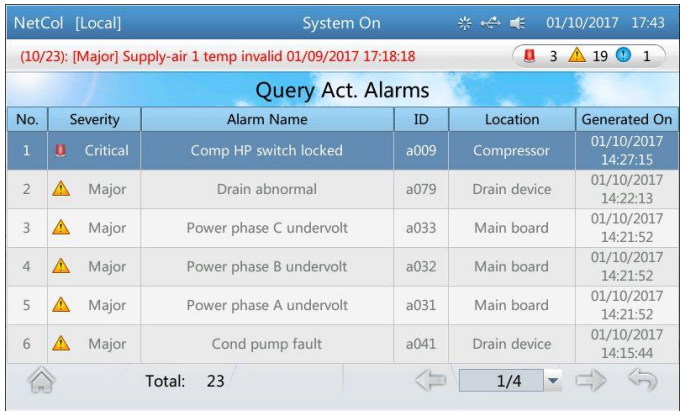
Temperature and humidity curves

- The screen can display curves for recent (the time is optional) temperature and humidity.
- You can choose to display the curves in the last one hour, one day, seven days, or 30 days.

Alarms

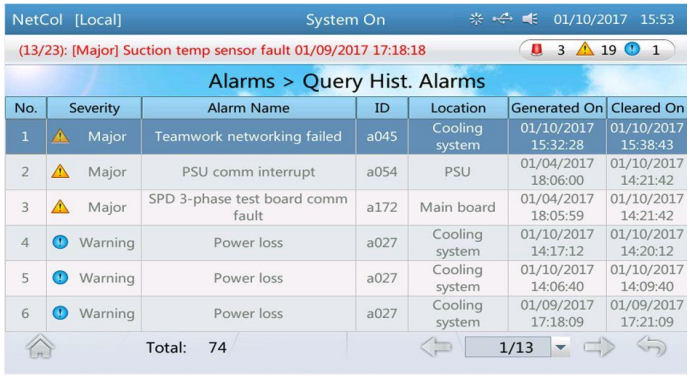
Alarm screen

- Querying active alarms
- Querying historical alarms
- Deleting historical alarms



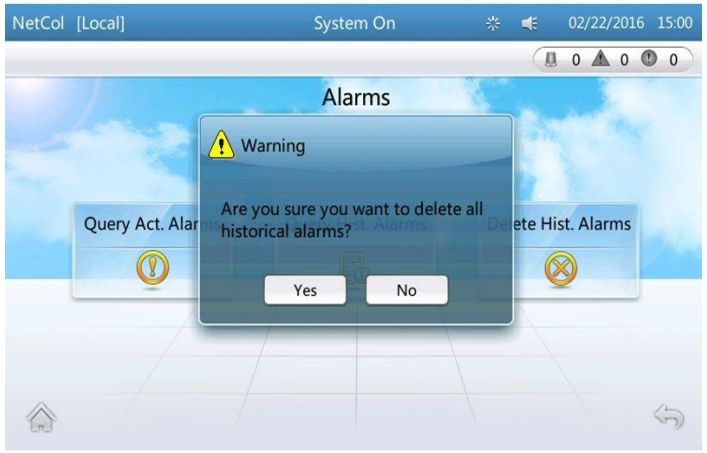
Screen for querying active alarms

- Alarms are displayed in chronological order by generation time. That is, the latest alarm is displayed in the uppermost row.
- If active alarms exist, they are displayed on the alarm bar one by one.
- You can query an alarm on the alarm list based on the alarm ID to view causes of the alarm and methods used to clear the alarm.



Screen for querying historical alarms

- A maximum of 500 historical alarms can be displayed.
- Historical alarms are displayed in chronological order by deletion time. That is, the alarm that is the last being deleted is displayed in the uppermost row.



Screen for deleting historical alarms

- Only the **Admin** users are allowed to delete historical alarms.
- After you tap **Delete Hist. Alarm**, a dialog box is displayed to remind whether you want to continue this operation. Tap **Yes** to delete all historical alarms.

Login Screen

Logging in to **Settings**

- Before logging in to the **Settings** screen to configure the system, enter the user name and password for permission authentication.
- The NetCol5000-A042 is configured with users **Admin** and **Operator**. The default password is 000001. User **Admin** has all operation rights. User **Operator** has only permission to view parameters and set parameters on the **User Settings** and **Comm Settings** pages.

Settings

Settings screen

- On the **Settings** screen, you can set parameters on the **User Settings**, **Comm Settings**, **Alarm Settings**, **System Settings**, **T/H Sensor Settings**, and **Restore Default Settings** pages as required (some settings must be performed by professional personnel and their values must not be changed).

1. The **User Settings** screen allows you to configure the language, system time, and password.
2. The **Comm Settings** screen allows you to configure **Protocol**, **Baud rate**, and **Comm address**.
3. The **Alarm Settings** screen allows you to configure alarms for the T/H sensor, main control board, indoor fans, drainage device, and air conditioning system (Exercise caution when configuring alarms. Changing alarm settings should be performed by professional maintenance personnel).
4. The **System Settings** screen includes the following items: system control, temperature control, humidity control, and indoor-fan control (settings excluding temperature and humidity settings, such as user rights, need to be performed by professional maintenance personnel).
5. The **T/H Sensor setting** screen allows you to set the T/H control type, supply-air temp set point, and supply-air humid set point for temperature control.
6. By restoring preset settings, you can restore parameters to factory values and save the restored values.

Maintenance

Maintenance screen

- This screen consists of **Diagnostic Mode**, **Log Maint**, **Performance Maintain**, **Sensor Adjust**, **Screen Calib**, and **USB Operations**.

1. The **Diagnostic Mode** screen allows you to start or stop a fan or compressor and adjust the speed of an indoor fan and the frequency of a compressor.
2. The **Log Maint** screen allows you to query or delete logs.
3. The **Performance Maintain** screen allows you to query the accumulated runtime of main components and clear the accumulated runtime of certain values.
4. The **Sensor Adjust** screen allows you to set the temperature and humidity deviations to adjust the detection tolerance of the humidity and temperature collection board.
5. The **Screen Calib** screen allows you to correct response position deviations caused by long-term running of the device or for other reasons.
6. After you enter the system upgrade screen but before the system is successfully upgraded, do not forcibly start the system on the NMS or remotely (upgrade operations should be performed by professional engineers).

About

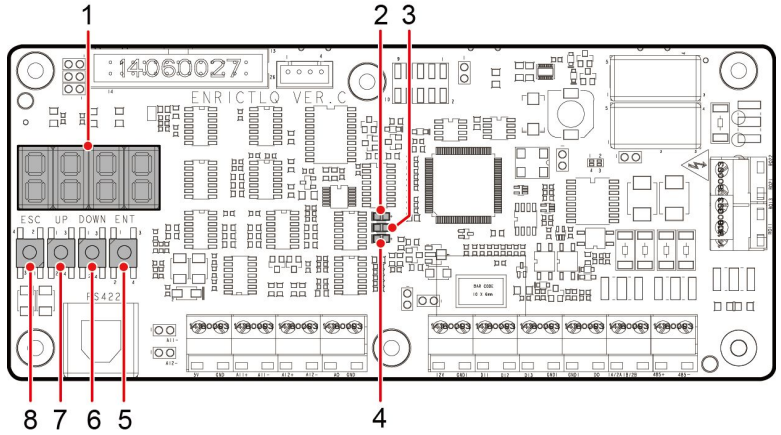
Help screen

- This screen displays the equipment model, manufacturer, monitoring device version, product version, and electronic tag.

4.9 Screen (Outdoor Unit)

Controller for NetCol500-A036 and NetCol500-A072

The following figure shows the screen, containing the nixie tube display, LED indicator, and four keys. You can set the controller by pressing one or more keys simultaneously.



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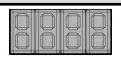
Instructions:

No.	Identifier	Description	Function
1		Nixie tube display	Displays codes and data.
2	Yellow indicator	Alarm indicator	If the yellow indicator is off, no alarm is generated. If the yellow indicator is steady on, there is an alarm.
3	Green indicator	Status indicator	If the green indicator is steady on, the unit is currently in standby mode. If the green indicator blinks, the unit is currently running.
4	Red indicator	Major alarm indicator	If the red indicator is off, no major alarm is generated. If the red indicator is steady on, there is a major alarm.
5	ENT	Enter key	Press this key to enter a submenu. Enable parameter value changes to take effect.
6	DOWN	Down key	Press this key to enter the next screen or decrease the current parameter value. If you press and hold this key for more than 1s, the value of a selected parameter decreases in accelerated mode until you release the key.
7	UP	Up key	Press this key to enter the previous screen or increase the current parameter value. If you press and hold this key for more than 1s, the value of a selected parameter increases in accelerated mode until you release the key.
8	ESC	Return key	Press this key to return to the previous menu or quit the parameter setting or viewing mode. If you press and hold this key for more than 5s, the home screen is displayed.

4 Installation and Commissioning

Summary of This Chapter

This chapter describes installation and commissioning for NetCol5000-A 42 kW air cooled in-row full-sized variable-frequency precision air conditioner, including installation parts preparation, installation process, major installation operations, power-on commissioning of the indoor unit and outdoor unit, and introductions to the indoor unit and outdoor unit controllers.

Question

1. What layout principles does unit installation conform to?

Contents

5 Routine Maintenance

5.1 Monthly Maintenance

Maintenance Item	Operation Guide	Troubleshooting
Water pan filter	Check that the water pan filter is clean and not blocked.	Clean the water pan filter.
Condensate pan and liquid level detector	Check that the condensate pan and liquid level detector have no dirt or scale.	Clean up the dirt and scale from the condensate pan and liquid level detector.
Air filter	Check that the air filter is clean and not blocked.	Clear the air filter with water (recommended).
	Check that the air filter is not damaged or distorted.	Replace the air filter.
Compressor	Check that the compressor is secured.	Tighten screws if the compressor is not secured.
	Check that the compressor service valve has no oil stains.	Clean the oil stains.
	Check that the operating compressor generates no abnormal noises.	Replace the compressor.
Evaporator	Check that no foreign matter exists on the evaporator surface.	Remove foreign matter.
Connecting pipe	Check that the refrigerant pipe does not leak or corrode, and is properly wrapped with thermal insulation foam.	Repair the refrigerant pipe and re-wrap thermal insulation foam.
	Check that the refrigerant pipe support is secure and intact.	Replace and re-tighten the refrigerant pipe support.
Indoor fan	Check that the indoor fan guard is not distorted.	Repair or replace the fan guard if it is distorted.
	Check that the indoor fan blades are intact.	Replace the fan component if it is damaged.
	Check that the operating indoor fan generates no abnormal noises.	Replace the fan component if it is damaged.
	Check that the screws on the indoor fan are not loose or distorted.	Tighten loose screws.

Humidifier	Check that the water inlet pipe valve is open. Start the air conditioner, tap **Maint > Diagnostic Mode > Enter** from the main screen. Set the humidity status to on, and check the wet-film water pan. At this time, the water inlet valve is started. The water pump works 5s after the float is floated. The water inlet valve is automatically started if the float drops down during humiliation.	If water feed is abnormal: 1. Check whether is available in the upstream pipe. 2. Check whether the float interconnection terminals are properly connected. 3. If the water inlet solenoid valve cannot be opened, replace it. 4. Check whether the float is jammed.
	The humidifier pump is faulty.	1. Check whether the pump races or is blocked due to air pressure. 2. Check whether the pump power supply voltage is normal. 3. Check whether the pump or the drainpipe is blocked. 4. Check whether the pump cables are properly connected. 5. Check whether the water pump races due to a liquid level detection fault.
	Wet film replacement due	Maintain or replace the humidifier pump and clear the accumulated runtime.
	Humidifier Pump Timeout	Maintain or replace the humidifier pump and clear the accumulated runtime.

5.2 Semi-annual Maintenance

Maintenance Item	Operation Guide	Troubleshooting
Monitoring unit	Export air conditioner logs, alarms, temperature, humidity, the operating status of the compressor, fan, electric heater, electric humidifier, and water pump, and time from the monitoring system. View the historical alarms generated in this quarter and select the most common five ones. (If no monitoring system is available, skip this item.)	Rectify the fault or contact Huawei technical support.
Electric heater	Check that the electric heaters and switches are secure.	Secure the electric heaters and switches.
	Check that the electric heater surfaces are not eroded.	Replace the electric heater if its surface is eroded.
Components inside the electric control box (Remove the electric control box before maintaining the internal components.)	Check that all circuit breakers and fuses work properly.	Replace faulty circuit breakers and fuses.
	Check that the cable connection is secure and correct.	Secure loose cables.
	Check that the electrical components, control components, and surge protection and voltage detection board are not dusty.	(Perform the operation when the system is powered off.) Use a brush or compressed dry air to remove dust from the electrical components, control components, and surge protection and voltage detection board.
	Check that the control board, display panel, T/H sensor, and surge protection and voltage detection board are not aging on the surface.	Replace the abnormal board.
	Check that all contactors work properly.	Replace faulty components.
Cable	Check that no cable is aging.	Replace aging cables.
T/H sensor	Check and calibrate the T/H sensor.	If the temperature error is greater than 1°C or humidity error is greater than 5%, the T/H sensor must be calibrated or replaced. For the calibration method, see the *ACC Precision Air Conditioner Controller User Manual*.
Water detector	Check whether the water detector cable is securely connected.	-

5.3 Annual Maintenance

Maintenance Item	Operation Guide (on the Basis of Monthly Maintenance)	Troubleshooting
Sensor	Use a high-precision humidity and temperature sensor to calibrate the humidity and temperature sensors inside and outside the cabinet.	If the temperature deviation is greater than 1°C or humidity deviation is greater than 5%, the T/H sensor must be calibrated or replaced.
Evaporator	The evaporator fins are not pushed down	Use a fin brush to organize the fins that are pushed down.
Welding spot and needle valve	Check that the welding spots and needle valves do not leak using soapy water, or check that they are free from oil stains.	If leaking points are found, retrieve the refrigerant and weld the leaking points again. For details, contact Huawei technical support.

5 Routine Maintenance

Summary of This Chapter

This chapter describes routine maintenance for NetCol5000-A 42 kW air cooled in-row full-sized variable-frequency precision air conditioner, including component introduction, operation guide and troubleshooting of monthly and annual maintenance.

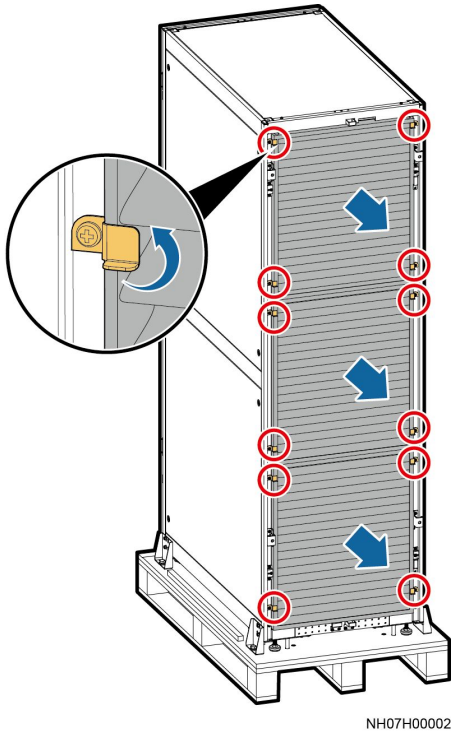
Question

1. How do you perform maintenance for a humidifier?

Contents

6.1 Parts Replacement

1. Replace an air filter.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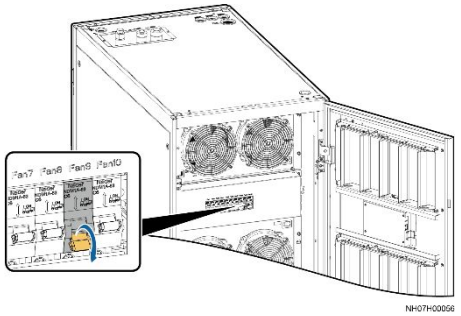
- ✔ Open the rear door of an air conditioner.
- ✔ Rotate the fasteners and take out the air filter.
- ✔ Install a new air filter and clear the runtime.

2. Replace an indoor fan.

- ✔ Switch off the circuit breaker of the faulty fan.
- ✔ Cut the cable tie that binds the cable connected to the faulty fan, remove the fan terminal, and remove the faulty fan.
- ✔ Install a new fan and fan guard, connect the connectors, and use a cable tie to secure the cable.
- ✔ Clear the runtime.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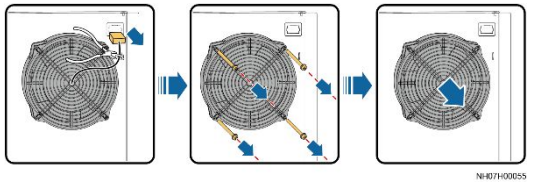
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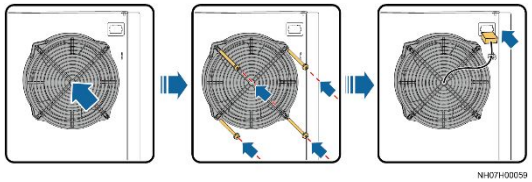
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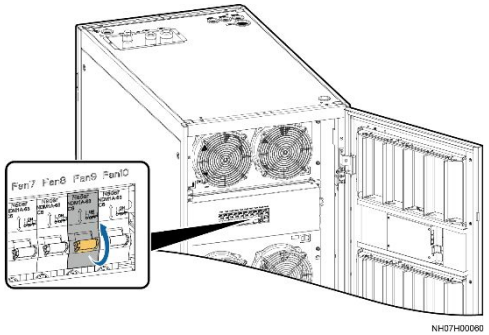
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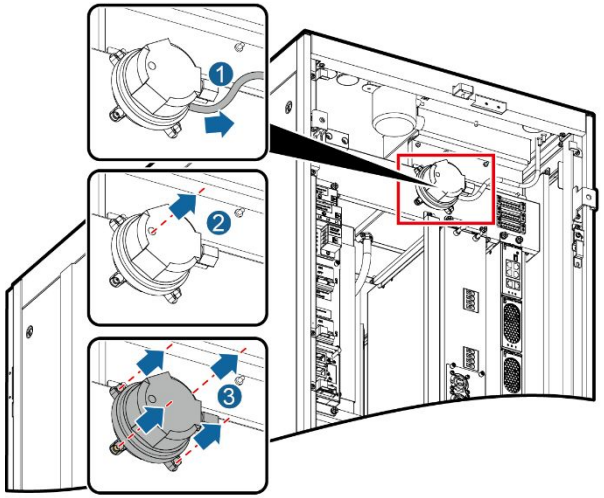
3. Replace a differential pressure switch.



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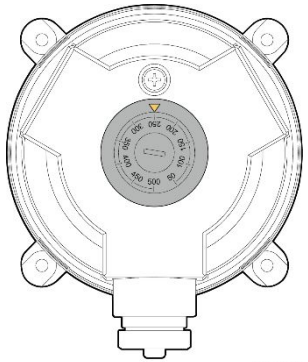

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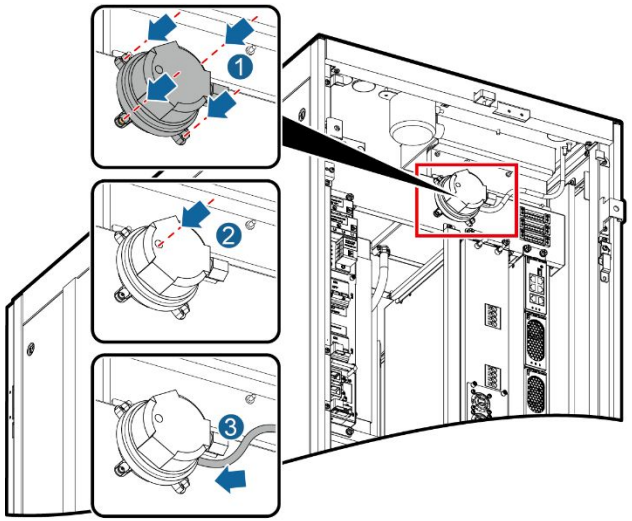

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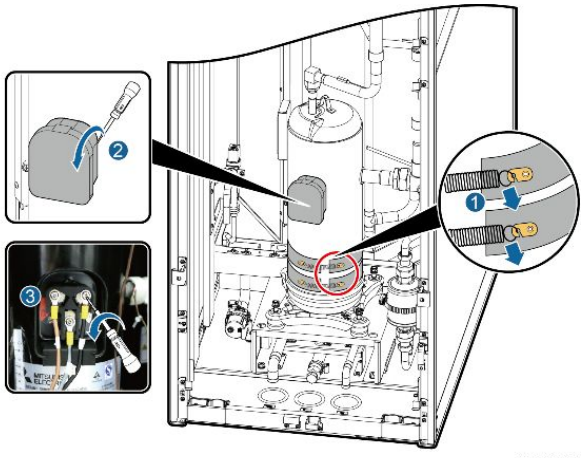
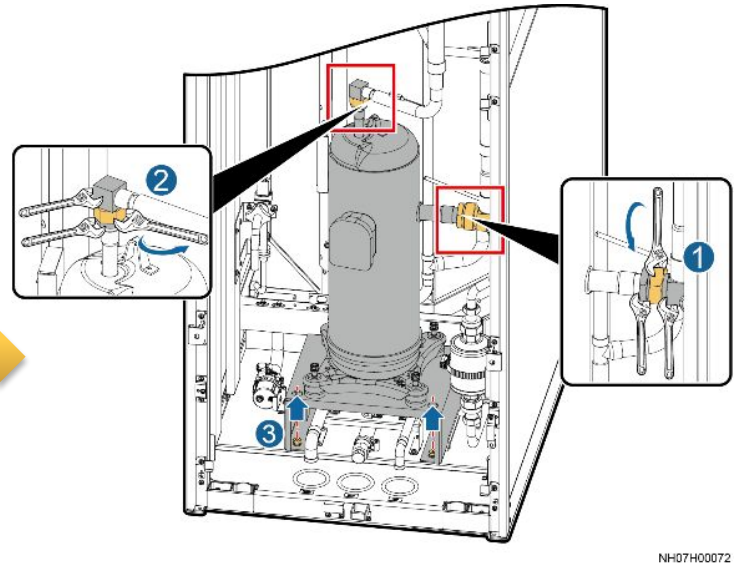
- ✔ Switch off the air conditioner circuit breaker in the PDC.
- ✔ Remove the pressure pipe and the cable of the faulty differential pressure switch. Then, remove the faulty differential pressure switch.
- ✔ Set the differential pressure switch value.
- ✔ Install the new differential pressure switch and close the rear door.
- ✔ Ensure that no alarms are generated during system running.

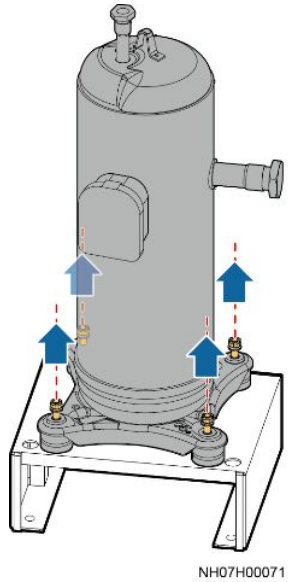
4. Replace a compressor.



Switch off the air conditioner circuit breaker, reclaim the refrigerant, remove the heating belt, and compressor cables.

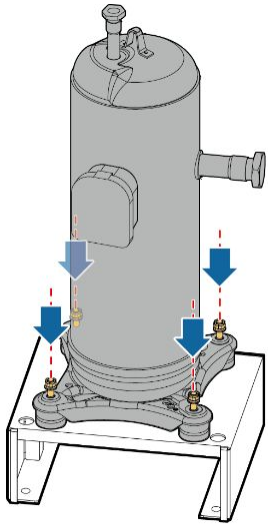


Remove the crankcase electric heating belt and angle valves.

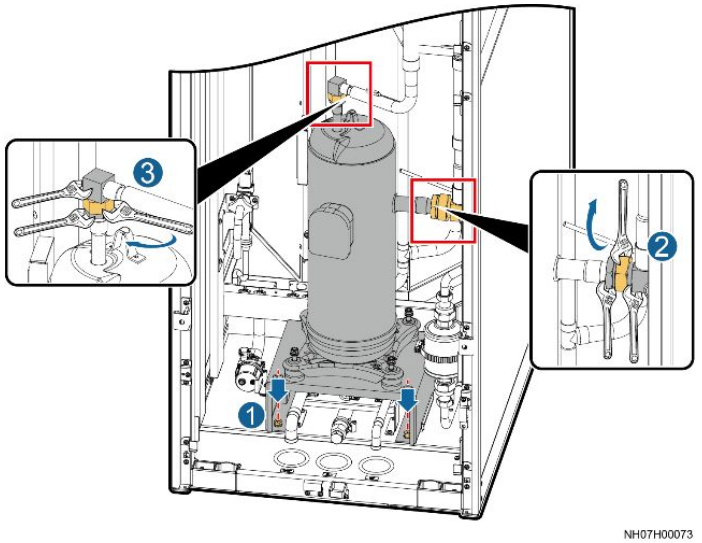


Remove the compressor rack and then remove the compressor.

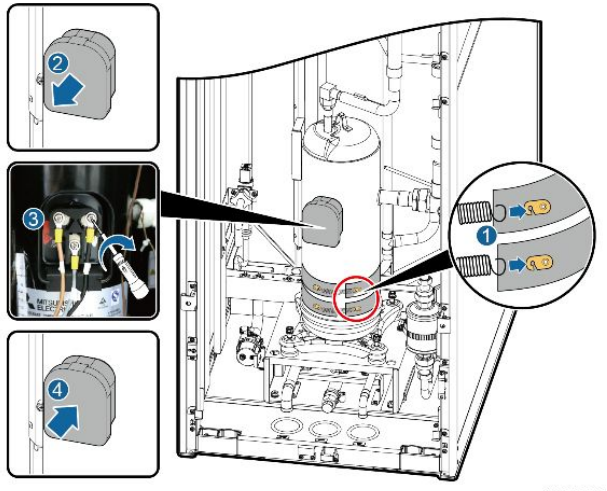
4. Replace a compressor.



Replace a compressor, and fix the compressor rack.

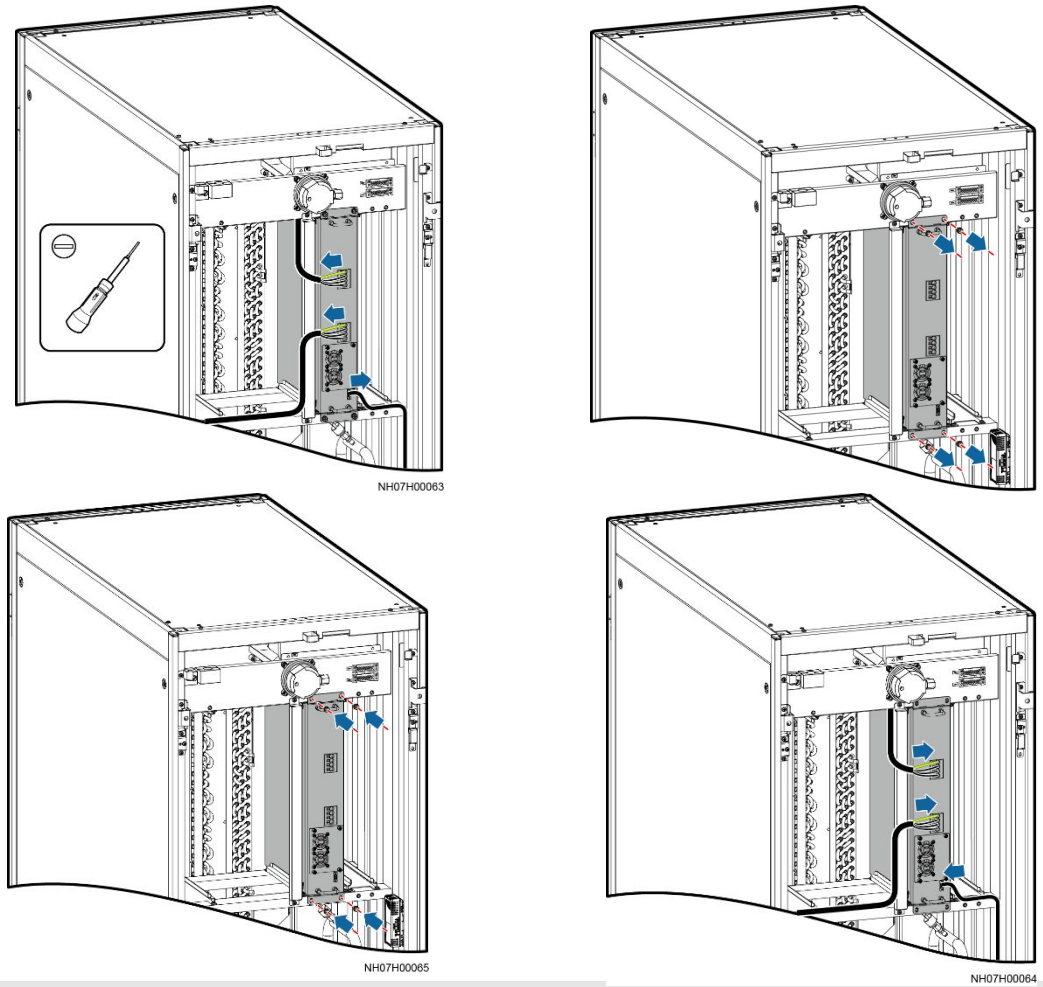


Install angle valves and oil heating belts.



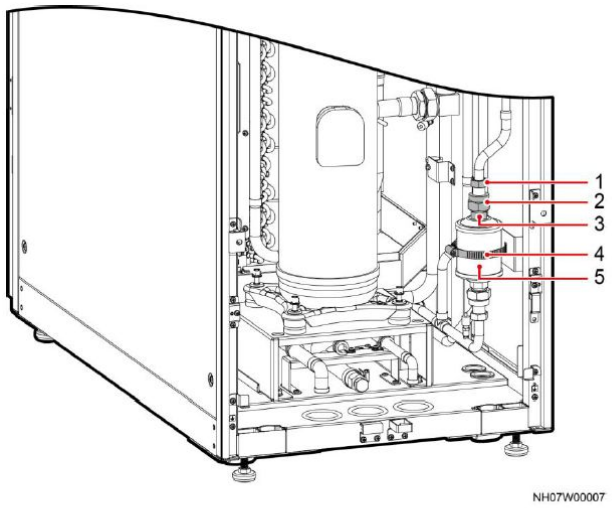
Install angle valves and oil heating belts. Vacuumize the cooling system, add refrigerant, and clear the runtime.

5. Replace the driver of a compressor.

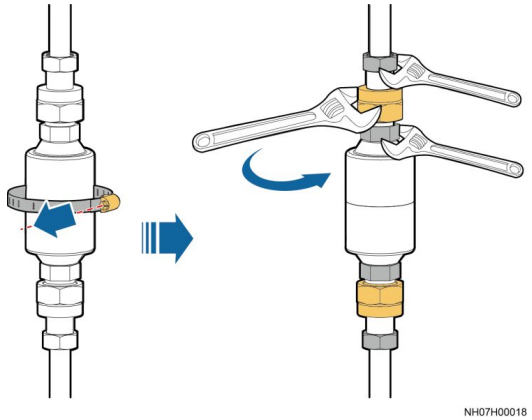


- ✔ Switch off the upstream circuit breaker of the air conditioner.
- ✔ Remove the cables.
- ✔ Remove the two screws that fasten the driver and take out the driver.
- ✔ Install a new driver and connect the cables.

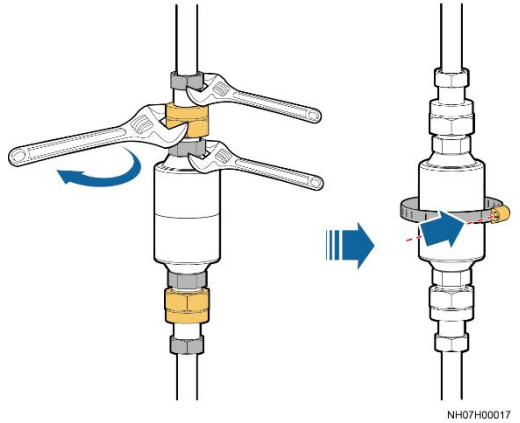
6. Replace a filter dryer.



(1) Pipe nut (2) Adjustable nut (3) Filter dryer nut
(4) Hold hoop (5) Filter dryer



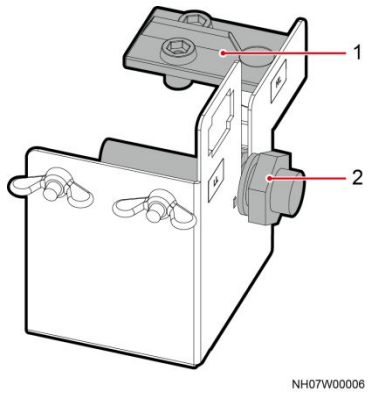
Uninstallation



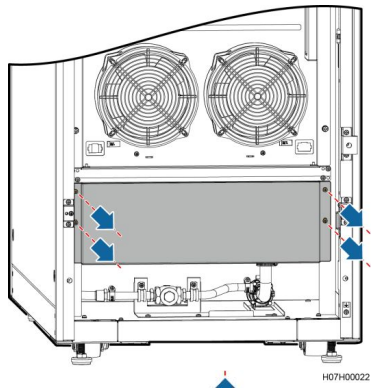
Installation

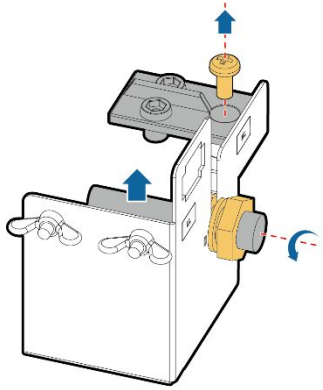
- ✔ Power off the air condition and switch off the compressor QF3 circuit breaker.
- ✔ Reclaim the refrigerant.
- ✔ Uninstall the filter dryer.
- ✔ Install a new filter dryer.
- ✔ Perform a leakage test with nitrogen again. Ensure that no leakage exists and add refrigerant.

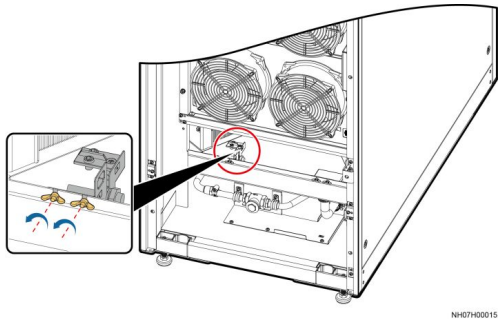
7. Replace a liquid level detector.

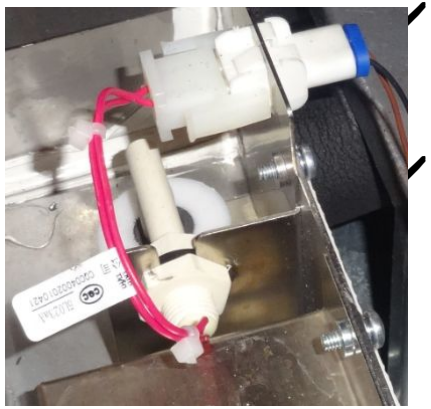


(1) High liquid level detector
(2) Low liquid level detector



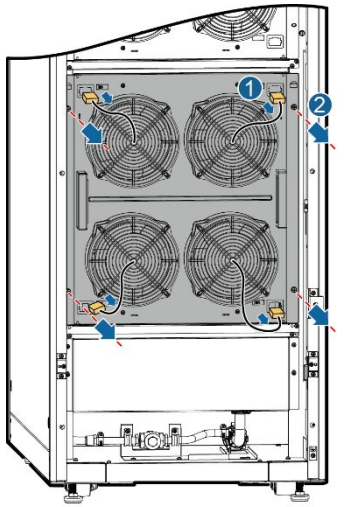


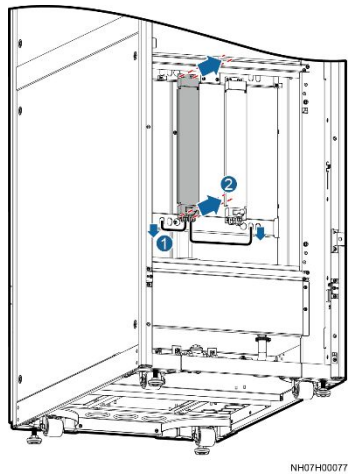


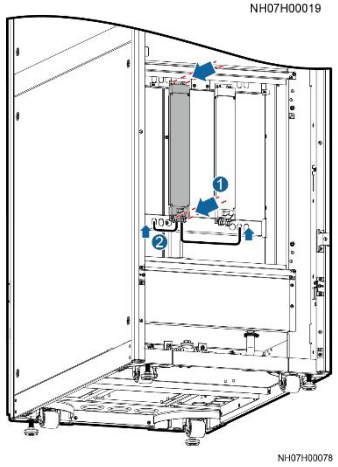


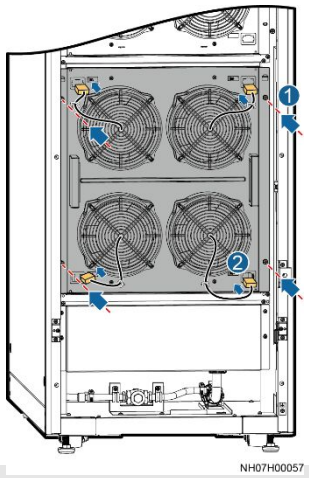
- ✔ Turn off the air conditioner switch, open the front door, and remove the water pan cover.
- ✔ Cut the cable tie securing the liquid level detector and remove the terminal.
- ✔ Remove the two butterfly nuts on the liquid level detector fastener, remove cables from the liquid level detector, and remove the liquid level detector and its fastener.
- ✔ Remove the liquid level detector.
- ✔ Install the new liquid level detector and properly connect its terminals.
- ✔ Tighten the screws, connect the cables, install the water pan cover, and close the front door.

8. Replace an electric heater.



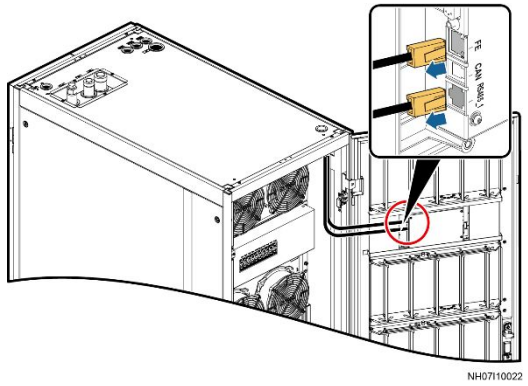


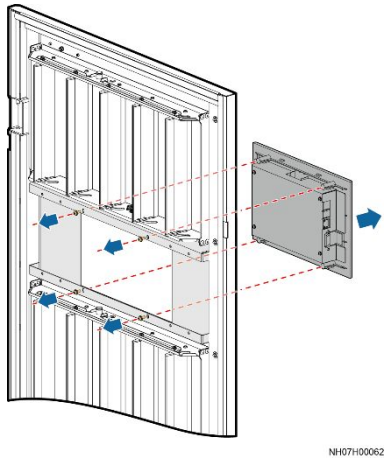


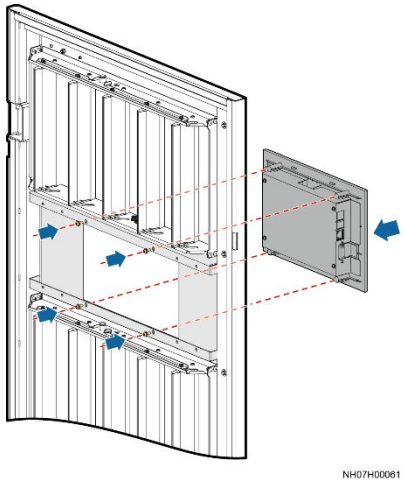


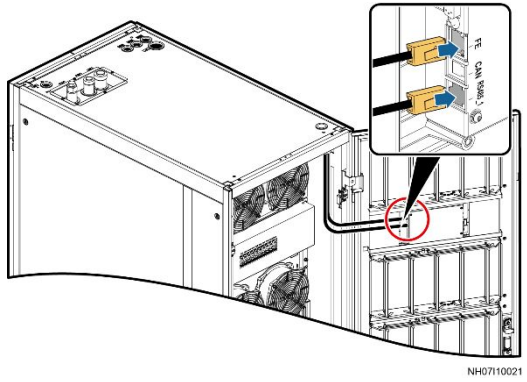
- ✔ On the controller home screen, tap **Shutdown**, and turn off the air conditioner switch in the PDC.
- ✔ Open the front door, and remove the fans.
- ✔ Cut the cable ties that secure the electric heater terminal and remove the terminals.
- ✔ Unscrew the four screws on the single electric heater.
- ✔ Install the new electric heater in the reverse order of the removal, and install the fan supports.
- ✔ Power on the system. On the main screen, tap **Maint** > **Diagnostic Mode** > **Enter**. Manually start the electric heater, and check that the electric heater works properly. Then exit from the diagnostic mode.
- ✔ Clear the electric heater runtime.

9. Replace an LCD.



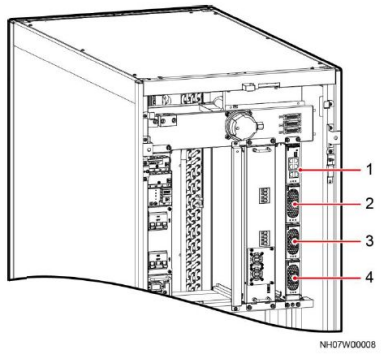






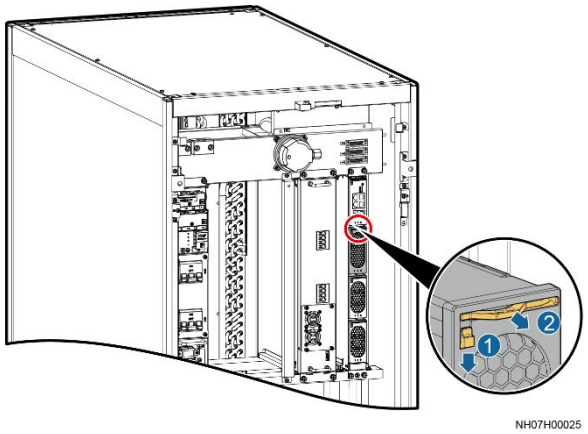
- ✔ Tap **Shutdown** on the LCD home screen.
- ✔ Open the front door of the air conditioner.
- ✔ Remove the network cable connected to the LCD.
- ✔ Remove the four screws that fasten the LCD. Then, push the LCD from its rear side while taking its front side gently.

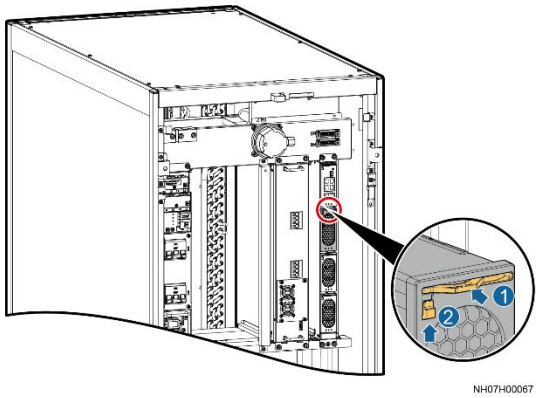
10. Replace a PSU, a control module, or an auxiliary source module.



(1) Main control module (2) Auxiliary power supply module

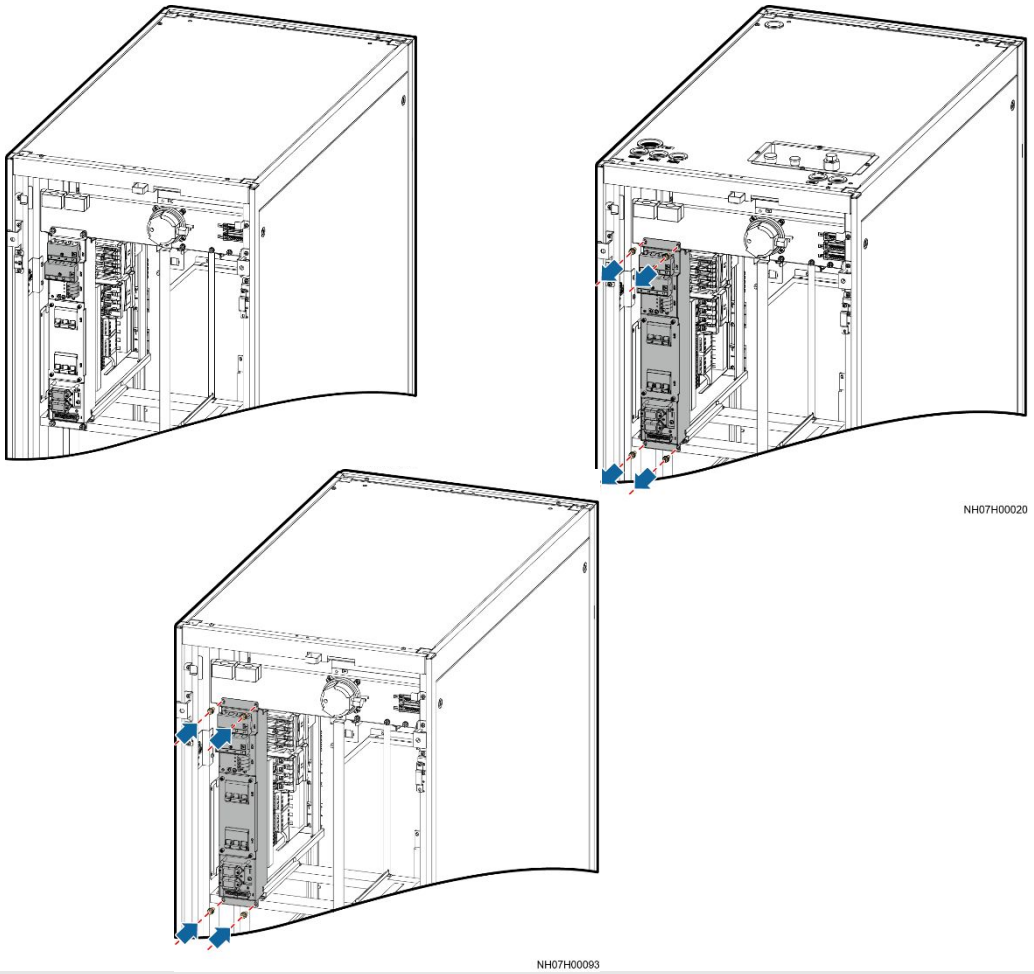
(3) PSU 1 (4) PSU 2





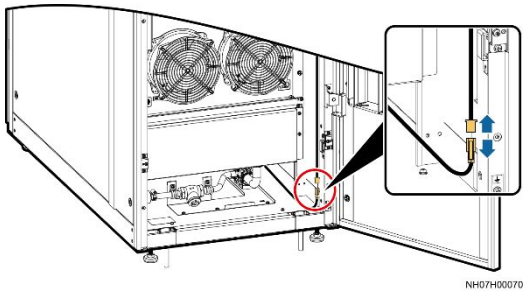
- ✔ Open the front door of the air conditioner.
- ✔ Flip the clip installed on the module to be replaced down.
- ✔ Pull the handle outwards and remove the module from the frame.
- ✔ Insert the spare module into the corresponding slot, and flip the clip up to lock the module.

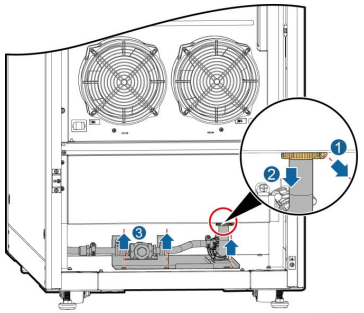
11. Uninstall an electric control box.

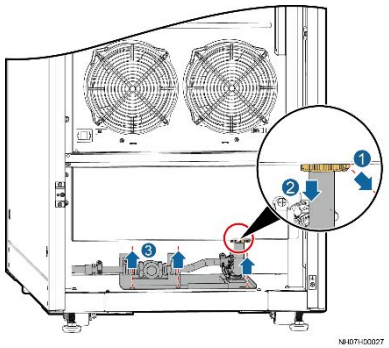


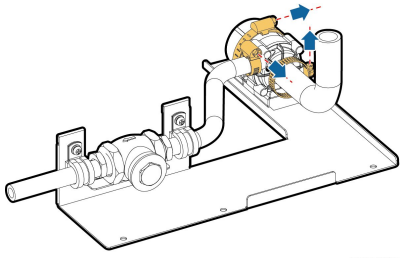
- ✔ On the controller home screen, tap **Shutdown**, and turn off the air conditioner switch in the PDC. Check whether the port is energized. (Use a multimeter to check that the AC voltage of the port is 0 V.)
- ✔ Open the rear door and remove the air filter. Remove all the power cables and terminals of the electric control box.
- ✔ Remove the four screws in front of the electric control box using a Phillips screwdriver.
- ✔ Remove the electric control box, replace components. Place the new electric control box in the installation position and secure it.
- ✔ Reconnect the cables and terminals.

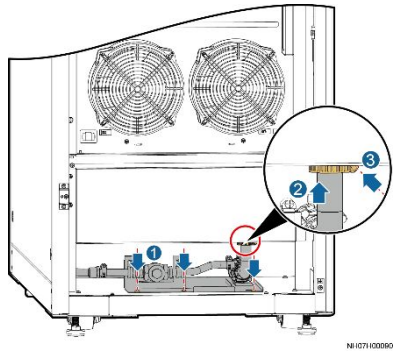
12. Replace a condensate pump.









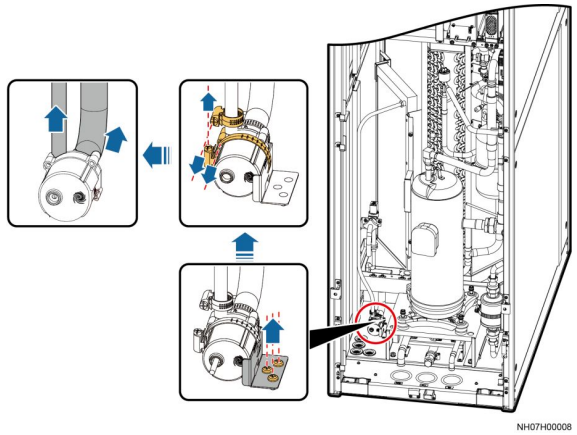


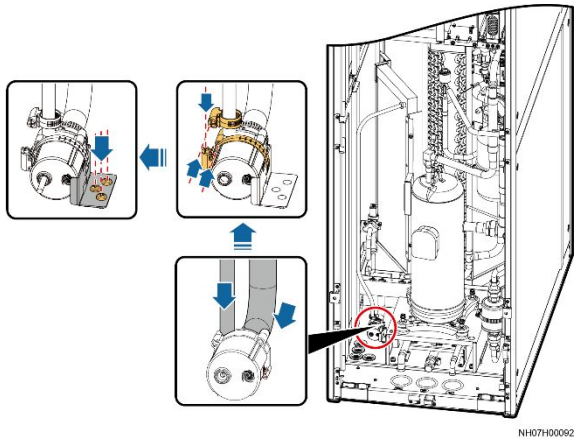
- ✔ On the controller home screen, tap **Shutdown**, and turn off the air conditioner switch in the PDC.
- ✔ Open the front door, and disconnect the white power cable terminals of the condensate pump at the lower right corner of the cabinet.
- ✔ Remove the hose clamp at the water pan drain outlet, and remove the hose.
- ✔ Remove the three screws that secure the condensate pump assembly using a socket wrench, and pull out the condensate pump assembly.
- ✔ Remove the hose clamps on the condensate pump pipes and the condensate pump using a flat-head screwdriver, pull out the hose, and take out the condensate pump.
- ✔ Install the new condensate pump and reinstall the condensate pump assembly in the cabinet. Connect the water pipe and secure it using hose clamps. Connect the condensate pump power cable.
- ✔ Remove the blockage from the pipe, close the front door, and clear the runtime.

Note:

- Before removing the condensate pump, block the water pan outlet and one-way valve outlet, preventing water in the water pan and pipe from overflowing.
- At the front of the condensate pump, block the water pan outlet as required. For example, a cleaning cloth can be used.

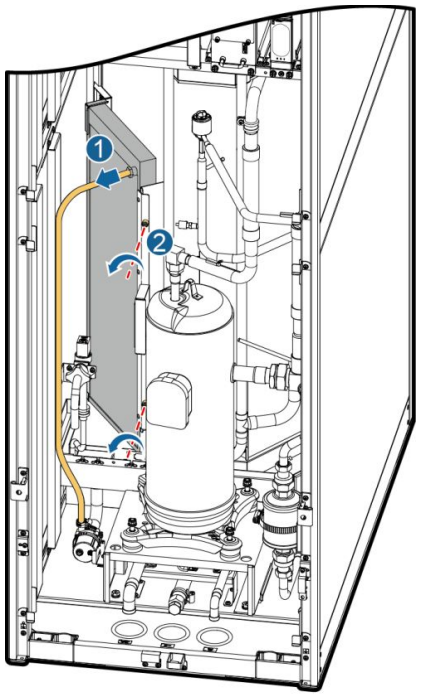
13. Replace a humidifier pump.



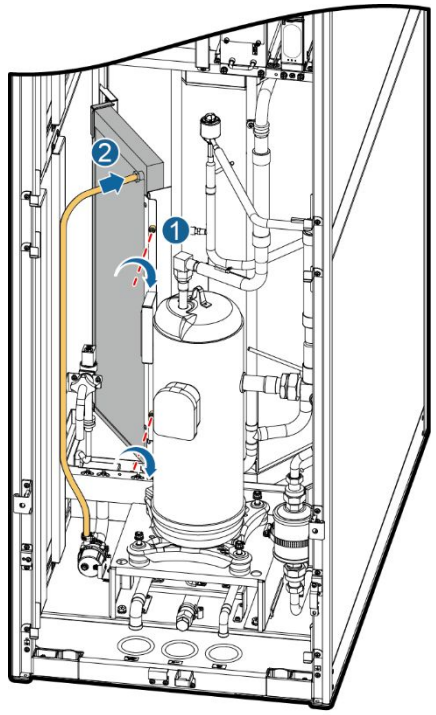


- ✔ On the controller home screen, tap **Shutdown**, and turn off the air conditioner switch in the PDC.
- ✔ Open the rear door and remove the air filter.
- ✔ Cut the cable ties securing the humidifier pump cable and remove the terminals.
- ✔ Remove the screws that secure the humidifier pump fastener using a Phillips screwdriver, and pull out the humidifier pump and the fastener.
- ✔ Remove the hose clamps at the water inlet and outlet ports of the humidifier pump and on the humidifier pump using a flat-head screwdriver, and remove the water inlet and outlet pipes.
- ✔ Install the new humidifier pump by performing the preceding steps in reverse order, connect the hoses and cables, and secure them using hose clamps.
- ✔ Install the air filter and close the rear door.

14. Replace a wet film humidifier.



NH07H00007



NH07H00066

- ✔ On the controller home screen, tap **Shutdown**, and turn off the air conditioner switch in the PDC.
- ✔ Open the rear door and remove the air filter.
- ✔ Remove the wet film humidifier. (Hold the blue release sleeve and remove the water inlet pipe. Loosen the two captive nuts on one side of the wet film humidifier and remove the humidifier.)
- ✔ Install the new wet film humidifier in the original position by performing the preceding steps in reverse order, secure the screws, and connect the hose.
- ✔ Install the air filter and close the rear door.

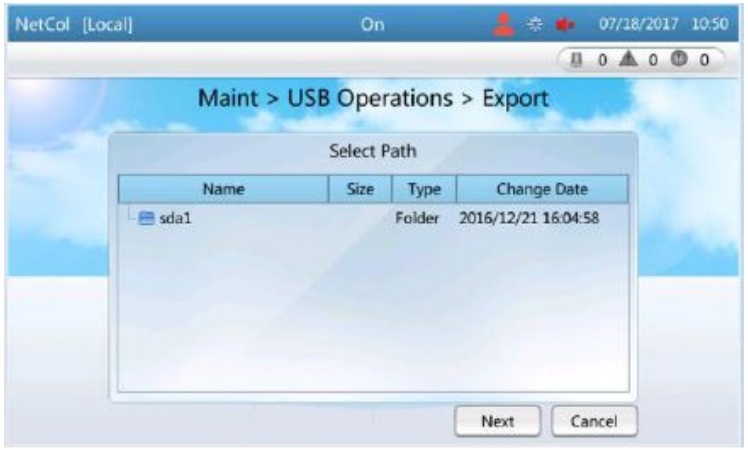
6.2 Exporting Fault Data

You can export data in one-click mode or by configurations. With the one-click mode, you can export active alarms, historical alarms, run logs, and so on. The two export methods are the same. This section uses one-click mode as an example to describe the export method

You are advised to use the FAT32 USB flash drive with a capacity no greater than 64 GB. The following models are recommended:

Model	Capacity
Netac U188	4 GB
Kingston DT101G2	8 GB

- ✔ Before using a USB flash drive, ensure that its data has been scanned by antivirus software and is secure.
- ✔ Before exporting active alarms, historical alarms, logs, and configurations, ensure that the USB flash drive has been successfully identified.
- ✔ If the USB flash drive has been successfully identified,  is displayed in the status bar.
- ✔ If the USB flash drive is not properly connected, the system will display **No USB device found** during operations about the USB flash drive.



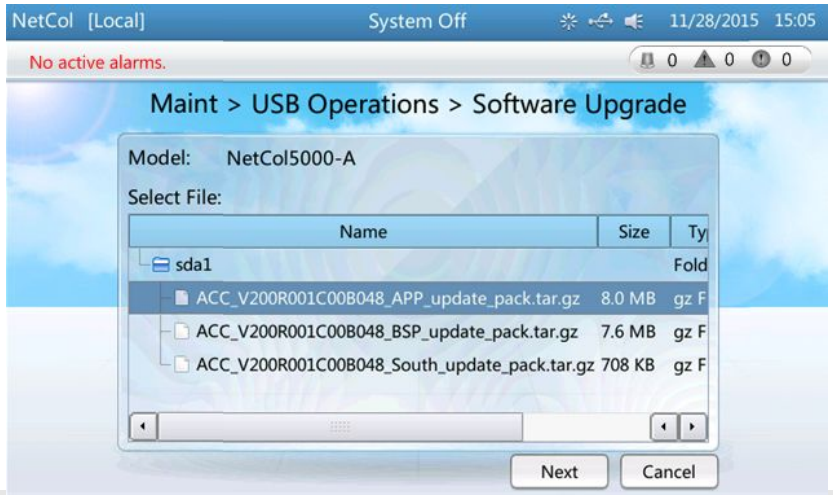
- Tap **Maint** > **USB Operations** > **Export** on the home screen to enter the **Select Path** screen.

- On the **Select Path** screen, select the folder that is used to store the data, and tap **Next**. In the displayed dialog box, tap **OK**. After the data is successfully exported, tap **Finish**.
- Tap **Maint** > **USB Operations** > **Remove USB** on the home screen to remove the USB flash drive in safe mode.

6.3 Upgrading the System

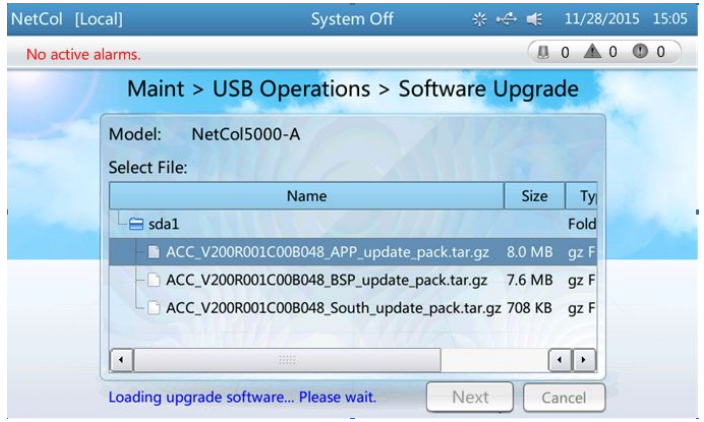
To upgrade ACC V200R001C30B052 to ACC V200R001C30B053, perform the following steps:

1. Obtain the **Huawei_ACC_V200R001C30B053.tar.gz** package from http://support.huawei.com.
2. Copy the package to the USB flash drive that is in FAT or FAT 32 format. In this example, the package is saved in the root directory if the USB flash drive.
3. Connect the USB flash drive to the USB host port of the display panel.
4. On the home screen, tap **Maint**, and log in as use **admin**. Tap **USB Operations** > **Software Upgrade** to open the **Software Upgrade** page. The system scans all files stored in the USB flash drive, as shown in the following figure.

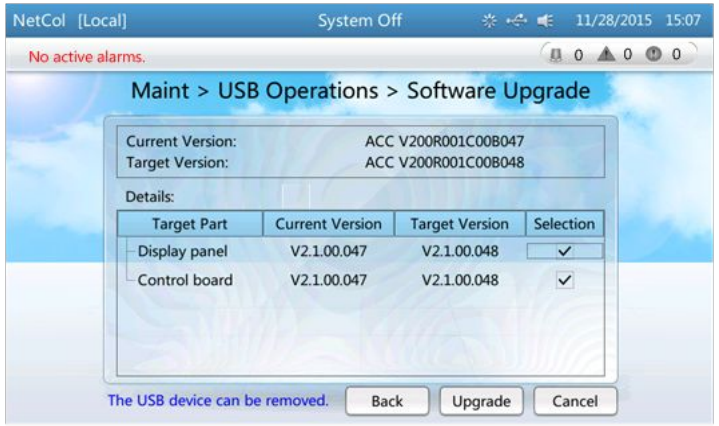


6.3 Upgrading the Air Conditioner

5. Select the **Huawei_ACC_V200R001C30B053.tar.gz** package, and tap **Next**. The system displays the message "Loading upgrade software. Please wait."



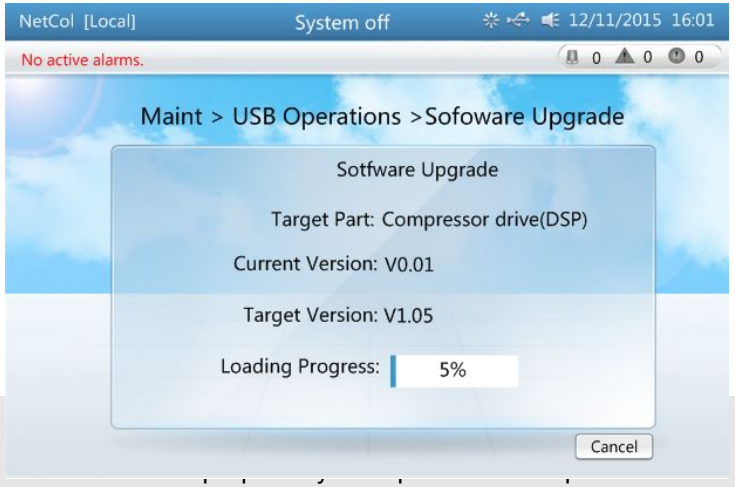
6. If the file is successfully parsed, the version information is displayed, as shown in the figure.



6.3 Upgrading the System

7. Select the components to be upgraded, and tap **Upgrade**. A dialog box is displayed. To continue the upgrade, tap **Yes**. To modify the selected components, tap **No**.

8. After you tap **Yes**, the upgrade progress of selected components is displayed in sequence, for example, the T/H board, surge protective device (SPD), outdoor fan, compressor, control board, and display panel.



6.3 Upgrading the System

9. After the upgrade is complete, the **Upgrade Result** screen is displayed. If all components are successfully upgraded, the figure as shown is displayed. If the display panel or control panel has been successfully upgraded, the system is automatically restarted in 10 seconds. If you tap **Finish**, the system is immediately restarted.

10. After the system is restarted, tap **About** > **Version Info** to view the version information after the upgrade to confirm that the upgrade is successful.

6.3 Upgrading the System

11. After the upgrade is complete, tap **Maint** > **USB Operations**, and tap the icon under **Remove USB** to remove the USB flash drive. After the USB flash drive is removed, the system displays the message "The USB device was removed successfully."

6.3 Common Alarm Handling

No.	Alarm Name	Possible Cause	Solution
1	Comp HP switch	1. The outdoor unit input power has an open phase, incorrect phase sequence, or is unavailable. 2. Signal cables to the outdoor unit are not properly connected. 3. The condenser fins are blocked. 4. Cables to the high pressure switch are not properly connected. 5. The cables to the high pressure switch are loose or damaged. 6. The high pressure switch is faulty. 7. The electronic expansion valve is faulty. 8. The refrigerant is overfilled. 9. The outdoor unit is not properly installed.	1. Check the power supply of the outdoor unit. 2. Check the cables to outdoor unit. 3. Clean the condenser fins. 4. Maintain or replace the outdoor unit or unit driver. 5. Check the cables to the high pressure switch. 6. Maintain or replace the high pressure switch. 7. Maintain or replace the electronic expansion valve. 8. Decrease certain amount of refrigerant. 9. Install the outdoor unit properly.
2	Comp discharge HT	1. The refrigerant leaks. 2. The condenser fins are blocked. 3. The ambient temperature is high. 4. The discharge temperature sensor is faulty. 5. The outdoor unit is not running properly. 6. The electronic expansion valve is faulty.	1. Check for any leakages. Fill refrigerant after maintenance or replacement. 2. Clean the condenser fins. 3. Measure the ambient temperature. 4. Calibrate or replace the exhaust air temperature sensor. 5. Maintain or replace the outdoor unit. 6. Maintain or replace the electronic expansion valve.
3	Comp discharge HT lock	The a012 comp discharge HT alarm is generated frequently.	Reference to the solutions for the a012 comp discharge HT.
4	Air filter blocked	1. Air filters are blocked. 2. The differential press switch is faulty. 3. The differential press switch is set inappropriately. 4. The pressure inlet tube of the differential pressure switch is blocked or disconnected. 5. The cables to the differential press switch are loose or damaged.	1. Maintain or replace the air filters. 2. Replace the differential press switch. 3. Adjust the threshold of the differential press switch. 4. Maintain or replace the press tube. 5. Check the cables to the differential press switch.
5	Power loss	The supply power is cut off.	Check the power supply cables.
6	Teamwork networking failed	1. **Teamwork CAN resistor enable** is incorrectly configured for the master control board. 2. The teamwork cables are loose or damaged. 3. Any two air conditioner units have the same address. 4. No air conditioner unit is configured as the master unit. 5. The master unit is powered off. 6. The ETH converter is faulty. 7. The intelligent socket is faulty. 8. Cables between the air conditioner and the intelligent socket and ECC are faulty.	1. Set the DIP switch correctly for teamwork. 2. Check the teamwork cables. 3. Change the addresses of the air conditioner units. 4. Configure one air conditioner unit as the master unit. 5. Power on the master unit, or configure another unit as the master unit. 6. Maintain or replace the ETH converter. 7. Maintain or replace the intelligent socket. 8. Maintain or replace the cables between the air conditioner and the intelligent socket and ECC.
7	Comp freeze point protection	1. The refrigerant leaks. 2. The press sensor is faulty. 3. The dryer filter is blocked. 5. The expansion valve is blocked.	1. Check for any leakages. Fill refrigerant after maintenance or replacement. 2. Calibrate or replace the press sensor. 3. Maintain or replace the dryer filter. 4. Maintain or replace the expansion valve.

6.3 Common Alarm Handling

No.	Alarm Name	Possible Cause	Solution
8	Supply-air LT	1. The load is low. 2. The ambient temperature is low. 3. The supply-air LT alarm threshold is inappropriate. 4. The temp displayed is different from the actual temp. 5. The air filters are blocked.	1. Consult Huawei technical support. 2. Check the ambient temperature. 3. Adjust the supply-air LT alarm threshold. 4. Calibrate or replace the abnormal T/H sensors. 5. Maintain or replace the air filters.
9	Comp discharge HP	1. The outdoor unit input power has an open phase, incorrect phase sequence, or is unavailable. 2. Signal cables to the outdoor unit are not properly connected. 3. The condenser fins are blocked. 4. The outdoor fan driver or fan is faulty. 5. The press displayed is different from the actual press. 6. The electronic expansion valve is faulty. 7. The refrigerant is overfilled.	1. Check the power supply of the outdoor unit. 2. Check the signal cables to outdoor unit. 3. Clean the condenser fins. 4. Maintain or replace the outdoor unit or unit driver. 5. Calibrate or replace the press sensor. 6. Maintain or replace the electronic expansion valve. 7. Decrease certain amount of refrigerant.
10	Comp suction LP	1. The refrigerant leaks. 2. The cables to the press sensor are loose or damaged. 3. The press sensor displayed is different from the actual pressure. 4. The filter dryer is blocked. 5. The expansion valve is blocked. 6. The indoor fans are faulty.	1. Check for any leakages and refill refrigerant after maintenance. 2. Check the cables to the press sensor. 3. Calibrate or replace the press sensor. 4. Maintain or replace the filter dryer. 5. Maintain or replace the expansion valve. 6. Maintain or replace the indoor fans.
11	Comp drive alarm	1. The compressor driver is faulty. 2. The compressor is faulty.	1. Maintain or replace the compressor driver. 2. Maintain or replace the compressor.
12	Comp drive module overheat	1. The fans in the comp driver are faulty. 2. Dirt exists in the air vents of the fans in the comp driver.	1. Check the fans in the comp driver. 2. Clean the air vents of the fans in the comp driver.
13	Comp drive phase loss	1. The cables to the compressor driver are loose or damaged. 2. The comp driver is faulty.	1. The cables to the compressor driver are loose or damaged. 2. The comp driver is faulty.
14	Comp phase current alarm	1. The comp is in lack of oil. 2. The condenser is blocked. 3. Outdoor fans run abnormally. 4. The refrigerant is overfilled. 5. The comp is faulty.	1. Fill oil to the comp. 2. Clean the condenser fins. 3. Maintain or replace outdoor fans. 4. Decrease certain amount of refrigerant. 5. Maintain or replace the comp.

6.3 Common Alarm Handling

No.	Alarm Name	Possible Cause	Solution
15	Indoor fan fault	1. The power supply to the indoor fan is abnormal. 2. The cables to the indoor fan are loose or damaged. 3. The indoor fans are faulty.	1. Check the power supply to the indoor fan. 2. Check the cables to the indoor fan. 3. Maintain or replace the indoor fans.
16	High humidity	1. The load is low. 2. The T/H sensors are located in inappropriate position. 3. The ambient humidity is high. 4. The high humidity alarm threshold is inappropriate. 5. The temp displayed is different from the actual temp.	1. Consult Huawei technical support. 2. Adjust the position of the T/H sensors. 3. Check the ambient humidity. 4. Adjust the high humidity alarm threshold. 5. Calibrate or replace the abnormal T/H sensors.
17	Full water	1. The cables to the high float are loose or damaged. 2. The high float is faulty or stuck. 3. The condensate pump is faulty, or the drainage capacity decreases. 4. The drainpipe of the condensate pump is faulty. 5. The pipeline or the internal drainpipe is blocked or frozen.	1. Check the cables to the high float. 2. Maintain or replace the high float. 3. Maintain or replace the condensate pump. 4. Rectify the condensate pump fault. 5. Clear the drain outlet or internal drainpipe.
18	Drain abnormal	1. The cables to the high float are loose or damaged. 2. The high float is faulty or stuck. 3. The condensate pump is faulty, or the drainage capacity decreases. 4. The drainpipe of the condensate pump is faulty. 5. The pipeline or the internal drainpipe is blocked or frozen. 6. The condensate pump pipe is filled with air.	1. Check the cables to the high float. 2. Maintain or replace the high float or clear the obstacles. 3. Maintain or replace the condensate pump. 4. Rectify the condensate pump fault. 5. Clear the drain outlet or internal drainpipe. 6. Discharge the air in the pump pipe.
19	Condensate pump exceed runtime	The accumulated runtime of the condensate pump exceeds the upper limit.	Maintain or replace the condensate pump, and clear the runtime.
20	High humidity	1. The load is low. 2. The T/H sensors are located in inappropriate position. 3. The ambient humidity is high. 4. The high humidity alarm threshold is inappropriate. 5. The temp displayed is different from the actual temp.	1. Consult Huawei technical support. 2. Adjust the position of the T/H sensors. 3. Check the ambient humidity. 4. Adjust the high humidity alarm threshold. 5. Calibrate or replace the abnormal T/H sensors.
21	Low humidity	1. The T/H sensors are located in inappropriate position. 2. The ambient humidity is low. 3. The low humidity alarm threshold is inappropriate. 4. The temp displayed is different from the actual temp.	1. Adjust the position of the T/H sensors. 2. Check the ambient humidity. 3. Adjust the low humidity alarm threshold. 4. Calibrate or replace the abnormal T/H sensors.

Alarms

Alarm List and Solution

6 Parts Replacement and Troubleshooting

Summary of This Chapter

This chapter describes parts replacement and methods for exporting fault information of the NetCol5000-A 42 kW air cooled in-row full-sized variable-frequency precision air conditioner.

Question

1. How do you view run logs of the air conditioner?