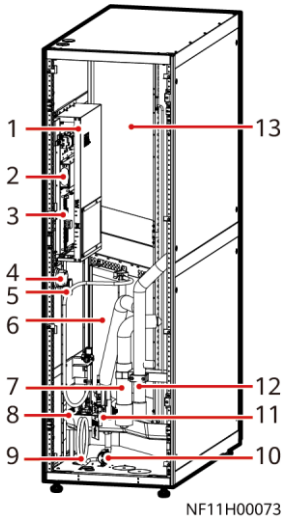
NetCol5000-C065 In-row Chilled Water Smart Cooling Product Quick Guide (Russia, Skoltech)

Issue: 01
Date: 2021-01-08

1 Overview



Model	NetCol5000-C065
Power system	220 V AC to 240 V AC, 1 PH, 50/60 Hz, dual power supplies
Net weight (full configuration)	About 222 kg
Dimension (mm) (H x W x D)	2000 x 600 x 1200

(1) Electric control box
(2) PSU
(3) Main control board
(4) Differential pressure switch
(5) Temperature and humidity sensor
(6) Wet film humidifier
(7) Chilled water outlet pipe
(8) Water pan
(9) Drainpipe
(10) Water pump
(11) Chilled water valve actuator
(12) Chilled water inlet pipe
(13) Heat exchanger

2 Preparing Materials

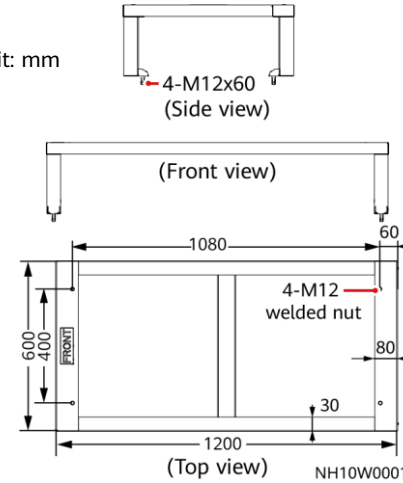
Materials Configured with the Equipment	Fuse, combined hexagon head bolts M12x90, OT ground terminal of the power cable to the indoor unit, and single cord end terminal of the power cable to the indoor unit, cable tie	
Engineering Procurement	Humidifier water inlet pipe	Rigid pipe: G 3/4-inch rigid pipe connector with internal threads (plastic materials such as PA66, or metal materials are recommended), and rigid pipe (withstand pressure ≥ 0.7 MPa)
	Chilled water inlet and outlet pipes	Seamless steel pipe with a G 1–1/2 inch external threaded connector or aluminum plastic pipe with an inner diameter of 41 mm.
	Cables	Power cable (3x6.0 mm^2), teamwork networking and monitoring cables, and equipotential cable (≥ 16 mm^2)
	Others	Indoor unit base, thermal insulation foam, and thermal insulation foam glue

2.1 Preparing an Indoor Unit Base

NOTE

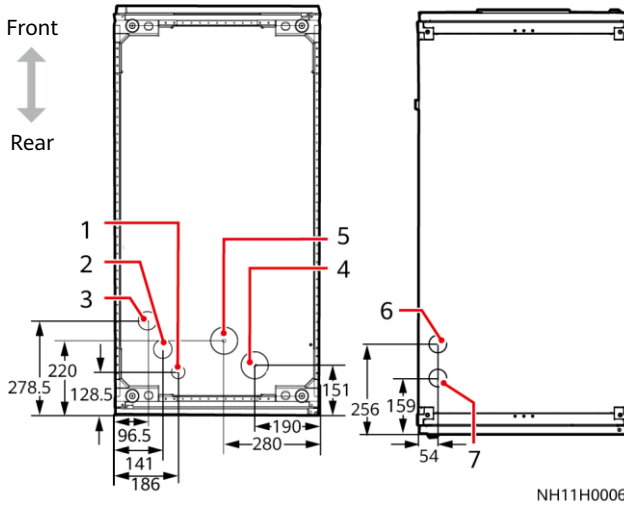
1. Shock absorption bars (EPDM rubber, 5 mm thick) need to be installed between the ground and the base.
2. The base should be at least 250 mm in height. The base bearing capacity must be at least 2 t.
3. You are advised to use angle steel, square steel or channel steel. Thickness of 3 mm to 5 mm is recommended.

Unit: mm



2.2 Holes in Top and Bottom Plates

(Top view of the bottom plate) (Top view of the top plate) Unit: mm



(1) Equipotential PE cable hole (Φ28 mm)

(2) Drainpipe hole (Φ43 mm)

(3) Humidifier water inlet pipe hole (Φ43 mm)

(4) Chilled water inlet pipe hole (Φ103 mm)

(5) Chilled water outlet pipe hole (Φ103 mm)

(6) Power cable hole (Φ43 mm)

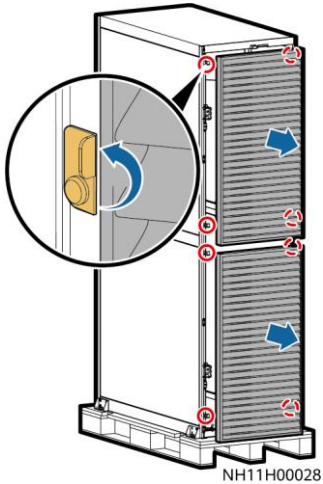
(7) Signal cable hole (Φ43 mm)

3 Installing the Equipment

NOTICE

1. Read the *NetCol5000-C(030, 032, 065) In-row Chilled Water Smart Cooling Product User Manual (2019)* or instructions before installing the NetCol5000-C.
2. You are recommended to use tools that are fully insulated when installing devices.
3. Only engineers from the manufacturer or engineers certified by the agent are allowed to install, commission, and maintain smart cooling products. Otherwise, personal injuries and device damage may be caused, which is beyond the smart cooling product warranty range.

3.1 Removing Air Filters



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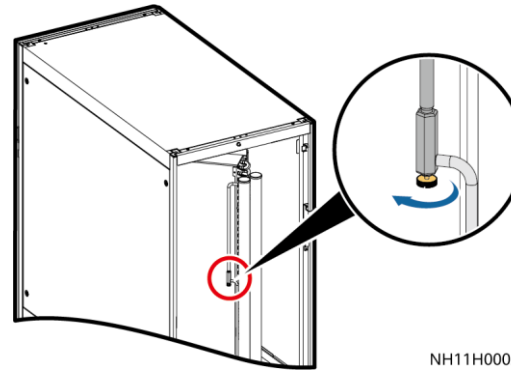
3.2 Discharging Nitrogen

Slowly open the exhaust valve to release nitrogen and close the valve afterwards.



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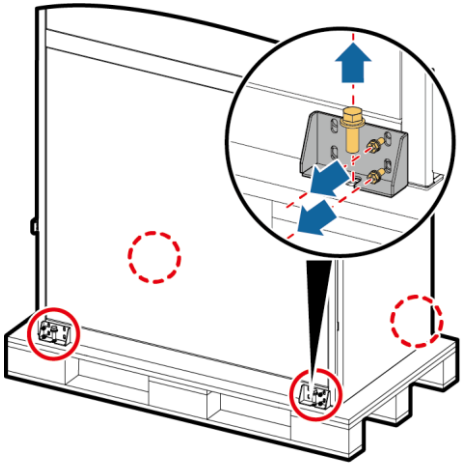
NOTICE

1. The equipment has been injected with 0.2–0.6 MPa of nitrogen before delivery. If no nitrogen is discharged, contact Huawei technical support.
2. You can open or close the exhaust valve using a flat-head screwdriver.

3.3 Removing the Pallet

NOTE

The connectors are secured to the equipment with M6 screws and secured to the pallet with M12 screws.



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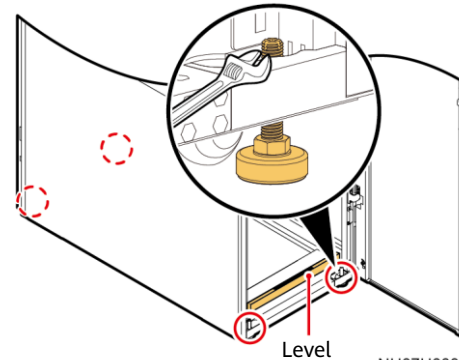
3.4 Leveling the Cabinet



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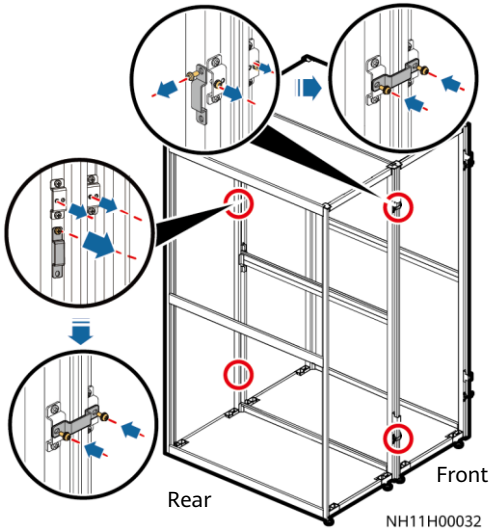
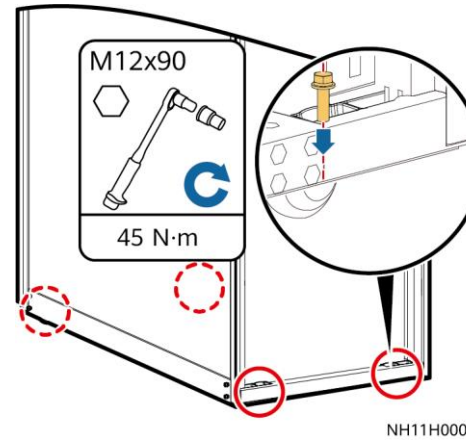
3.5 Installing Cabinets Side by Side



3.6 Securing the Equipment



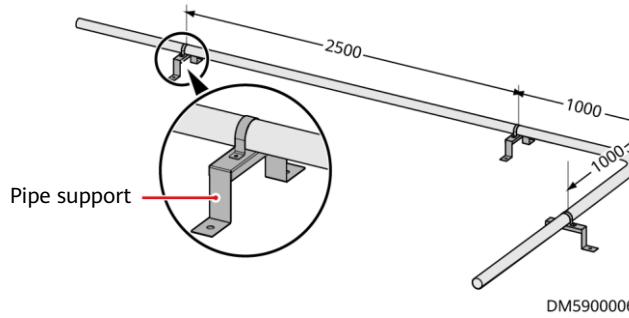
4 Installing Pipes

4.1 Pipe Layout

NOTICE

1. A 1:100 tilt should be reserved for the main drainpipe and humidifier water inlet pipe.
2. Keep a clearance of at least 25 mm between pipes. Secure the pipes to supports every a certain distance.
3. Clean the water inlet engineering pipes to avoid impurities entering into the humidifier.
4. A reducing valve must be installed if the inlet water pressure exceeds 0.7 MPa.
5. Pipes should be wrapped with thermal insulation foam along the route.

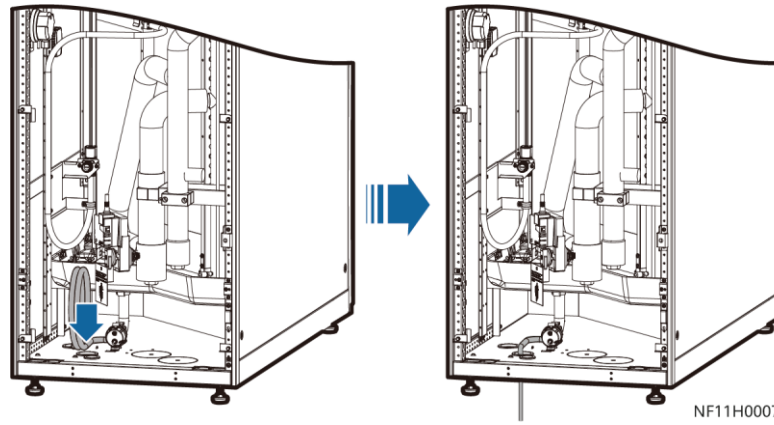
Unit: mm



4.2 Drainpipe Layout

NOTICE

Secure the drainpipe properly.



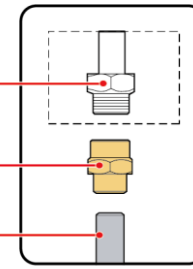
4.3 Connecting the Humidifier Water Inlet Pipe

Connection method

G 3/4 inch reserved connector with outer screw thread

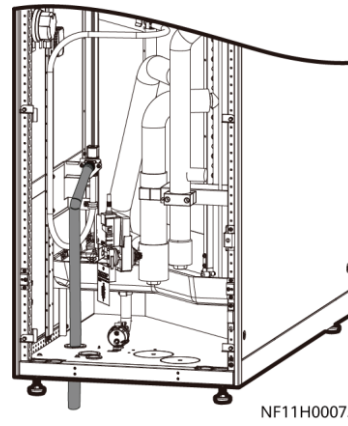
G 3/4 inch adapter with inner screw thread[Note1]

Matched with the adapter, the pressure resistance should be at least 0.7 MPa



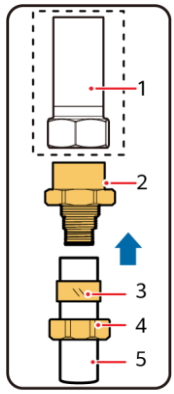
Note 1:

1. When plastic materials such as PA66 are used, the recommended torque is 5 N·m.
2. When metal materials are used, the recommended torque is 10 N·m. A sealing washer must be used when an union is used.



4.4 Connecting the Chilled Water Inlet and Outlet Pipes

Aluminum plastic pipe



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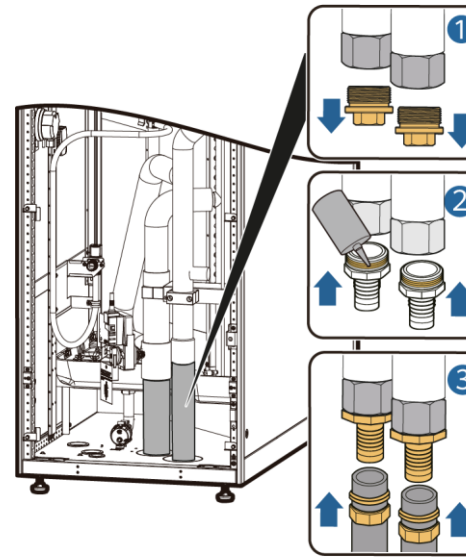

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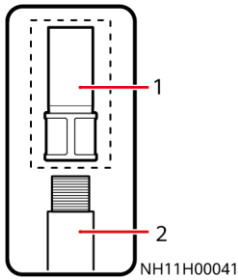
(1) G 1–1/2 inch port with inner threads (reserved device port)
(2) Direct connection of external teeth
(3) Sealing ring
(4) Nut
(5) Aluminum plastic pipe with an inner diameter of 41 mm

Seamless steel pipe



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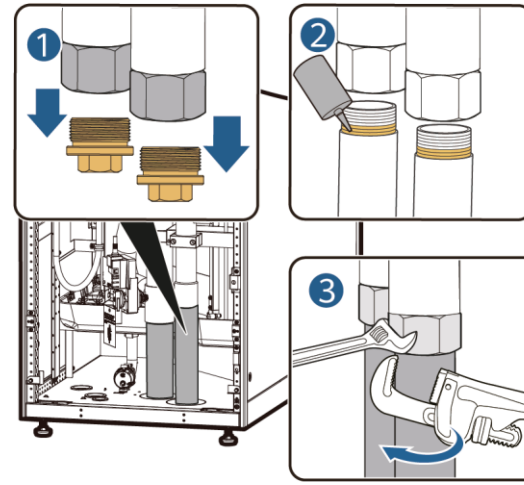
(1) G 1–1/2 inch port with inner threads (reserved device port)
(2) Seamless steel pipe with a G 1–1/2 inch external threaded connector



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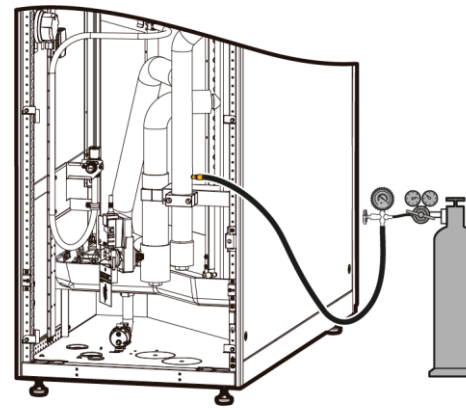
4.5 (Optional) Leakage Test with Nitrogen

NOTICE

- If the pressure has fallen, apply soapy water on the pipes, especially pipe joints, to check for leakages. Rectify the leakages if any.
- If the pressure is stable, wrap all pipes and connectors with thermal insulation foam.
- Install a reducing valve on the outlet of the nitrogen cylinder. Its outlet pressure must not exceed 0.8 MPa.
- In addition to the leakage test with nitrogen, there is the leakage test with water. You can choose one test based on site requirements.

1. Rotate the chilled water valve to the maximum (100%).
2. Check that the needle and exhaust valves on the pipeline are closed.
3. Connect a reducing valve and a nitrogen cylinder at the needle valve position shown in the figure, charge 0.8 MPa of nitrogen (when the pressure is stable), and leave them for 24 hours.
4. Check for pressure change after 24 hours.



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4.6 (Optional) Leakage Test with Water

NOTICE

If the leakage test has been done with nitrogen, skip the test with water.

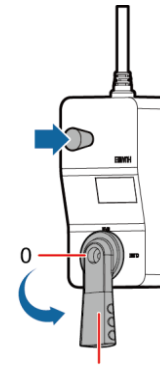
Manually open the chilled water valve. Inject water to 0.8 MPa, and preserve the pressure for 24 hours. Then connect a pressure gauge to a needle valve on the pipeline to measure the pressure. If the reading remains unchanged, the pipe is not leaking. You can perform the following operations.

4.7 Injecting Water to Expel Nitrogen

NOTICE

Clean the main pipe beforehand to avoid blockage of the heat exchanger due to foreign construction matter. Close the isolation valve on the water inlet and outlet pipes before the cleaning.

1. Open the general water supply valve.
2. Press the button on the side of the actuator and manually rotate the valve handle to the maximum in the specified direction. Check that the chilled water valve is in the open state (100%).
3. Slowly open the exhaust valve to let out gas.
4. Adjust the gas releasing speed until no gas flows out of the valve. Then close the exhaust valve.
5. Manually close the chilled water valve.



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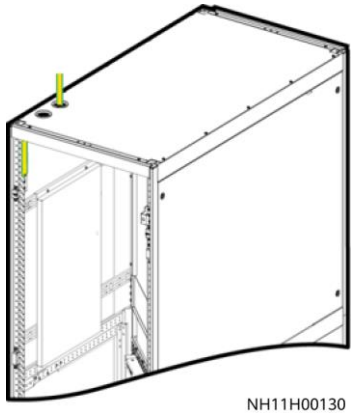
5 Installing Cables

5.1 Connecting the Equipotential Ground Cable and Power Cable

NOTICE

1. When routing the cables, wrap the section of all signal cables inside the smart cooling product with the corrugated pipes and route them out of the corresponding cable holes so that the strong- and weak-current cables are separated.
2. Route the power cable along the rear door post, and use cable ties to secure the cable to the post every 150–200 mm.

1. Connect the equipotential cable.



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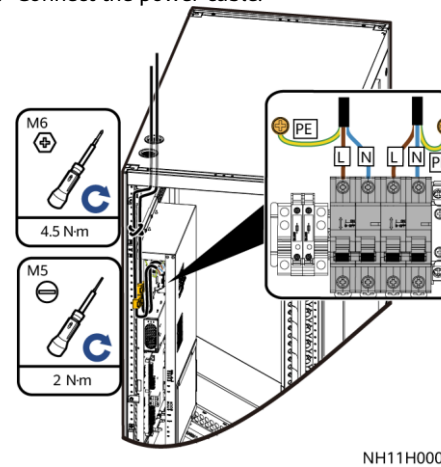
2. Connect the power cable.



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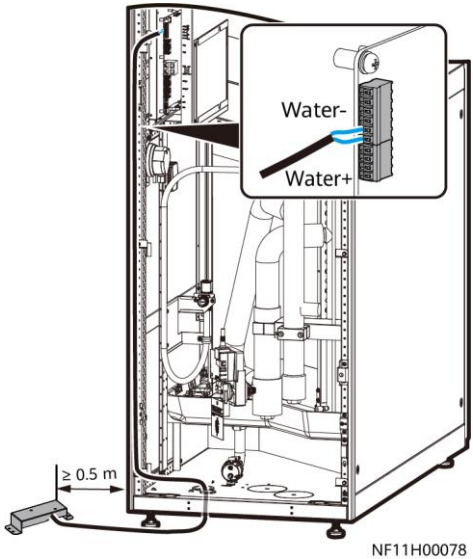
5.2 (Optional) Connecting the Water Sensor



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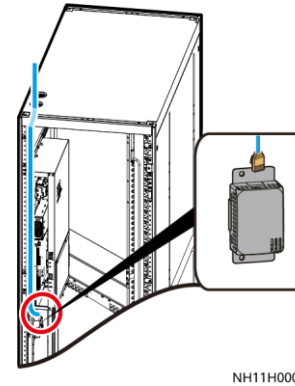
5.3 Installing T/H Sensors Outside Cabinets

1. Connect the temperature and humidity (T/H) sensor cable.

   T/H sensors in the aisle should be installed at the door frame inside the server cabinet and 1.5 m above the ground (33 U). After they are secured, set the sensor positions based on their location and the table.



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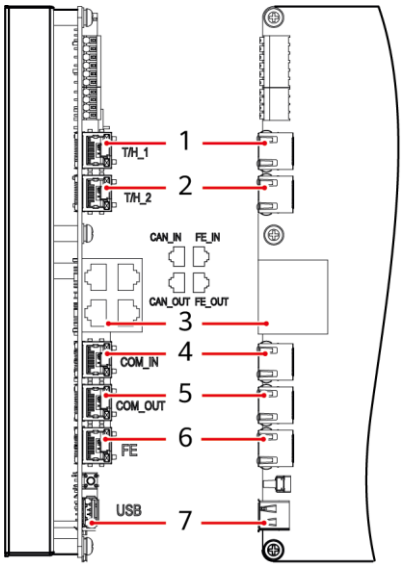
2. Set the DIP switches on the T/H sensors.

Name	Address	DIP Switch ID					
		1	2	3	4	5	6
Cold aisle 1 temp/humid	11	ON	ON	OFF	ON	OFF	OFF
Cold aisle 2 temp/humid	12	OFF	OFF	ON	ON	OFF	OFF
Cold aisle 3 temp/humid	13	ON	OFF	ON	ON	OFF	OFF
Cold aisle 4 temp/humid	14	OFF	ON	ON	ON	OFF	OFF
Cold aisle 5 temp/humid	15	ON	ON	ON	ON	OFF	OFF
Hot aisle 1 temp/humid	21	ON	OFF	ON	OFF	ON	OFF
Hot aisle 2 temp/humid	22	OFF	ON	ON	OFF	ON	OFF
Hot aisle 3 temp/humid	23	ON	ON	ON	OFF	ON	OFF
Hot aisle 4 temp/humid	24	OFF	OFF	OFF	ON	ON	OFF
Hot aisle 5 temp/humid	25	ON	OFF	OFF	ON	ON	OFF

5.4 (Optional) Connecting the Teamwork Network Cable

Main control board ports



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(1) T/H_1 (T/H RS485 communications port) (used for connecting to the external temperature and humidity sensor)

(2) T/H_2 (T/H RS485 communications port) (used for connecting to the external temperature and humidity sensor)

(3) CAN_IN/CAN_OUT/FE_IN/FE_OUT (used for teamwork networking and FE_IN/FE_OUT are reserved)

(4) COM_IN (RS485 communications port) (used for connecting to the monitoring system)

(5) COM_OUT (RS485 communications port) (used for connecting to the monitoring system)

(6) FE (used for connecting to the monitoring system)

(7) USB

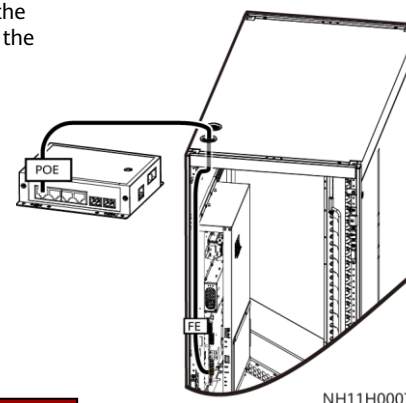
The smart cooling product supports both FE teamwork networking and CAN teamwork networking (hand-in-hand).

NOTE

- All smart cooling products in a teamwork group must be of the same model.
- Do not directly connect the first and the last smart cooling products to form a ring network.
- A maximum of 32 smart cooling products can be networked in one group. The teamwork cable between two adjacent smart cooling products must not exceed 10 m.
- If CAN networking is required onsite, set **Enable teamwork CAN resistor** for the first and last smart cooling products to **Yes** on the screen.

Connecting an FE teamwork network cable

Connect one end of the FE network cable to the FE port on the main control module, connect the other end to the POE port on the smart ETH gateway.



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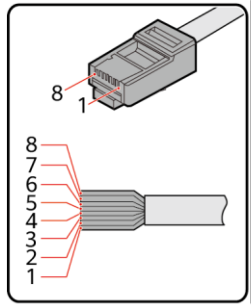
CAN teamwork networking cable

1. Prepare the 8 pin standard network cable, the cable pin sequence requirements are shown below.



PIN	Color	CAN_IN/CAN_OUT Pin Sequence
1	white-orange	RS485 +
2	orange	RS485 -
3	white-green	N/A
4	blue	RS485 +
5	white-blue	RS485 -
6	green	N/A
7	white-brown	CANH
8	brown	CANL

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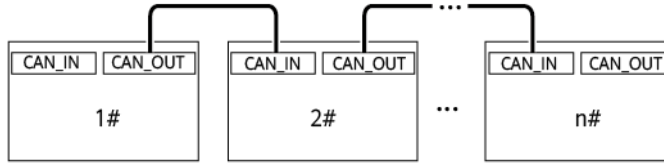
2. Connect the CAN_OUT port of each smart cooling product to the CAN_IN port of the following smart cooling product using a CAN network cable. After powering on the device, set the **Enable teamwork CAN resistor** to **Yes** for the first and last devices in a teamwork group.



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5.5 (Optional) Connecting the Monitoring Network Cable

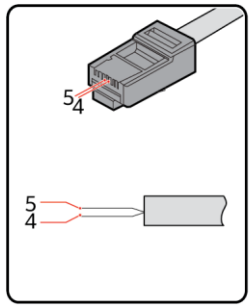
The smart cooling product supports both RS485 monitoring and FE monitoring.

Connecting the FE monitoring cable (SNMP/Modbus-TCP protocol)

The FE monitoring and FE teamwork use the same network cable. Connect the FE monitoring cable in the same process of connecting the FE teamwork network cable.

RS485 Monitoring Network Cable (Modbus-RTU Protocol)

1. Make the COM network cable by referring to the following figure.



PIN	Color	COM Pin Sequence
1	/	/
2	/	/
3	/	/
4	blue	RS485 R+
5	white-blue	RS485 R-
6	/	/
7	/	/
8	/	/

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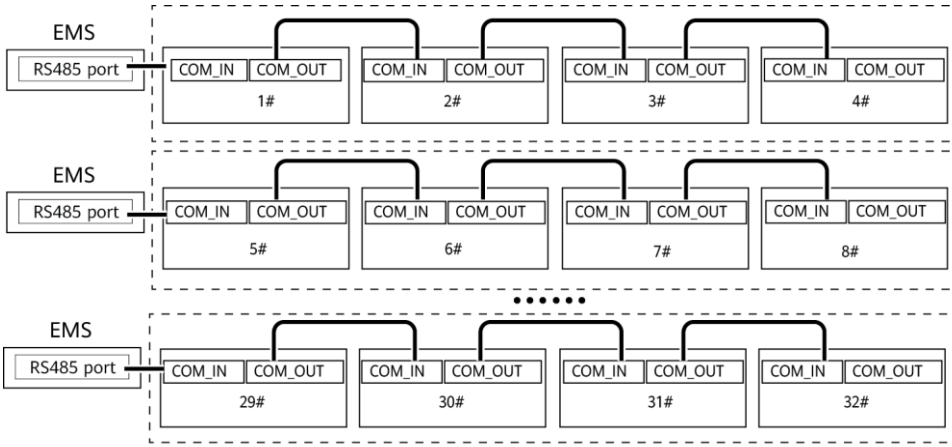
2. Group smart cooling products for monitoring based on performance requirements and connect the monitoring network cables.

- If there is no teamwork control, connect the COM_IN port on each smart cooling product to the customer's monitoring system.
- In CAN networking, connect the COM_IN port on the first smart cooling product in each monitoring group to the monitoring device.



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6 Verifying the Installation

No.	Check Item	Check Result
1	All water pipes are properly and securely installed, and free from leakage, blockage, and sharp turns.	☐ Passed ☐ Failed
2	The liquid level detector is level. The water pan is free from foreign matter such as cable remains and thermal insulation foam. Cables are securely bound and not in the water pan.	☐ Passed ☐ Failed
3	The distance between two chilled water pipes outside the cabinet is sufficient (recommended distance: longer than 25 mm), the hose is tightly wrapped with insulation foam, and joints are secured using glue.	☐ Passed ☐ Failed
4	The pipeline system has passed the pressure preservation and air tightness tests.	☐ Passed ☐ Failed
5	The needle valve plugs are secured (torque of 0.45±0.05 N•m), and screw caps are tightened.	☐ Passed ☐ Failed
6	The cabinet is reliably grounded.	☐ Passed ☐ Failed
7	The power cables and signal cables are correctly connected and properly separated. Strong-current and weak-current cables are separately bound.	☐ Passed ☐ Failed
8	The chilled water valve and its actuator are securely installed. The chilled water connector joints have been wrapped with thermal insulation foam, and no metal or hose is exposed. Cables are securely connected to the chilled water valve actuator. The actuator manual button is reset (ejected state).	☐ Passed ☐ Failed

7 System Power-On

7.1 Power-On

1. Turn on the smart cooling product switch in the power distribution cabinet and the AC1 and AC2 switches on the smart cooling product.
2. After the device is powered on for the first time, the LCD displays the **Quick Settings** screen. Log in as the admin user, and set parameters as instructed, such as language, date format, date, time, and time zone. If the device is not powered on for the first time, the home screen is displayed.

NOTE

- Users are classified into **admin** and **operator**. The preset password is **000001** for both types of users.
- After powering on, the smart cooling product is in shutdown mode.

7.2 (Optional) Setting the T/H Control Type

Application Scenario	Recommended T/H Control Type	Remarks
Cold aisle containment	Cold aisle control	If cold aisle T/H sensors are not configured, you can also choose the supply air control.
Hot aisle containment	Cold aisle control	
Non-aisle containment	Return air control	If cold aisle T/H sensors are configured, you can also choose the cold aisle control.

Path: **Settings** > **System Settings** > **Common Settings** or **Settings** > **System Settings** > **T/H Sensor.**

7.3 (Optional) Enabling the T/H Sensor Outside the Cabinet

If a T/H sensor outside the cabinet is installed, enable it. Path: **Settings** > **System Settings** > **Common Settings** or **Settings** > **System Settings** > **T/H Sensor**

7.4 Temperature and Humidity Settings

Set **Temperature and humidity control type**, **Control point temperature setpoint**, and **Control point humidity setpoint** as required on site. Path: **Settings** > **System Settings** > **Common Settings** or **Settings** > **System Settings** > **T/H Sensor.**

7.5 (Optional) Setting the Indoor Fan Control Type

If a micro differential pressure sensor is installed and the pressure difference control is required, set **Air-side difference pressure sensor type** to **0–50 Pa**, and set the **Indoor fan control type** to **Pressure diff ctrl**. It is recommended that the **Indoor fan pressure difference setpoint** retain the default value. If there are hot spots onsite, you can increase the value. Path: **Settings** > **System Settings** > **Indoor fan**

7.6 (Optional) Teamwork Settings

1. Teamwork group no.: One teamwork networking can contain four groups at most. They must have the same teamwork control number and can be assigned 1–4 respectively.
2. Smart cooling product address: In a teamwork control group, each smart cooling product address (1-32) must be unique, and the smart cooling product with minimum address is the master smart cooling product.
3. Networking mode: The networking mode set on the screen must be consistent with the actual networking mode. **CAN network** indicates teamwork control over a CAN bus, **MAC_CAN network** teamwork control over an FE port.
4. Enable teamwork CAN resistor: In CAN networking, set this parameter for the first and last smart cooling products to **Yes**.
5. Number of smart cooling products in this group: Indicates the number of precision smart cooling products in a group. The value is an integer ranging from 1 to 32.
6. Number of running smart cooling products in this group: Specifies the number of running NetCol5000-Cs in a group. The value ranges from 1 to the number of NetCol5000-Cs in the group.
7. Rotation function: Enable the active and standby smart cooling products to work alternately. This function is recommended when the heat load is even.
8. When **Requirement control** is set to **Anti-competitive running**, the master smart cooling product synchronizes operating data (parameters such as the T/H control type, temp set point, humid set point for the master smart cooling product) to the slave smart cooling product, and all the precision smart cooling products in the group refer to the mode delivered by the master smart cooling product. When **Requirement control** is set to **Disable**, all the smart cooling products operate based on their own requirements. When the requirement control is **Indoor fan unified control** or **Central load distribution**, all smart cooling product fans in the group rotate at the same speed.

The table uses 8 smart cooling products in CAN teamwork as an example.

No.		1	2	3	...	7	8
Item	Teamwork group no.	1	1	1	...	1	1
	Air conditioner address	1	2	3	...	7	8
	Enable teamwork CAN resistor	**Yes**	No	No	...	No	**Yes**
	Teamwork function	Enable	Enable	Enable	...	Enable	Enable
	Networking mode	CAN	CAN	CAN	CAN	CAN	CAN
	Number of air conditioners in this group	8	/	/	...	/	/
	Number of running air conditioners in this group	6 (2 standby)	/	/	...	/	/
	Rotation function	Enable	/	/	...	/	/
	Requirement control	Enable	/	/	...	/	/

The table uses 8 smart cooling products in MAC_CAN teamwork as an example.

No.		1	2	3	...	7	8
Item	Teamwork group no.	1	1	1	...	1	1
	Air conditioner address	1	2	3	...	7	8
	Teamwork function	Enable	Enable	Enable	...	Enable	Enable
	Networking mode	MAC_CAN	MAC_CAN	MAC_CAN	MAC_CAN	MAC_CAN	MAC_CAN
	Number of air conditioners in this group	8	/	/	...	/	/
	Number of running air conditioners in this group	6 (2 standby)	/	/	...	/	/
	Rotation function	Enable	/	/	...	/	/
	Requirement control	Enable	/	/	...	/	/

8 Startup and Wizard Startup

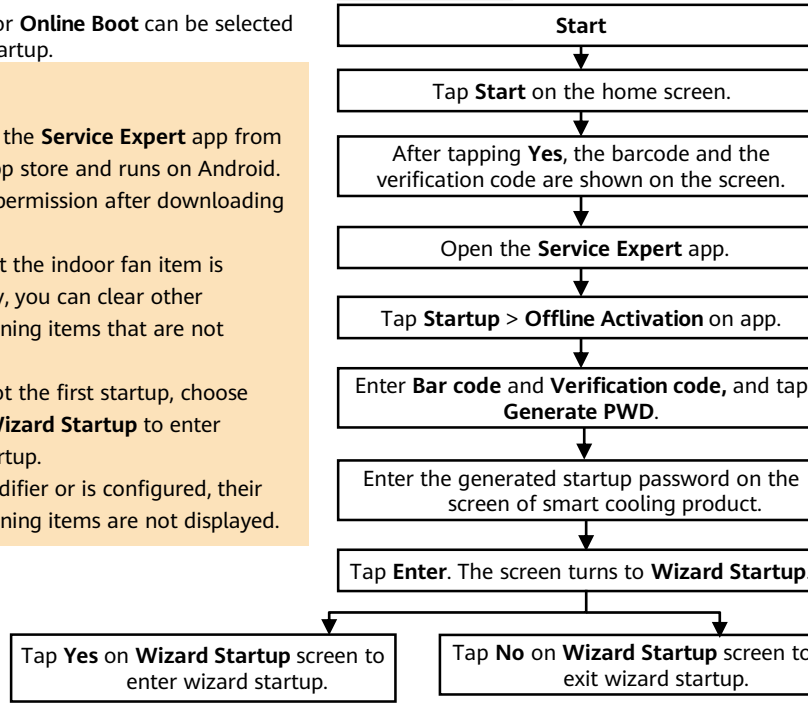
1. First startup flowchart

Offline Boot or **Online Boot** can be selected for the first startup.

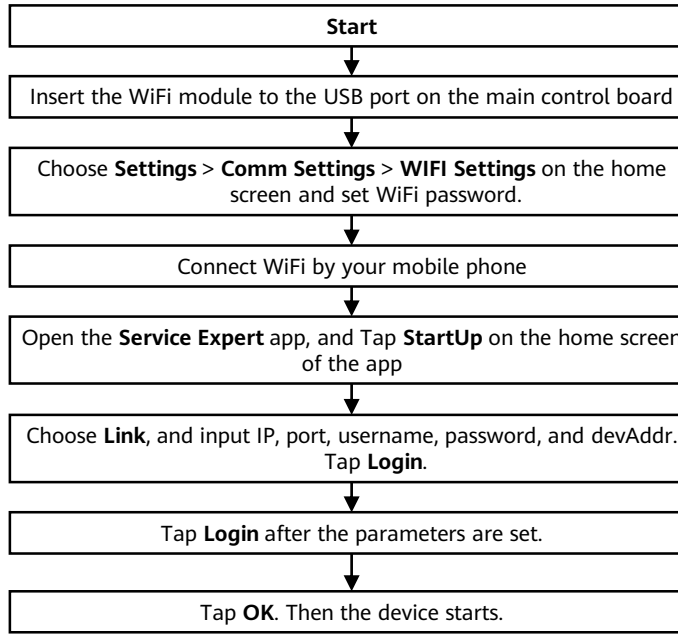
NOTICE

- Download the **Service Expert** app from Huawei app store and runs on Android. Apply for permission after downloading the app.
- Except that the indoor fan item is mandatory, you can clear other commissioning items that are not required.
- If this is not the first startup, choose **Maint** > **Wizard Startup** to enter wizard startup.
- If no humidifier or is configured, their commissioning items are not displayed.

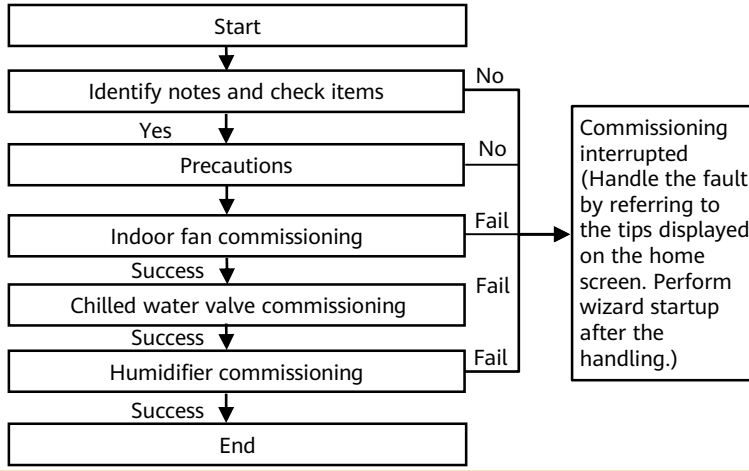
Offline Boot



Online Boot



2. Wizard startup flowchart



NOTICE

- If the floor water overflow alarm is generated, the smart cooling product will shut down by default. If you do not need to stop the smart cooling product, contact Huawei technical support engineers to evaluate risks. After the risk is accepted, choose **Settings** > **System Settings** > **System Control**, and set the **Water overflow alarm action** to **Inactivity** or **Only indoor fan running** or **Humidification stopped**.
- If the in-cabinet water overflow alarm is generated, the humidifier will stop by default. If you do not need to stop the humidifier, contact Huawei technical support engineers to evaluate risks. After the risk is accepted, choose **Settings** > **System Settings** > **System Control**, and set the **Water overflow alarm action** to **No action** or **Only the indoor fan running** or **Shutdown**.

9 Checking the Commissioning

Check Item	Result
The controller exits diagnostic mode.	☐ Passed ☐ Failed
The temperature and humidity are correctly set.	☐ Passed ☐ Failed
Check that the chilled water valve is closed.	☐ Passed ☐ Failed

10 Power-Off

1. Tap **Shutdown** on the LCD home screen.
2. Turn off all switches on the smart cooling product.
3. If the smart cooling product will not be used over a long time, drain the water in the heat exchanger or take antifreeze measures to avoid frost cracks.

Appendix: Precautions Against Adding Glycol

To prevent glycol solution from corroding pipes and the heat exchanging coil, corrosion inhibitor should be mixed into the glycol solution. For details about the mixing schemes, consult glycol experts.

NOTICE

For details about device commissioning and maintenance, see *NetCol5000-C(030, 032, 065) In-row Chilled Water Smart Cooling Product User Manual (2019)* .

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