

INSTALLATION MANUAL

VARIABLE REFRIGERANT FLOW

Model: TIS-VRF-AC

TIS
CONTROL EVERYTHING



PRODUCT INFORMATION

This variable refrigerant flow (VRF) is a type of HVAC technology to set and adjust smart home climate. Supporting 20 brands of AC VRF units, it can navigate the cooling and heating devices with variable motor speed and help with energy efficiency.

PRODUCT SPECIFICATIONS

	Ports and function	Ethernet TIS-BUS RS485 A1 B1 RS485 A2 B2 Micro USB	For web configuration, testing and online upgrade Connection TIS system Modbus RTU connection ASCII protocol for 3rd party integration Special upgrade
	Other specification	Contact Resistance Insulation Resistance	100m max. (at 1A 24VDC) 1000M (500VDC)
	TIS Bus	Number of devices on 1 line Bus voltage Current consumption (Normal)	Max. 64 12-32 V DC <40 mA / 24 V DC
	Reaction time	approx. 20ms	
	Mounting	Din Rail Wall mount	Standard 35 mm Din rail screw holder on the back of the module
	Connection terminal	Load and Power Data / bus	Screw terminal 0,25...4mm ² Male/female connectors link + screw terminal
	Weight	Without packaging	0.35 KG
	Dimensions	Width x length x height	91mm x 145mm x 75mm
	Housing	Materials Casing color IP rating	ABS anti fire Black Gray IP 20
	Temperature range	Operation Storage Transport	-30...60°C -20...60°C -30...75°C
	Air humidity		<85% non-condensing



BARCODE (UPC-A)





READ INSTRUCTIONS

We recommend that you read this Instruction Manual before installation.



SAFETY INSTRUCTIONS

Electrical equipment should only be installed and fitted by electrically skilled persons.

Failure to observe the instructions may cause damage to the device and other hazards. These instructions are an integral part of the product and must remain with the end customer.

Any issues stemming from an installation by an unauthorised person is the responsibility of the user and will not be covered by warranty.



PROGRAMMING

This device can be tested and programmed manually. Advanced programming requires knowledge of the TIS Device Search software and instruction in the TIS advanced training courses.



SIMPLE INSTALLATION

You can use either the DIN rail or fixing points to install this module.



MOUNTING LOCATION

Position the TIS VRF on a stable location within clear reception of the local Wi-Fi signal and where controls and connections are accessible.



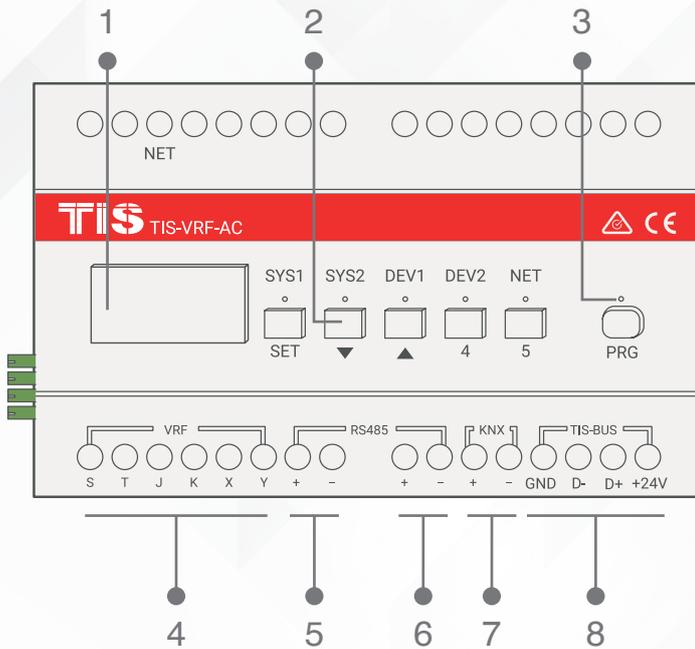
WARRANTY

There is a Two-Year warranty provided by law. The hologram warranty seal and product serial number are available on each device.

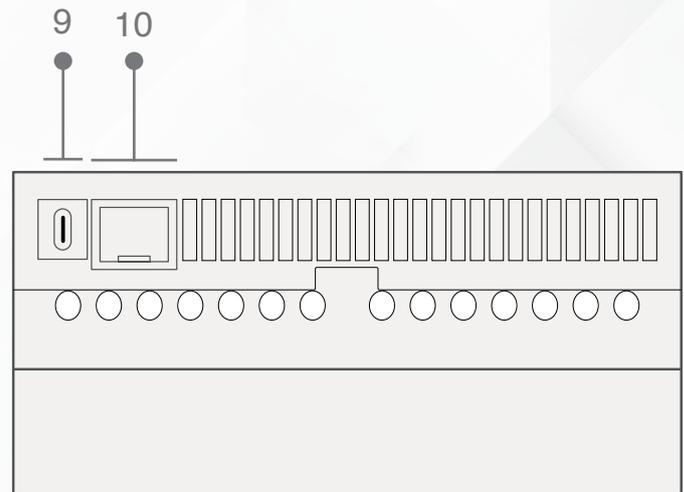


OVERVIEW

FRONT VIEW



TOP VIEW



1) LCD screen

displays whether the communication is normal; displays the brand and number of the air conditioners being controlled

2) Buttons

turn content pages displayed on the LCD screen and set parameters; different functions can be realized through the combination of keys

3) LED indicator

working status indicator

4) AC terminal

Port 4 is used to connect to different AC brands. (the list of compatible brands is available in figure 2.)

5) Modbus RTU connection

6) RS485 interface

used to communicate with any 3rd-party automation system

7) KNX interface

optional if purchased with KNX hardware function

8) TIS-BUS interface

TIS-BUS connection

9) LAN PORT

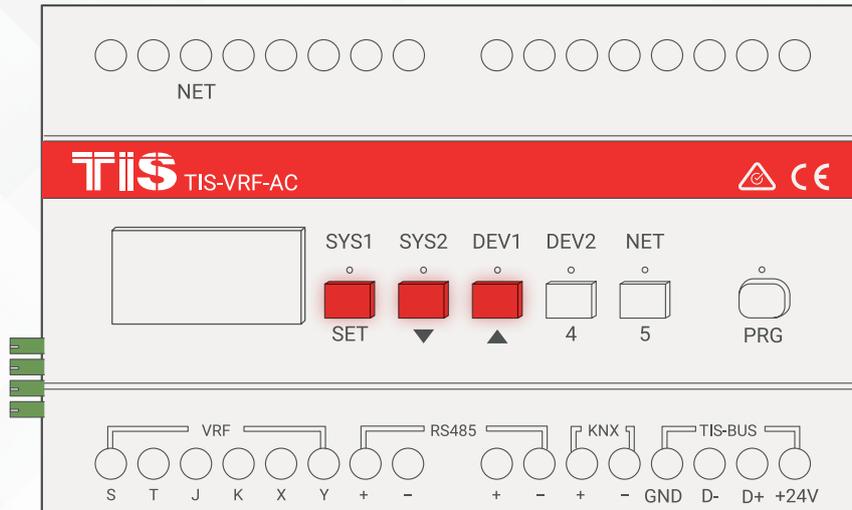
1 RJ45 interface

10) DB INTERFACE

debugging and downloading programs



BUTTON DEFINITION



Button name	Funcation
SET key	During the power-on window (long press set to reset at this time), the factory value can be restored.
UP key	Short press to page up.
DOWN key	Short press to page down.
SET+UP key	(After finding the air conditioner) After 5 seconds, the air conditioner will be fully turned on.
SET+DOWN key	(After finding the air conditioner), the air conditioner will be turned off after the key is pressed for 5 seconds.

WIRING METHOD

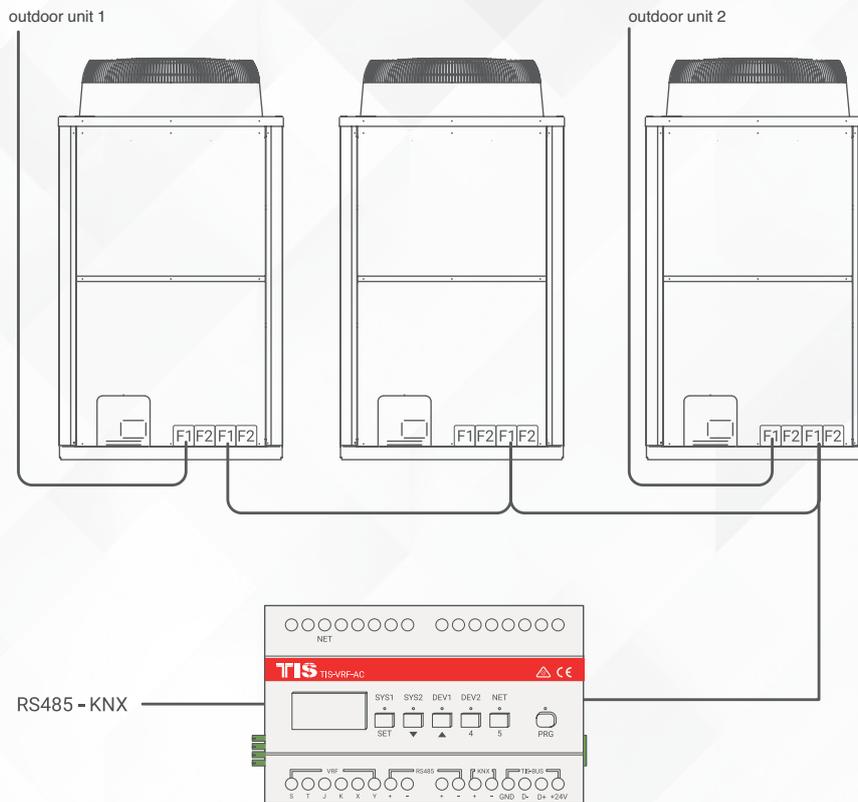


Figure 1: System wiring diagram

The communication line between the indoor unit and the outdoor unit of the air conditioner is the responsibility of the air conditioner construction party. This product is connected to the outdoor unit or indoor unit of the air conditioning system through a 2-core shielded twisted-pair cable. Then, it communicates with all indoor units in the air conditioning system for monitoring. The shielded twisted-pair cable from the outdoor unit of the air conditioner to this product requires a wire diameter of 0.75mm² or more and a total length of not more than 1000 meters, which can be reserved by the air conditioner construction party or added later.

The communication between this product and the low current integrated system is also realized by twisted-pair or network cable. The parameter requirements and construction details of the communication line should be determined according to the location between the gateway and the low current integrated system. This product needs to be installed indoors and can be installed in the smart home control box or ceiling inspection port.



PRECAUTIONS FOR WIRING:

- The input wiring terminals of different control modes are different.
- The network cable of the LAN port should be controlled within 80 meters.
- If the wiring is wrong, the product may be damaged.
- Be sure to cut off the power to the gateway and air conditioner during wiring work; otherwise, it may cause malfunction.
- Please pay attention to avoid routing the signal wires and cables side by side with the power wires; otherwise, it may cause malfunction due to signal interference. If side-by-side wiring cannot be avoided, please keep the distance between the communication line related to this product and the communication line of the air-conditioning system at least 15cm and the distance from other wiring at least 30cm. Or, connect the cable in a protective iron tube and ground one end of the tube. The chassis must be type D grounded.

HARDWARE CONFIGURATION

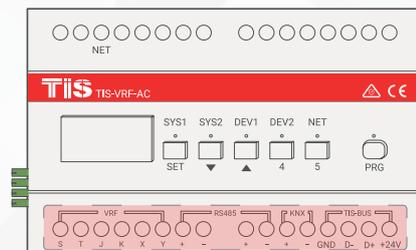
Before Configuration:

Confirm that the air-conditioning system is in the power-on state: check that all indoor and outdoor air-conditioning units connected to the centralized control are all powered on.

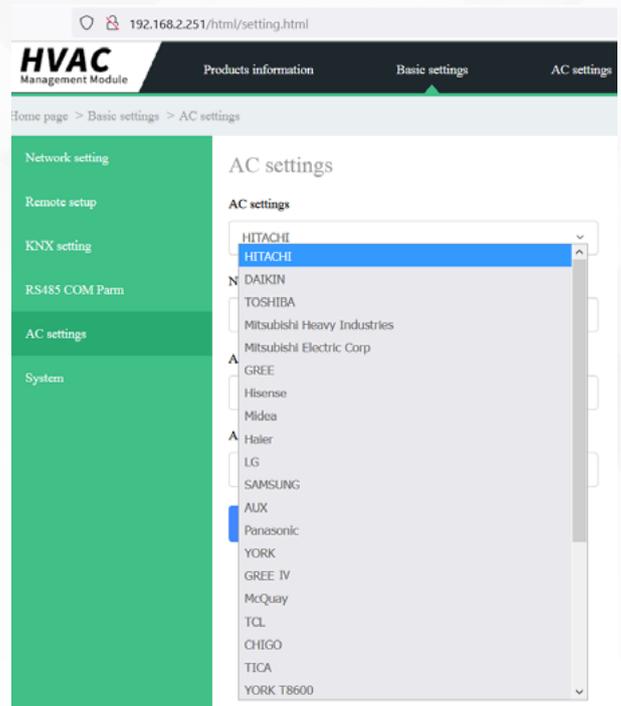
Confirm that the air-conditioning system has been successfully commissioned by the air-conditioning manufacturer without any alarms or abnormalities.

Confirm and record the addresses of the indoor unit of the air conditioner and the corresponding outdoor unit.

1 Connect the air conditioner communication line, Please refer to the AC brand connection method table in next page and connect the TIS BUS, KNX, or RS485 network cable to the corresponding interface of this product as needed.



2 Select the correct air conditioner brand on the web page.





HARDWARE CONFIGURATION

Brand	TIS VRF Gateway wiring port	Air conditioner wiring port	polarity
Daikin-multi-outside machine	J, K	F1,F2 Outdoor-outdoor	No
Daikin-Single machine	J, K	F1,F2 Indoor -Outdoor	No
Hitachi	J, K	1, 2	No
Toshiba	J, K	U1,U2	No
Mitsubishi Heavy multiple external unit systems	J, K	M1,M2 (TB7)	No
Mitsubishi single motor	J, K	M1,M2 (TB3)	No
Panasonic	J, K	U1, U2	No
Hisense	J, K	1, 2	No
Haier	J, K	P, Q	No
Haier-E	J, K	P, Q	No
York- Model 1	J, K	1, 2	No
York – Model 2	X, Y	X, Y	Yes
Gree	S, T S, T	G1, G2 D1, D2	Yes
TCL	S, T	F1, F2	Yes
Mitsubishi Heavy Industries	X, Y X, Y	A1, B1 A2, B2	No
Midea, Bosch, Carrier	X, Y X, Y	X, Y P, Q	Yes
Oaks	X, Y	X, Y	Yes
Samsung	X, Y	F1, F2	No
LG	X, Y	A, B (CEN)	Yes
McQuay	X, Y	Apc, Bpc	Yes
Tianjia	X, Y	A3, B3	Yes
Chigo	X, Y	P,Q	Yes
Trane	X, Y	A, B	Yes

Figure 2: Brand Connection Method



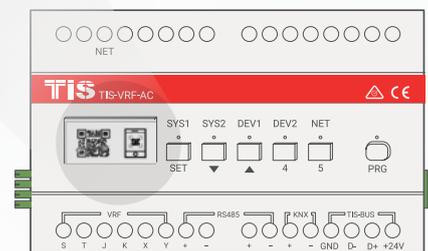
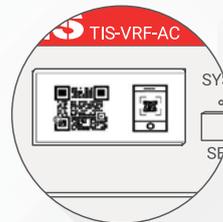
HARDWARE CONFIGURATION

PLEASE NOTE

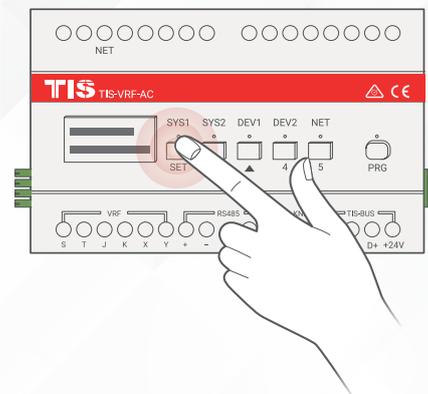
- 1) Motor is the abbreviation of Mitsubishi Electric. When Mitsubishi Electric has multiple external unit systems, connect the centralized control line to TB7 "M1, M2" and insert the jumper cap of the centralized control switch CN41 on the outdoor unit PCB board to CN40.
- 2) Haier air conditioning system has two baud rates. In the above table, the Haier baud rate is 9600 and the Haier-E baud rate is 2400.
- 3) If the port polarity is marked as "None," the wiring between the gateway wiring port and the air conditioning wiring port can be free; if the port polarity displays "Yes," the wiring between the gateway wiring port and the air conditioning wiring port must be in accordance with the manual. The order marked below the ports corresponds to the order of the ports below the air conditioner port. For example: For Midea, the polarity of the gateway wiring port is marked as "Yes," so you need to connect the air conditioner X wiring port to the gateway X wiring port and the air conditioner Y wiring port to the gateway Y wiring port.

3 The LCD screen displays the description of the buttons and the description of the LED indicator

When the gateway is connected to the power supply, the gateway's device ID QR code is displayed. Using this code, you can remotely upgrade or check the product information of the gateway, as shown in the figure.

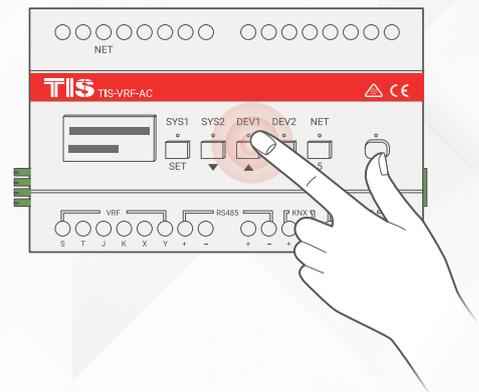


4 After the QR code disappears, the LCD screen displays: "At this time, you can press and hold SET for 5 seconds to reset." If the reset operation is not required, you can wait to skip automatically; if you need to reset, when it displays "press and hold SET for 5 seconds to reset," press the "SET" key for about 5 seconds, and the LCD screen will display "reset successful" to complete the reset.

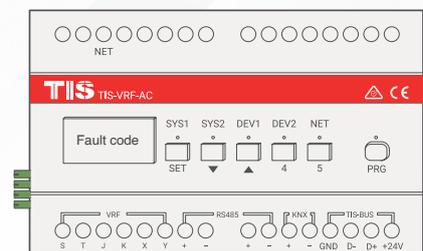


HARDWARE CONFIGURATION

4 At this time, the information page will be displayed. The first page displays the air conditioner brand, supported protocols, normal operation/errors of the machine, and the number of air conditioners searched. (When the number of air conditioners is 0, it is searching for air conditioners. It takes about 5 minutes to refresh. The interface can display the number of air conditioners searched.) At this time, press “▼” to switch to the next page. The first line displays the IP of the unit, and the second line displays the firmware version number. At this time, press “▼” again to switch to the last information page, which displays the presence or absence of remote functions, brand information of fresh air and floor heating, etc. Each information page can be viewed and moved through using “▲” and “▼” as shown in the figure below.



5 When the air conditioner is running abnormally, the position displayed on the LCD panel will change to display the air conditioner fault code and digital code. Using the air conditioner’s fault code, you can consult with us to find out how to repair it, or return it to the original supplier for a repair. When the air conditioner failure code is removed, it will show that the air conditioner is running.

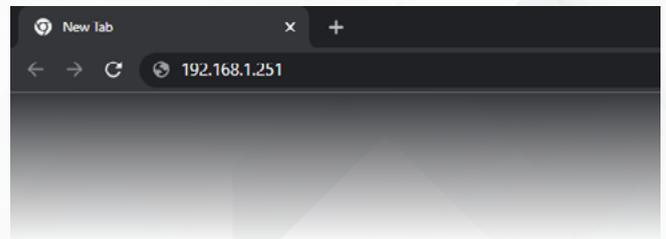


WEB CONFIGURATION

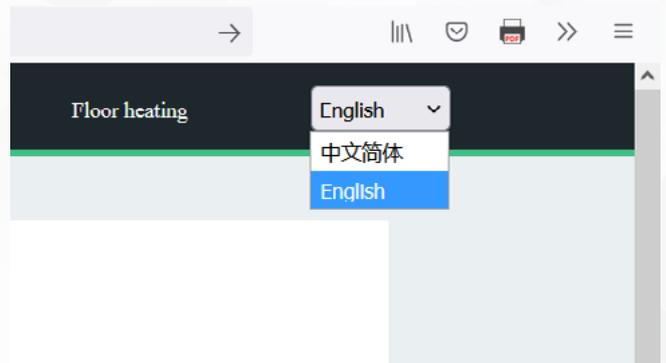
PLEASE NOTE

The factory default IP address of the product is 192.168.1.251. If you use a computer to access this product's WEB page, please set the computer's own IP to the same network segment as the IP address of this product. The specific method is as follows: set the computer's local IP address to any one of 192.168.1.2~250, the subnet mask to 255.255.255.0, and the default gateway to 192.168.1.1.

1 To access the interface login and product information homepage, use Chrome. Type "192.168.1.251" in the URL bar. The user is "admin," and no password is needed. Then, press Enter to access the product information page.



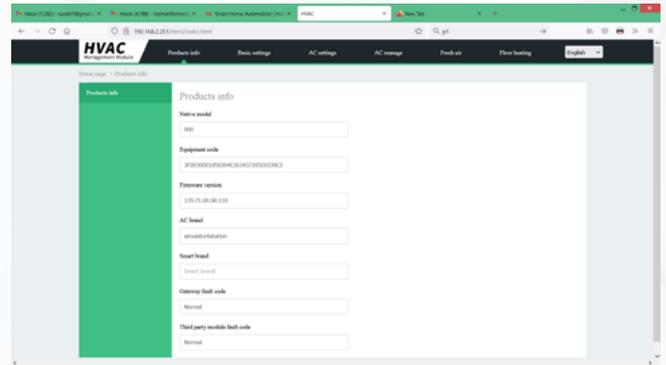
2 Set your language from the dropdown menu in the corner.



WEB CONFIGURATION

PRODUCT INFORMATION

 The product information page displays the machine model, device code, firmware version, air conditioner brand, smart brand, etc.



Navigation bar

includes product information, basic settings, air conditioning management, fresh air management navigation.

Local model

the model of the product.

Device code

the product's unique device ID.

Firmware version

the version number of the underlying driver of the product.

Air conditioner brand

the controlled VRV air conditioner brand. You can change the control brand by upgrading the firmware version.

Smart brand

the connected smart system.

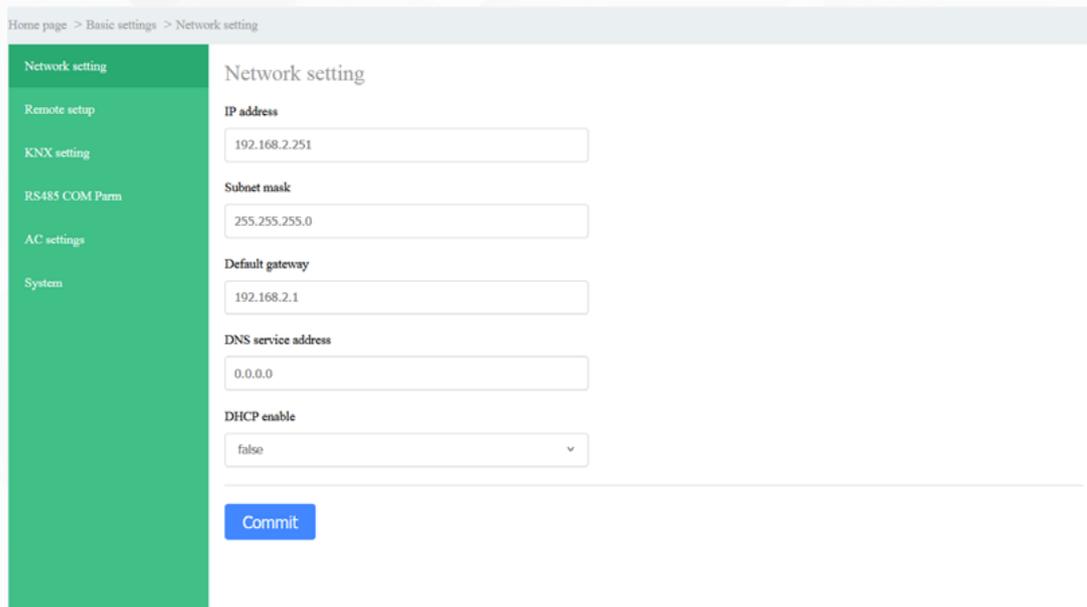
BASIC SETTING

The basic settings page includes functions such as network settings, remote settings, KNX settings, RS485 communication parameters, air conditioning settings, and systems.



WEB CONFIGURATION

Network settings includes the IP address, subnet mask, default gateway, DNS service address, and DHCP enable. Users can change their own settings according to their own network conditions. (For instance, if you forget the IP address, you can use the reset button to restore the factory settings. For details, please refer to the introduction of the button description in Chapter 3: Hardware Configuration.)



Home page > Basic settings > Network setting

Network setting

Remote setup

KNX setting

RS485 COM Param

AC settings

System

Network setting

IP address
192.168.2.251

Subnet mask
255.255.255.0

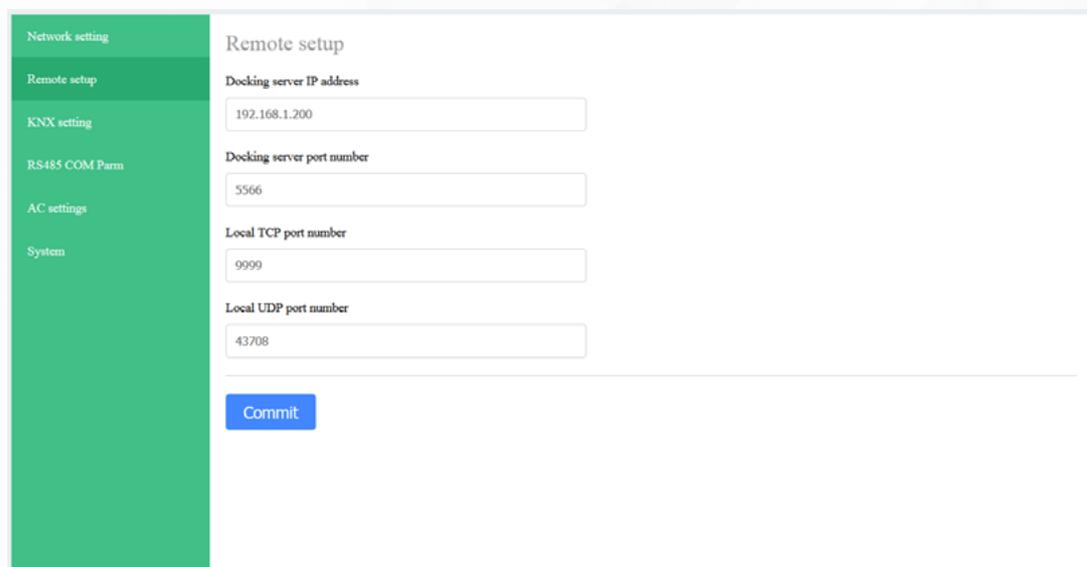
Default gateway
192.168.2.1

DNS service address
0.0.0.0

DHCP enable
false

Commit

Remote settings includes the IP address of the docking server, the port number of the docking server, and the domain name of the docking server. Users who need the remote control function can set it according to their needs.



Home page > Basic settings > Remote setup

Remote setup

Remote setup

KNX setting

RS485 COM Param

AC settings

System

Remote setup

Docking server IP address
192.168.1.200

Docking server port number
5566

Local TCP port number
9999

Local UDP port number
43708

Commit

WEB CONFIGURATION

KNX SYSTEM SETTINGS

KNX control main group address: The KNX system control main group address can be modified by setting specific values. For example, the default is 12/BB/CC, which can be changed to 14/BB/CC by modification.

KNX feedback main group address: The KNX system feedback main group address can be modified by setting specific values. For example, the default is 11/BB/CC, but it can be changed to 14/BB/CC.

Wind speed setting: You can set the low, medium, and high speed value of the corresponding air conditioner through the partition box. For example, the default value is 1, 2, and 3. If you modify it by filling in the box with 1, 3, and 5, 1 will be low wind, 3 will be stroke, and 5 will be high wind. (The relative position of low, middle, and high is fixed.)

Mode setting: You can choose to use 1bit or 1byte data to connect to the KNX system. Among them, 1bit data only has cooling and heating functions, while 1byte data has cooling, heating, dehumidifying, and air freshening functions. The corresponding air conditioning mode can be set through the partition box. For example, the default value is 1,8,2,4, and 0,1,2,3 can be filled in to make modifications: 0 is for cooling, 1 is for heating, 2 is for dehumidifying, and 3 is for fresh air. (The relative position of the fresh air for cooling, heating, and dehumidifying is fixed.)

Remote setup

KNX setting

RS485 COM Parm

AC settings

System

Model
Default

KNX Control the address of main group(0-15)
12

KNX Feedback main group address(0-15)
11

Wind speed setting
1byte (Low wind.Mid wind.High wind)
4 2 1

Mode setting
1bit (Refrigeration.Heat)
0 1

1byte (Refrigeration.Heat.Dry.Ventilation)
1 8 2 4

[Commit](#)

KNX address Checklist : Conversion

AC address AA-BB	Operation content	KNX group address
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WEB CONFIGURATION

KNX SYSTEM SETTINGS

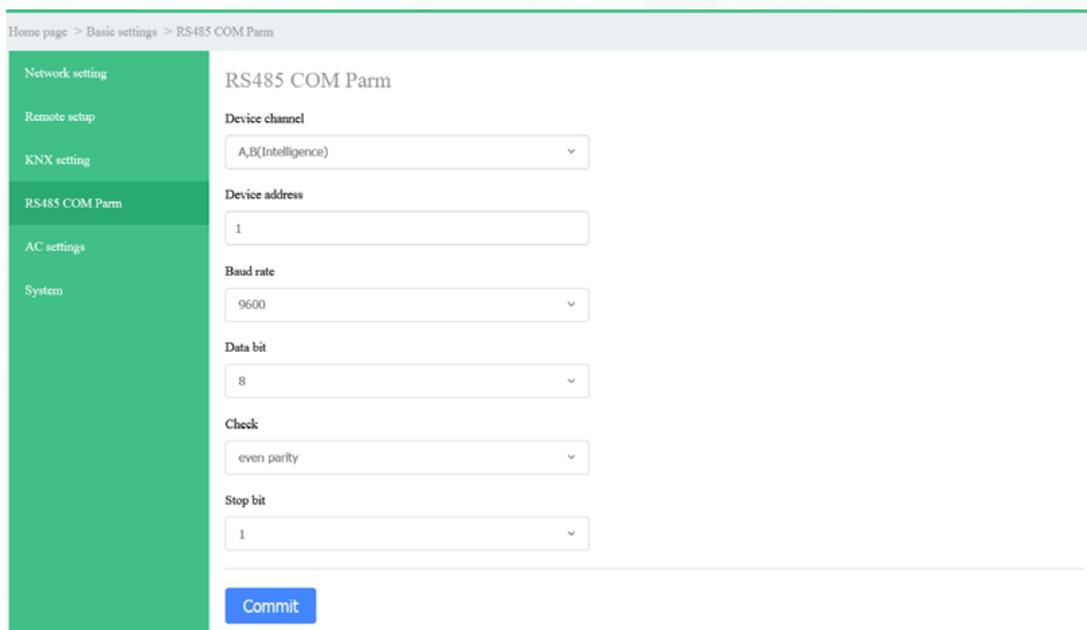
The KNX address comparison table plug-in can conveniently query the refrigeration system and the KNX group address of the corresponding internal machine. The value in the comparison table will be based on the main control group address, numerical values (0-15), feedback main group address value (0-15), and indoor air conditioner indoor unit address.

KNX地址对照表: -

空调地址AA-BB	操作内容	KNX组地址
01-01	当前开关状态	11/0/1
	当前模式设定	11/1/1
	当前风速设定	11/2/1
	当前温度设定	11/3/1
	当前房间温度	11/4/1
	当前故障代码	11/5/1
	设定开关	12/0/1
	设定模式	12/1/1
	设定风速	12/2/1
	设定温度	12/3/1

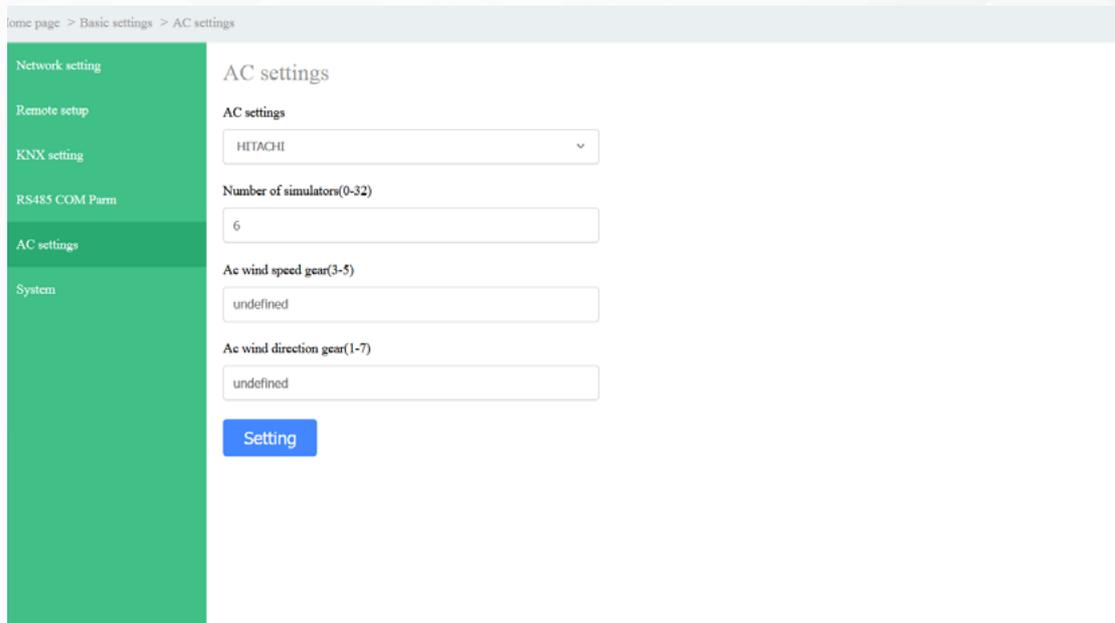
RS485 COMMUNICATION PARAMETERS

The device channel refers to the three 485 interfaces on the corresponding product hardware: A,B interface for BUS system; A1,B1 interface for fresh air; and, the A2 and B2 interfaces on the front panel can set the baud rate, data bit, parity bit, and stop bit of each channel.



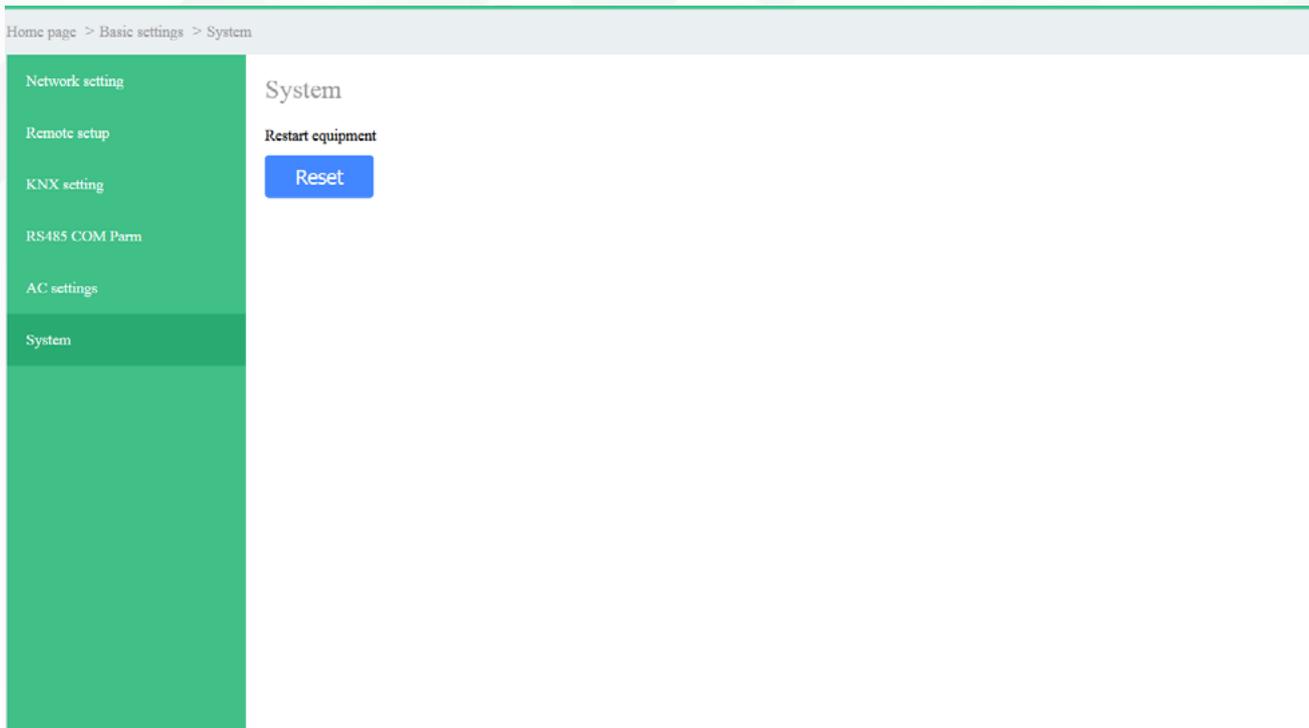
WEB CONFIGURATION

The air conditioning settings page includes air conditioning settings and the number of simulators. You can set the controlled air conditioner brand and simulator function on this page. For the simulator, enter the required number in the box.



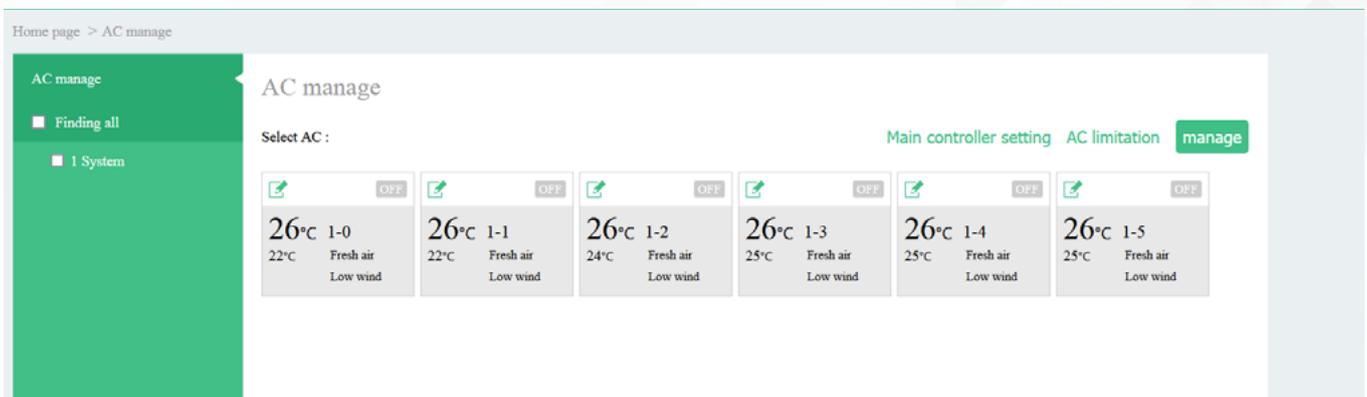
WEB CONFIGURATION

The system page can restart the device.



AC MANAGEMENT

On the air conditioning management page, you can select one system or multiple systems for single or multiple centralized management. Through the management button, set the parameters for the equipment. You can also check the number, address, and status of the connected equipment.



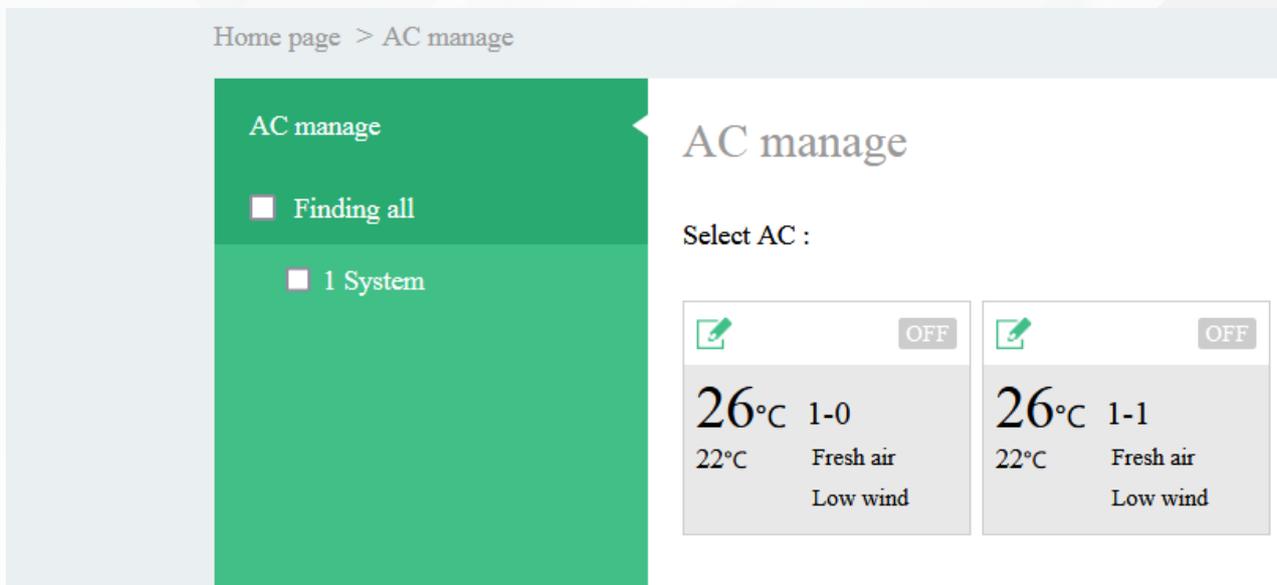
WEB CONFIGURATION

PLEASE NOTE

In the above figure, each air conditioner has its own address number, and the display format is defined as “AA-BB.” For example, the address of the fourth indoor unit in the fourth line is “2-5,” where AA is defined as 02 and BB is defined as 05.

When all are selected in the navigation bar, all of the air conditioners found will be displayed on the right page. When the No. 1 system or the No. 2 system is ordered, only the air conditioner of the No. 1 system or the No. 2 system will be refreshed.

Check box: When all of the front check boxes are selected, all of the air conditioners are selected. When the No. 1 system is selected, all of the air conditioners of the No. 1 system are selected.



Click one or more air conditioner icons on the right to select an air conditioner. The address of the selected air conditioner’s internal unit can be displayed in the air conditioner selection, as shown below

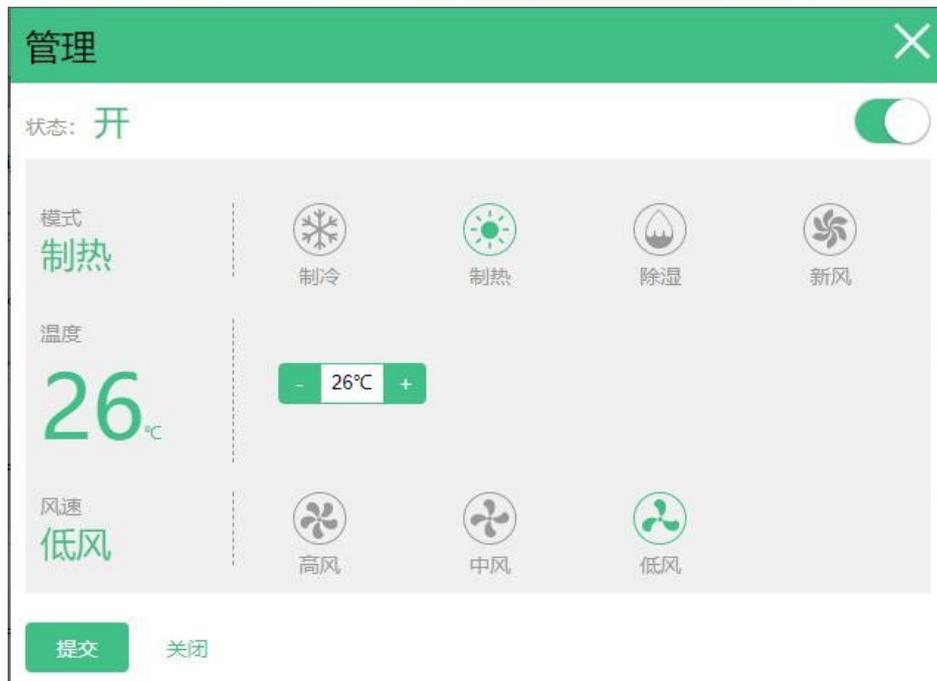


WEB CONFIGURATION

The air conditioner limit button can control the limited settings of the selected air conditioner.



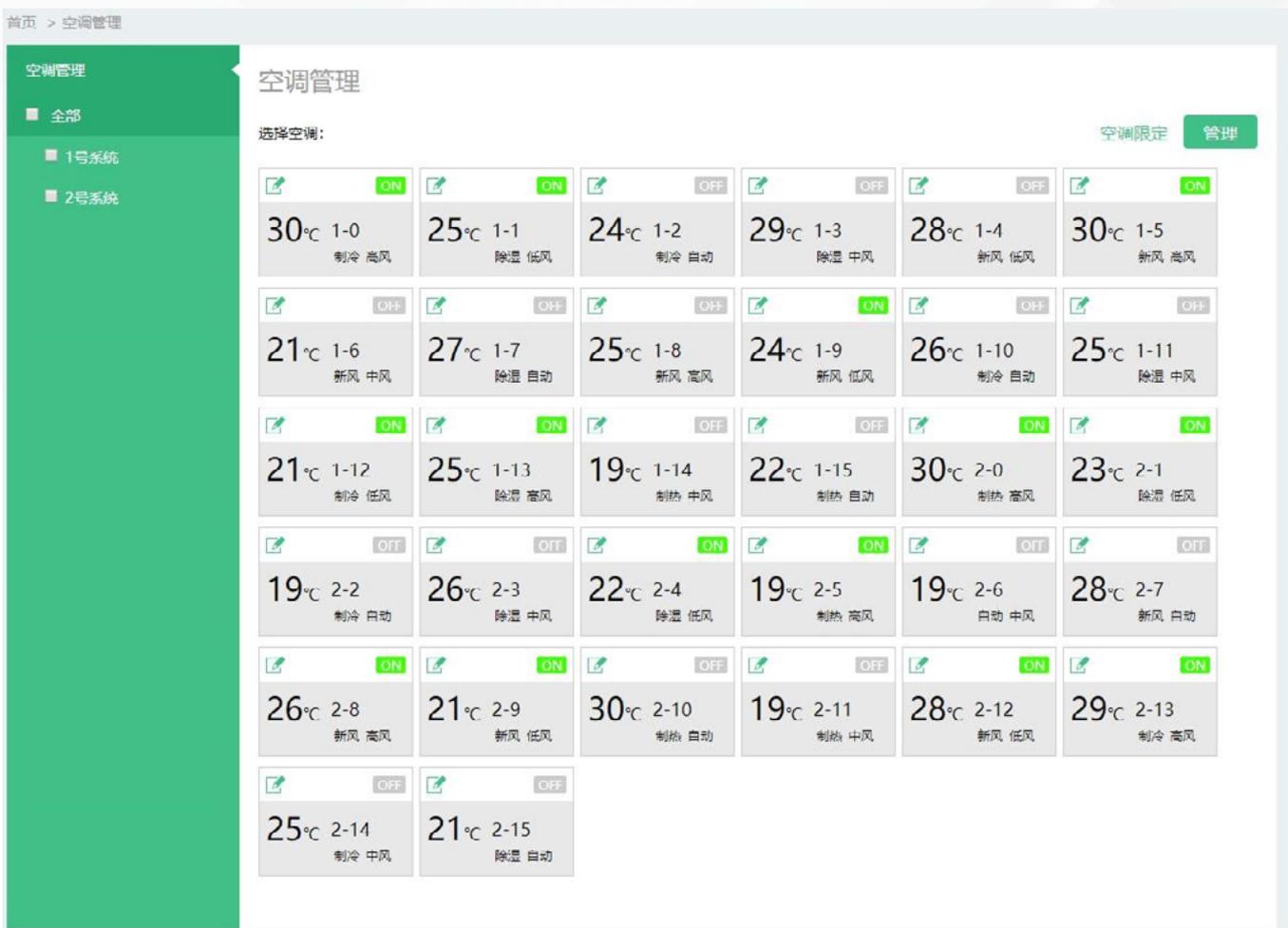
The management button can control the functions of the selected air conditioner.



WEB CONFIGURATION

Smart Home or Centralized Control Protocol Integration

The address displayed on the product's WEB page is the actual address of the air conditioner. Click on the air conditioner management page to enter the air conditioner management interface shown in the figure below (see Chapter 4: WEB Configuration Instructions for details).



PLEASE NOTE

In the above figure, each air conditioner has its own address number, and the display format is defined as “AA-BB.” For example, the address of the first indoor unit in the second line is “1-6”; AA is defined as 01, and BB is defined as 06 here. When customers make integration solutions, please abide by the specifications in the following agreement. The corresponding method of the address in TCP or custom 485 protocol is as follows: In the agreement, AA stands for “outdoor unit address,” and BB stands for “indoor unit address.” The address range of the outdoor air conditioner unit is 1~64, and the fresh air system address is fixed at 65. For example: “4-12” corresponds to “Outdoor Unit Address” as 04 and “Indoor Unit Address” as 12; “65-3” corresponds to the address of the fresh air system, while 3 corresponds to the address of the fresh air internal machine.

The corresponding method of address in MODBUS or KNX protocol

In the agreement, all the register addresses of “air conditioner address AA-BB” are calculated. “AA” should be calculated according to AA in “AA—BB,” and “BB” should be calculated by pressing calculate according to BB in “AA-BB.” For example, “4-12” corresponds to “air conditioner address AA-BB as 04-12.” 1) For details, please download the latest interface protocol standard documents on the official website .

REMOTE UPGRADE

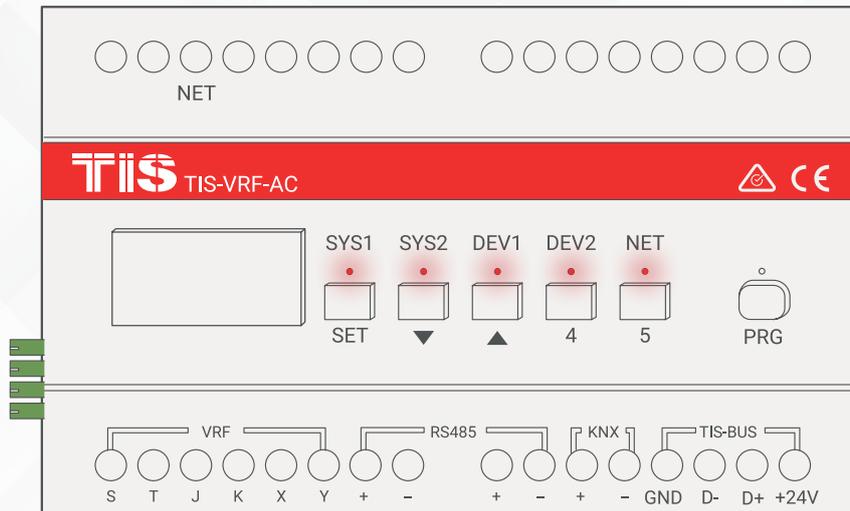
In order to ensure the practicability, convenience, and changeability of the gateway for the user, the gateway that the user gets does not support any particular brand of air conditioner or protocol by default. You need to contact us to perform the corresponding firmware upgrade operation after getting the product. Please refer to the following firmware upgrade steps:

1. Scan QR code and send it to TIS Tech support to do the product upgrade remotely.
2. After the gateway is successfully upgraded, the LCD screen will display “success” .
3. After the gateway is successfully upgraded, it will automatically restart. Then, you can formally connect to the air-conditioning equipment you need to control.

PLEASE NOTE

If there is any inconsistency between this product manual and the description on the official website, please refer to the description on the official website/public account. The product’s own functions are perfect and upgraded.

LED INDICATOR BEHAVIOR



Name	Representative equipment	Light status	Meaning
SYS1 SYS2	Gateway	SYS1 flashes slowly	Gateway is normal.
		SYS1 and SYS2 lights are always on	Gateway is abnormal.
		SYS1 Steady ON	Gateway is initializing.
		SYS2 Steady ON	The gateway is not authorized.
DEV1 DEV2	Device	DEV1 Steady green	Searching for air conditioner...
		DEV1 Flashing	The gateway has found the air conditioner, fresh air, and panel equipment. The light flashes slowly when the device is running, and the green light flashes quickly when the device has data.
		DEV1 and DEV2 is steady ON	When the gateway does not find the air conditioner, fresh air, and panel device, the air conditioner bus has a fault code or the bus has no data.
		DEV2 steady ON	Air conditioner failure during operation.
NET	Data	NET Lights Off	No data is being transmitted.
		Net LED ON	There is data transmission.