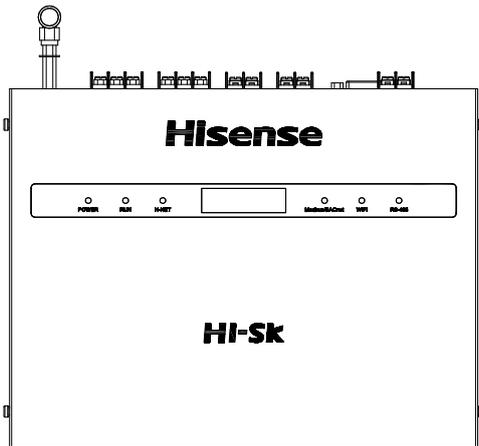


Modbus Adapter

(Model : HCPC-H2M1C)

Installation Instruction Manual



Thank you for choosing Hisense commercial air conditioner!

Please keep this manual for future reference after reading, please ask the dealer or service personnel of the company for the “Mapping Table” mentioned in this manual. If there’s any question, please contact the dealer or the service center of the company.

This manual is exclusively for Modbus adapter (HCPC-H2M1C).

Tips: Before installing Modbus adapter, please read the installation instruction manual carefully, and make sure you understand the information provided before carrying out related operation.

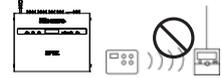
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Preface

- The product is Modbus adapter for air conditioner.
- Do not install this product in the following places where are easy to lead to failure of the Modbus adapter.
 - Place where there is oil (including mechanical oil) splash, a lot of steam;
 - Hot springs and other places with more sulfide gas;
 - Place where combustible gas may be generated and flow in;
 - Coastal zone with higher salt content;
 - Acid or alkaline environment.



- When using medical devices and other devices which produce electromagnetic wave, in order to prevent malfunction of the air conditioner, do not make the emission surface of the electromagnetic wave directly facing the electrical box, remote control wire and remote control.
- In addition, in order to prevent airborne electromagnetic waves from affecting the air conditioner, please put the apparatus which can generate electromagnetic wave and radio transmitting device at a distance of 3M away from the remote control.



Symbol Meaning

	Warning : Indicates incorrect operation, which may cause serious injury or death.		: Indicates compulsory matters, instruction for behavior of non-professional and general users.
	Attention : Indicates incorrect operation, which may cause injury or damage to the product.		: Reference page.
	Note : Note, other than warning, attention.		Shortcut : Help you operate more easily.
	: Indicates prohibition matters.		

Important Safety Information

- Please correctly use this product after carefully read this important safety information.
- The notes listed here are divided into **Warning** and **Attention** two types. In [Warning] column it lists incorrect operation which may cause serious consequences.

- But in [Attention] column the matters listed may also cause serious consequences in special circumstances. Because what it lists are important matters related to safety, please be sure to comply!
- please keep this manual properly for future reference after reading.

Installation · Electrical Construction



Warning

- Relevant important safety information is also listed in the manual of attached indoor and outdoor unit, please be sure to comply!
- Please entrust the dealer or professional installation personnel for the installation.
If you install it improperly, it may cause electric shock, fire, adapter fall down and other injury accidents.
- Electrical construction worker shall obtain construction qualification. Please entrust qualified dealer to carry out.
If carrying out construction by yourself, improper installation may cause electric shock and other accidents.
- When you open the top cover of the unit, ensure to cut off the main power supply. As long as the main power is not cut off, the power terminal is in charged state.

Important Safety Information (Continued)

Repair and move

 **Warning**

- When this product is repaired and moved, please consult the dealer or service center designated by the company.
- Improper repair and installation may cause electric shock, fire and other accidents.

Other warnings and attention

 **Warning**

- In repair or maintenance, do not let water enter the interior. Electric shock may occur when electrical parts encounter water.
- Do not change electrical wiring. Otherwise it may cause major accidents.
- In repair and maintenance, please use solid ladder. Otherwise it may overturn and cause injury.

 **Attention**

- When using power adapter, please choose formal manufacturer, 3C certification is essential.

Important Safety Information (Continued)

Installation

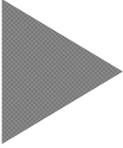
⚠ Warning	<ul style="list-style-type: none"> This product supports sit and hang type installation, be sure to check whether four rubber feet is installed firmly for sit type installation. 
	<ul style="list-style-type: none"> Please install and use strictly according to this manual. Improper installation may damage the product. 
	<ul style="list-style-type: none"> Do not install this product in the place where combustible gas may be generated and flow into. Otherwise, it may cause a fire. 
Attention	<ul style="list-style-type: none"> When the product is subject to electromagnetic wave (strong shock) and other external interference, it may be unable to send or receive signals, pay attention to the installation position of the product.

Wiring

⚠ Warning	<ul style="list-style-type: none"> All parts of the product are using weak current, all terminals are prohibited to connect to 220V AC, otherwise it will burn the product. 
	<ul style="list-style-type: none"> Wiring is fixed firmly with external force, poor fixing may cause high temperature, and cause fire or electric shock. 
	<ul style="list-style-type: none"> The wiring connection should be reliable. If the connection is loose, the wire gets hot and causes fire or electric shock. 
Attention	<ul style="list-style-type: none"> Turn off the power supply before wiring operation, otherwise, it may cause electric shock accident.

Use

⚠ Warning	<ul style="list-style-type: none"> Do not place it where can be reached by children, otherwise, the product is easy to be damaged and causes accidental injury to the child's body.
	<ul style="list-style-type: none"> When using in the following circumstances, it may cause abnormal communication, cannot concentrate to control the air conditioner units, so please use it based on full confirmation. <ul style="list-style-type: none"> Continuous use in high humidity; Use in the state of strong shock; Use in the state of long time vibration; Use in the places of electrostatic, electromagnetic waves; Use in the places where the ambient environment may change sharply; Use in the places where the warm air heater sends air and blows straightly; Use in the environment of liquid, corrosive gas and tidal wind.



Important Safety Information (Continued)

Attention	• The company is committed to the improvement of the products constantly, it may subject to change without notice.
	• This product is only used for conversion between the air conditioner network and control network.
	• The company does not provide service of changing the product to other use.
	• Without permission, no part of this manual shall be copied.
	• If you have any question, please contact the service center designated by the company.
Arrival inspection	• Upon receipt of this product, inspect it for any damages incurred in transit.
	• Check whether the accessories are complete.
	• Do not use this product in other places which are not specified in this manual.

1 System Constitution

1.1 System Constitution

Figure 1.1 shows the system constitution case of using this product.

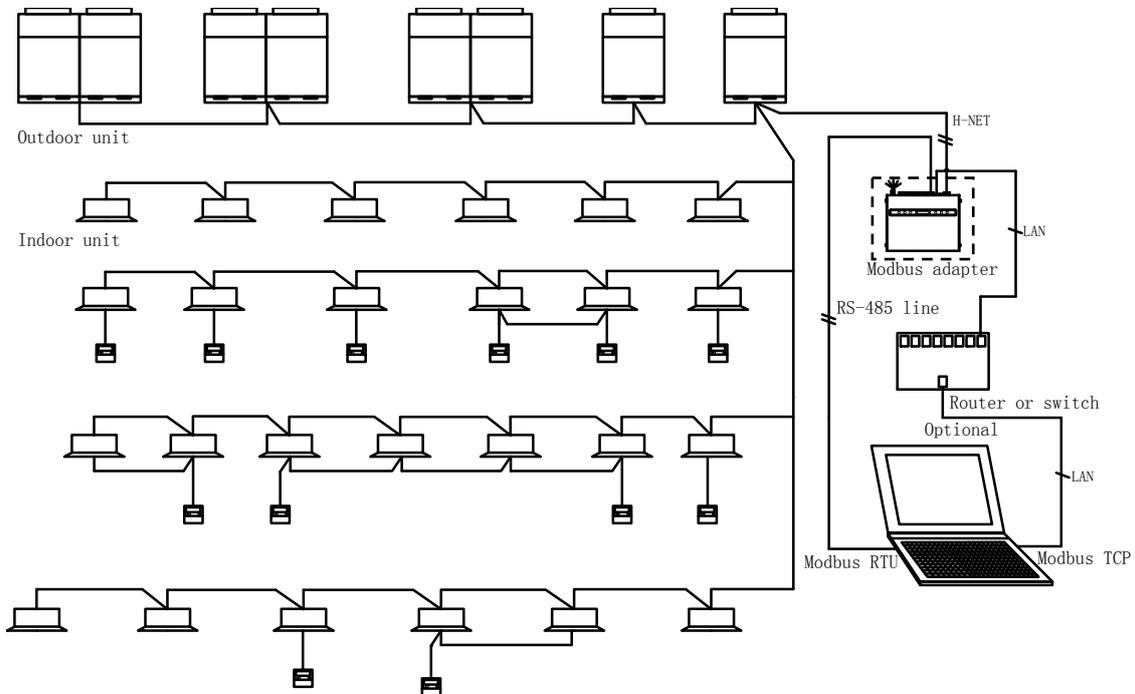


Figure 1.1 The product system constitution case

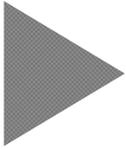
This product is Modbus adapter of Hisense air conditioner. Use Modbus TCP as the main body, compatible with Modbus RTU protocol, and convert the communication protocol of the company's air conditioner into Modbus standard format protocol for PC's secondary development and monitoring. It's more convenient to achieve docking with the third party system.

The product also has the following functions:

- ① Can concentrate to control the air conditioner units;
- ② External input and output linkage function;
- ③ Support USB power supply;
- ④ LAN control;
- ⑤ Indoor unit data monitoring;
- ⑥ WEB server configuration, etc.

Note

- The object controlled by the product is the outdoor and indoor unit connected to the communication line.
- One Modbus adapter can be connected to the same bus the utmost.
- Do not support the connection of no crossing line for indoor unit.



1 System Constitution

1.2 Name of Each Part

See the name of each parts of the product shown in Figure 1.2, 1.3.

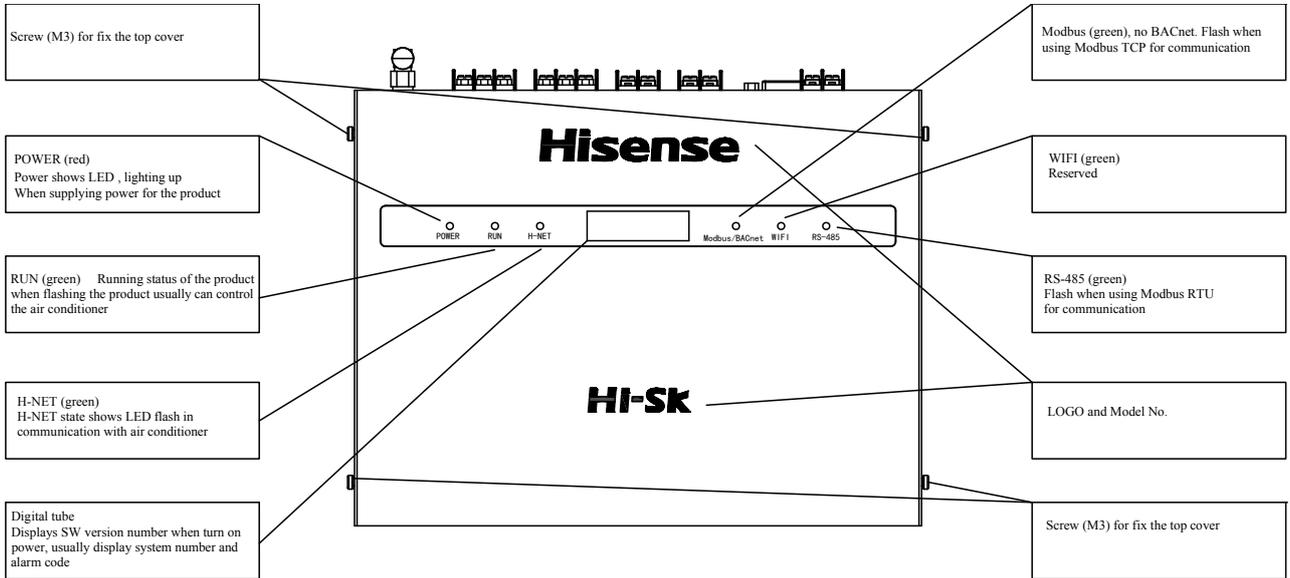


Figure 1.2 Name of each part 1

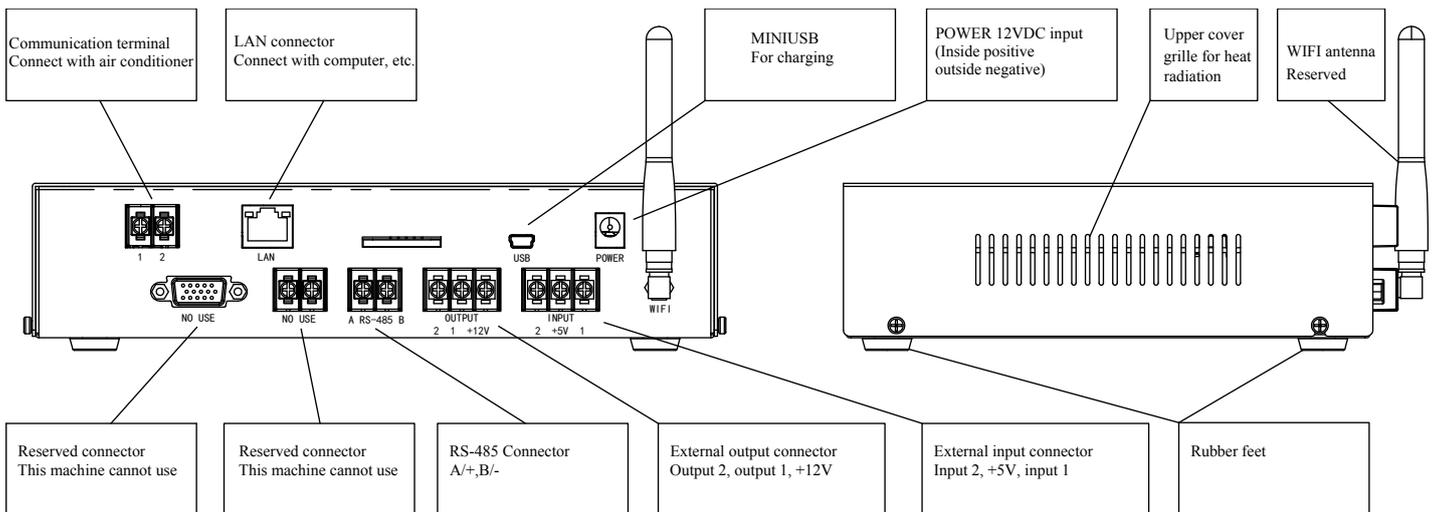


Figure 1.3 Name of each part 2

1 System Constitution

1.3 Name of Parts in the Modbus Adapter

See the state of removed top panel in Figure 1.4. See the name and functions in below figure.

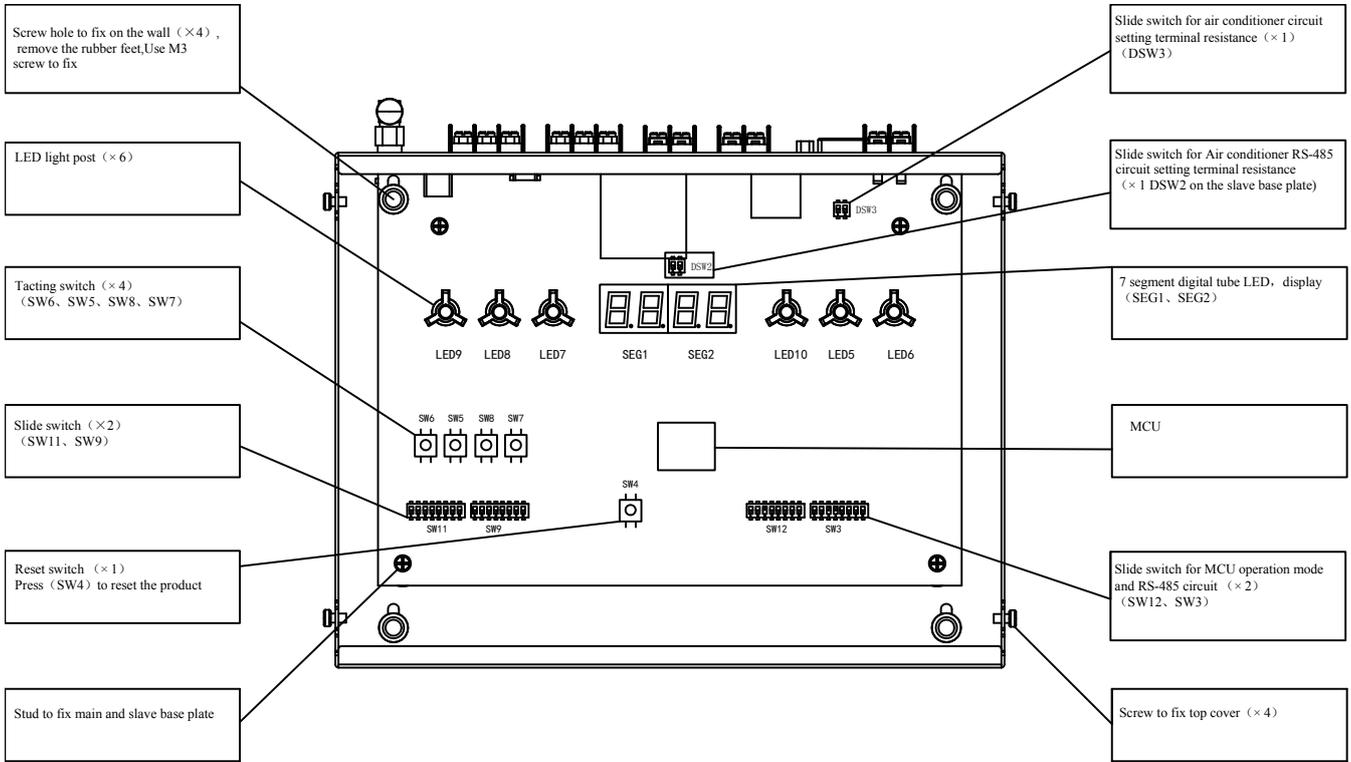


Figure 1.4 Name of parts in the Modbus adapter

The default slide switch setting state shown in Figure 1.5

SW12		MCU operation mode setting cannot change at any time.
SW11		When pin 1 is ON, refers to enable output 1, when pin 2 is ON, refers to enable output 2. When Pin 3 is ON, it shows the system is connected with single board constant speed machine.
SW3		Indicate to activate the hardware of RS-485 loop.
SW9		Reserve.
DSW3		When Pin 1 is ON, connect 75Ω terminal resistance in the H-NET communication bus.
DSW2		When Pin 2 is ON, connect 120Ω RS-485 terminal resistance in the communication bus.

Figure 1.5 The default setting state of code switch

1 System Constitution

1.4 Modbus Adapter Specifications

See Table 1.1 for the hardware specifications; Table 1.2, 1.3, 1.4, 1.5 for the communication specifications.

Table 1.1 Hardware specifications

Items	Specifications
Power supply	12VDC power adapter input or 5VDC MINI USB input
Consumption power	Below 12W
Action environment condition	Environment temperature: 0~40°C
	Environment humidity: 20~85% (no condensation)
Dimension	L×W×H (mm): 220×170×50(excluding the protruding part)
Weight	About 1kg
Installation condition	Indoor use, support both horizontal (installation) and vertical (hang)

Table 1.2 Air conditioner H-NET II communication specifications

Items	Specifications
Communication object	Outdoor and indoor air conditioner
Communication wiring	Shielded twisted pair
Communication mode	Half duplex communication
Concurrent mode	Asynchronous communication
Communication speed	9600bps
Wiring distance	Total length below 1000m
Number of air conditioners to be connected	The largest outdoor unit ×64[system], maximum indoor unit ×64[set] In the same H-NET II bus, total number should be below 200 sets (including centralized control device). ※Cannot connect to non H-NET II unit. ※For outdoor unit combined with several modules, counted as 1 set outdoor unit when calculating the number of outdoor unit
Centralized controller can be used together	Hi-Dom、HYJ-J01H ※The number of centralized control devices can be used together on the H-NET II does not exceed 8 sets (including this product).

Table 1.3 LAN (Modbus TCP) communication specifications

Items	Specifications
Communication object	Computer used for management, PLC
Communication wiring	LAN (Ethernet)
Communication mode	IEEE802.3 standard (10BASE-T/100BASE-TX)
Wiring distance	100m

1 System Constitution

Table 1.4 RS-485(Modbus RTU) communication specifications

Items	Specifications
Communication object	Computer used for management, PLC
Communication wiring	Shielded twisted pair, Distinguish A/B port
Communication mode	Half duplex communication
Concurrent mode	Asynchronous communication
Communication speed	9600bps
Wiring distance	Within 1000m

Table 1.5 External input and external output communication specifications

Items	Specifications
External output voltage	12VDC
External input voltage	5VDC Dry node signal (short circuit or open circuit)
Function and application	With external linkage, provide output and input signal of the switch
Wiring distance	Within 70m

2 Installation construction

This chapter describes the installation method from installing the product to power input. See Table 2.1 showing the process from installation to power input.

Table 2.1 Installation Process

Sequence	Item	Content to confirm
1	Select installation place	Notes and attention in respect of setting
2	Installation method	Installation methods and attentions
3	Wiring connection method	Connection method of each wiring
4	Switch setting method	Switch content and setting method
5	Power input	Matters to confirm

2.1 Installation place

Please select a place which meets the following conditions for installation:

- (1) The place where the [Preface] of the installation instruction manual describes.
- (2) For horizontal installation, pay attention to select a relatively stable table.

For vertical (wall hang) installation, please use M3 screws to fix it on the sturdy wall.

2.2 Installation Method

- (a) As shown in Figure 2.1, ensure maintenance space.

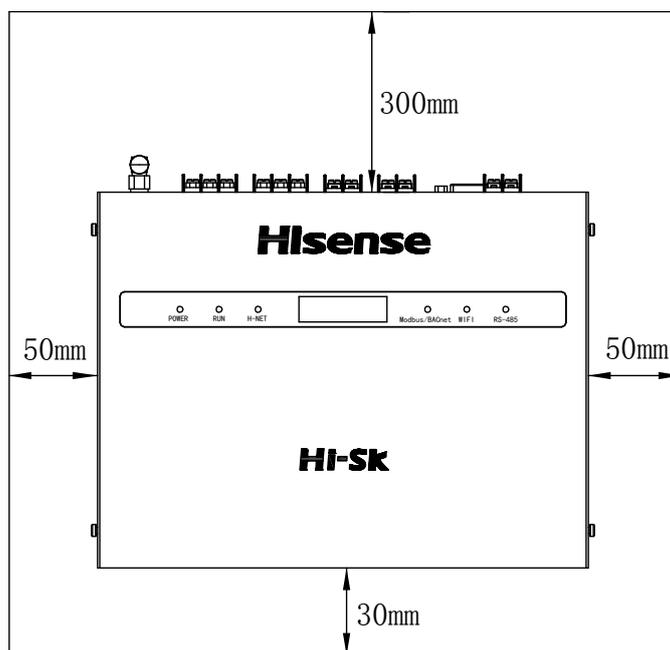


Figure 2.1 Maintenance space

2 Installation construction

(b) Vertical (wall hang) installation

(1) For vertical (wall hang) installation, note the connector side is top side, as shown in Figure 2.2.

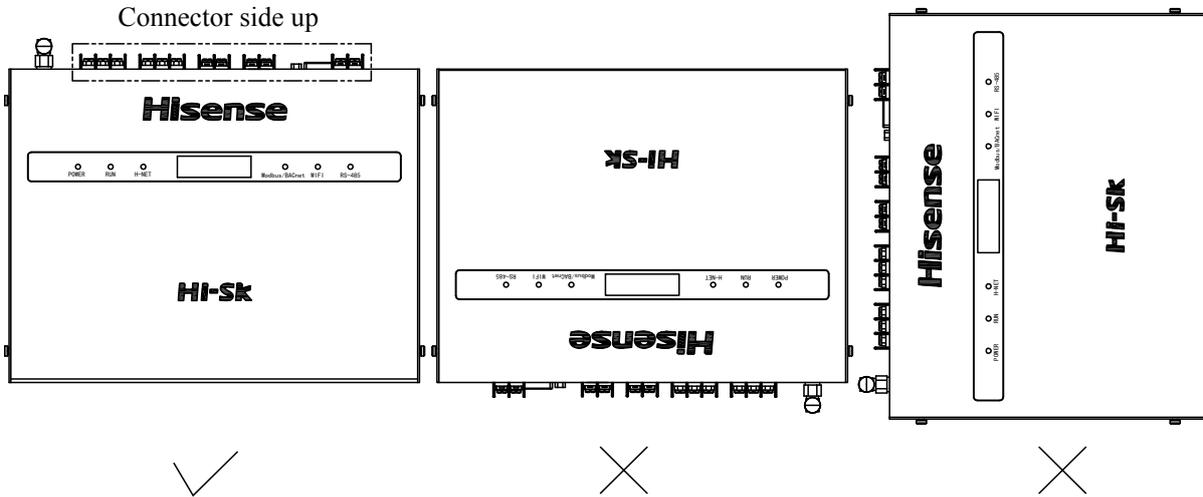


Figure 2.2 Installation direction

(2) Remove 4 rubber feet.

(3) Loosen 4pcs screws which fix the top cover, remove top cover, as shown in Figure 2.3, 2.4.

(4) Use “M3 screw” to fix on the wall from the inner side of the frame, as shown in Figure 2.5. (“M3 screw” needs to be prepared on the spot)

(5) Install top cover.

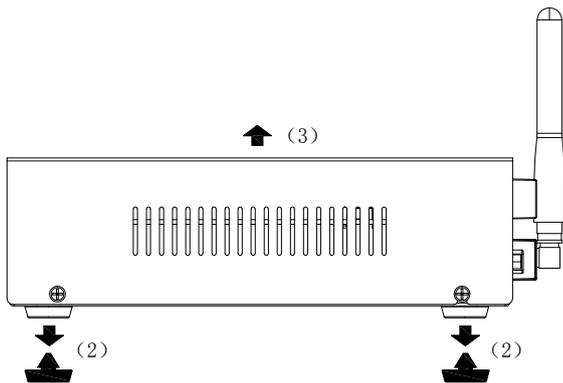


Figure 2.3 Remove rubber feet and top cover

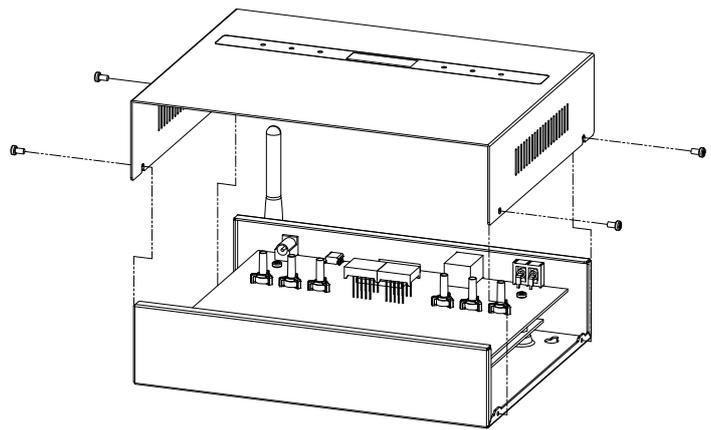


Figure 2.4 Direction of removing top cover

2 Installation construction

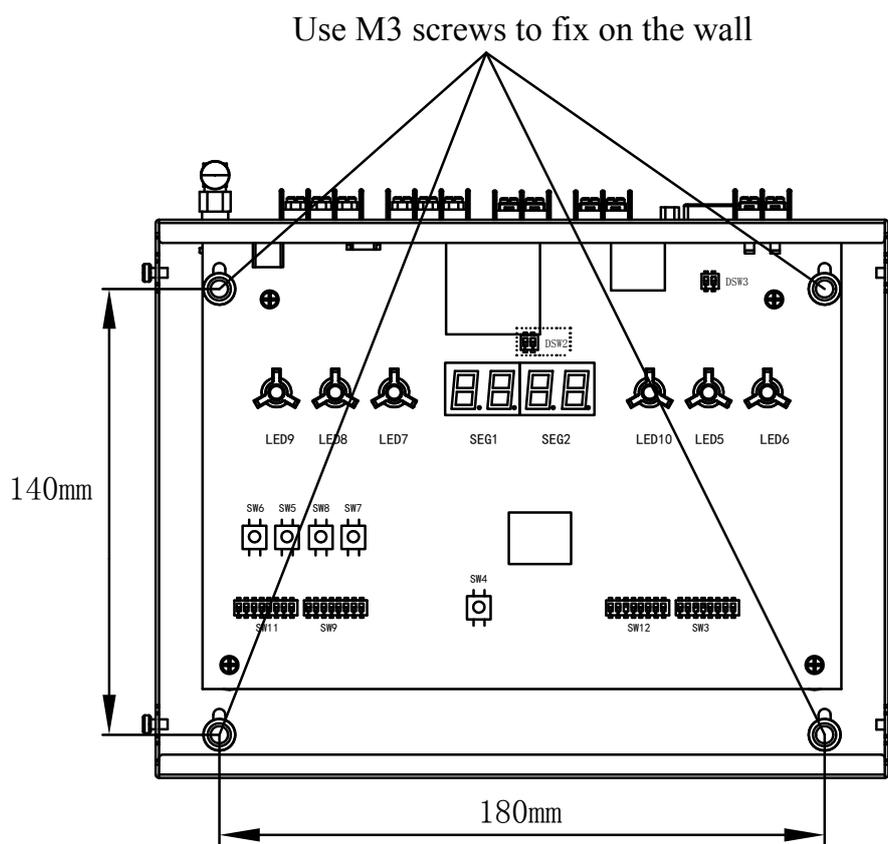


Figure 2.5 Position and size of the screw holes

2.3 Wiring connection method

Please read carefully before construction.

- Place where the [Preface] of this installation instruction manual describes.
- Carry out wiring construction according to relevant national electrical equipment and construction standards as well as the guidance of electric power companies.
- When it is used below 300V power supply voltage, there's obligation to do D class grounding construction (grounding resistance below 100Ω), when used above 300V low voltage circuit, there's obligation to do C class grounding construction (grounding resistance below 10Ω).
- Communication line should be as shorter as possible, more than 150mm away from power line, do not be parallel with the power line (can cross). In any case, when parallel construction is required, please put the communication line or power line into the metal tube (one end has ground contact); or communication line adopts shielded wire and other anti-disturbance measures.
- Please do not implement internal change of the product. Otherwise, it may cause failure.

2 Installation construction

2.3.1 Wiring Method

- (1) This product should connect to power supply wiring (adapter), communication line with air conditioner (H-NET), communication line with computer for management (Modbus TCP)
 If using RS-485 loop (Modbus RTU), need to connect with RS-485 special communication line.
 If using USB for power supply, please use MINI USB communication line for power supply.
 In addition, if connected to external equipment, also need to carry out construction of communication line (external input and output) with external unit.
 During wiring construction, ensure to cut off the main power supply.

(2) Wiring Method

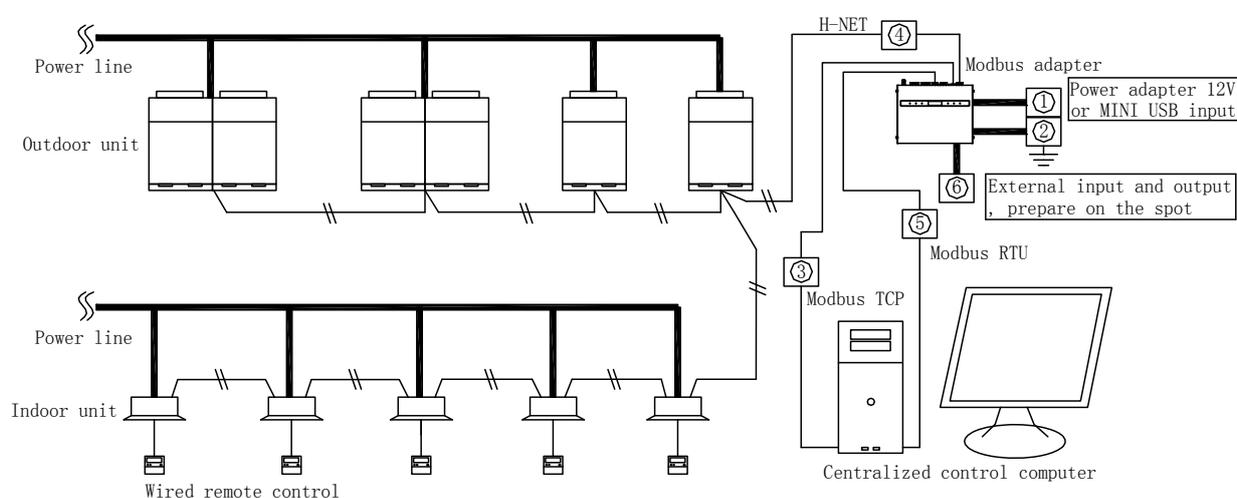


Figure 2.6 Wiring Method

Table 2.1 Installation process

Sequence	Wiring type	Specifications	Wiring length	Cable specification
①	Power supply wiring	12VDC or MINI USB 5V power supply	—	1.25~2mm ²
②	Grounding wire	—	—	1.25~2mm ²
③	Modbus TCP wiring	IEEE 802.3 standard	Below 100m	Above LAN cable 5 class
④	H-NET wiring	5VDC	Below 1000m	0.75~1mm ²
⑤	Modbus RTU wiring	5VDC	Below 1000m	0.75~1mm ²
⑥	External input and output wiring	Input: 5VDC Output: 12VDC	Within 70m	0.5~1.25mm ²

※For Modbus TCP wiring, use LAN wiring, Modbus adapter LAN port is RJ45.

※When connecting to Modbus TCP wiring, insert LAN port of Modbus adapter at one end, connect to computer for management or HUB at the other end.

※Please use through LAN wiring.

Note	<ul style="list-style-type: none"> • Power supply wiring, communication line (Modbus TCP, Modbus TRU, external input and output) require distance above 150mm. • When using shielded wire, class D grounding work must be done.
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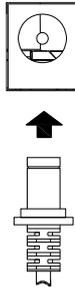
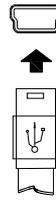
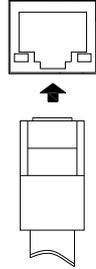
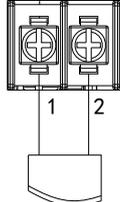
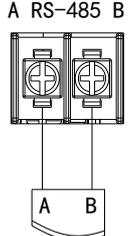
2 Installation construction

2.3.2 About Wiring Connection

- (1) For wiring connection, please ensure to cut off the main power supply and the power supply of surrounding machine.
- (2) Please connect to each wiring according to Table 2.2, the [sequence] column in the table shall be corresponding to the [sequence] in Table 2.1.

Note: do not remove the cover of unused connectors, if removed, it may cause failure.

Table 2.2 Installation process

Distinguish	Place to Connect	Sequence	Wiring method	Remark
Power supply cable	DC 12V	①		Plug the 12V power adapter to the DC port of Modbus adapter as shown in left figure.
	Or use MINI USB 5V	①		Insert MINI USB cable to the USB port of Modbus adapter as shown in left figure. The other end of USB use 5V power supply.
Ground wire	—	②	—	—
Communication line	Computer for management/PLC (LAN)	③		Connect with computer for management or HUB, use through network cable, insert and lock tightly.
	Air conditioner (H-NET)	④		<ul style="list-style-type: none"> · No polarity, circular terminal connects to fastening torque 0.4N·M. · Please connect H-NET wiring to the H-NET terminal of the air conditioner.
	Computer for management /PLC (RS-485)	⑤		<ul style="list-style-type: none"> · DC 5V, A-A, B-B, circular terminal connects to the fastening torque 0.4N·M. · Please connect the RS-485 wiring to the computer for management or PLC.

2 Installation construction

Table 2.2 Installation process (continue)

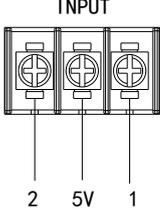
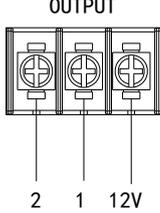
Communication line	External equipment (INPUT)	⑥		<ul style="list-style-type: none"> DC5V input, refer to Table 2.3 External input and output table.
	External equipment (OUTPUT)	⑥		<ul style="list-style-type: none"> DC12V output, refer to Table 2.3 External input and output table. SW11 output bit1 is ON, output 1 is valid. SW11 output bit2 is ON, output 2 is valid.

Table 2.3 External input and output table

Sequence	Input output		Operation	Setting content
1	Input1	INPUT1	Short circuit 5V and input 1 terminal	Close all indoor unit
2	Input 2	INPUT2	Short circuit 5V and input 2 terminal	Close all indoor unit of system NO.0
3	Output 1	OUTPUT1	Code switch SW11 bit1 is ON	Running signal
4	Output 2	OUTPUT2	Code switch SW11 bit2 is ON	Alarm signal

<Connection example>



Figure 2.6 Example of using Input and output

Note	<ul style="list-style-type: none"> If powered by MINI USB, do not use external output function. When both input 1 and input 2 are valid, input 1 is valid, input 2 is neglected. When using pulse input, please note pulse width and pulse interval shall be above 500ms. Please choose the relay with DC12V and rated current below 40mA to connect to external output. Please do not use relay with built-in diode. If the wiring is wrong, it may be damaged.
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2 Installation construction

2.4 Slide Switch Setting Method

Table 2.4 Slide Switch Setting Table

Slide switch		Purpose	Factory setting	Remark
SW12 (MCU operation mode)	bit1	OFF : None	OFF	Please do not change.
	bit2	OFF : None	OFF	Please do not change.
	bit3	ON : MCU normal operation	ON	Please do not change.
	bit4	OFF : None	OFF	Please do not change.
	bit5	OFF : None	OFF	Please do not change.
	bit6	OFF : None	OFF	Please do not change.
	bit7	OFF : None	OFF	Please do not change.
	bit8	OFF : None	OFF	Please do not change.
SW3 (RS-485 circuit)	bit1	OFF : None	OFF	Please do not change.
	bit2	OFF : None	OFF	Please do not change.
	bit3	ON : RS-485 circuit enable OFF : RS-485 circuit disable	ON	Please do not change.
	bit4	ON : RS-485 circuit enable OFF : RS-485 circuit disable	ON	Please do not change.
	bit5	OFF : None	OFF	Please do not change.
	bit6	OFF : None	OFF	Please do not change.
	bit7	OFF : None	OFF	Please do not change.
	bit8	OFF : None	OFF	Please do not change.
DSW3 (H-NET)	bit1	ON : H-NET circuit terminal resistance 75Ω is available OFF : H-NET circuit terminal resistance 75Ω is not available	OFF	When terminal resistance of the product is available, please ensure to confirm there's no terminal resistance in the same H-NET.
	bit2	—	OFF	—
SW11 (function code)	bit1	ON : External output 1 enable OFF : External output 1 disable	OFF	—
	bit2	ON : External output 2 enable OFF : External output 2 disable	OFF	—
	bit3	ON : Single board constant speed machine is connected to the system OFF : No single board constant speed machine is connected to the system	OFF	—
	bit4	OFF : None	OFF	—
	bit5	OFF : None	OFF	—
	bit6	OFF : None	OFF	—
	bit7	OFF : None	OFF	—
	bit8	OFF : None	OFF	—
SW9 (reserve)	—	—	OFF	—
DSW2 (RS-485 terminal resistance)	bit1	ON : None	ON	—
	bit2	ON : RS-485 circuit terminal resistance 120Ω is available OFF : RS-485 circuit terminal resistance 120Ω is not available	ON	Please ensure there's terminal resistance to be connected at both ends of the RS-485 communication circuit.

2 Installation construction

Please change the slide switch setting before input power supply.

The slide switch setting table of this product is shown in Table 2.4. In addition, according to the using situation on the spot, sometimes it may need to change factory setting.

2.5 Power Supply Input

When setting the slide switch, please refer to the following procedures.

- (1) Turn off the power supply of the product, open the top cover.
- (2) Change switch setting.
- (3) Complete installation, wiring connection, by end of switch setting, close the top cover, tighten and fix the screws, please complete the following operation, then input power supply.
 - ※ Please connect to the power supply of all connected air conditioner group.
 - ※ Carry out test run for all air conditioners, ensure that all air conditioners can work properly.
 - ※ Please input main power supply.
 - ※ Please input the power supply of the machine.

POWER lights up.

After about 10s, start the connection confirmation of the air conditioner.

During the air conditioner connection process, EUN lights up constantly.

- ※ It takes about 20 minutes the longest to complete the connection (according to actual connection quantity of the air conditioner), when the product enters normal running air conditioner, RUN light flashes in 1Hz.

See lights status and light content at normal control (normal) and abnormal shown in below Table 2.5.

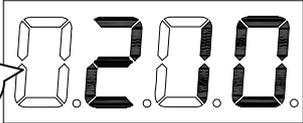
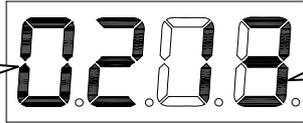
Table 2.5 Lighting condition table of each light

Name of light	State	Lighting condition	Condition of lighting off
POWER	Power supply	·Turn on power supply	·Cut off power supply
RUN	Connection confirmation state	·Constant lighting up during connection confirmation	·Flash in 1Hz in normal control
H-NET	H-NET communication state	·In the circumstance of receiving data in H-NET ·In the circumstance of sending data in H-NET	·In the circumstance of not receiving data in H-NET ·In the circumstance of not sending data in H-NET
Modbus /BACnet	Modbus TCP communication state	·Light up when it's connected to Modbus TCP · Flash when data has been received on Modbus TCP	·In the circumstance of not receiving data in Modbus TCP
RS-485	Modbus RTU communication state	·In the circumstance of receiving data in Modbus RTU ·In the circumstance of sending data in Modbus RTU	·In the circumstance of not receiving data in Modbus RTU ·In the circumstance of not sending data in Modbus RTU

2 Installation construction

See the digital tube display in normal control (normal) and alarm and display content as shown in Table 2.6.

Table 2.6 Lighting condition table of each light

State	Lighting · display condition	Lighting off · display cancel condition	Display content of 7 segment digital tube
Show software version number	When power on the machine	Light off after 2s	i.e.: Example 
Alarm code 00~FF (except 60,61,64,65)	Air conditioner alarm	Please refer to the installation and maintenance manual of each air conditioner.	i.e.: Constant lighting  Flash System number 02 constantly lighting, alarm code 13 flashes in 1Hz
60	This product-abnormal communication among outdoor units (when more than 1 indoor unit is running)	Please confirm the H-NET wiring connection	i.e.: Constant lighting  Flash System number 02 constantly lighting, alarm code 60 flashes in
61	This product-abnormal communication among indoor units (when the indoor unit is running)	Please confirm the H-NET wiring connection	i.e.: Constant lighting  Flash System number 02 constantly lighting, alarm code 61 flashes in
64	This product-abnormal communication among outdoor units (when all the indoor unit stops)	Please confirm the wiring connection of H-NET	i.e.: Constant lighting  Flash System number 02 constantly lighting, alarm code 64 flashes in
65	This product-abnormal communication among indoor units (when the indoor unit stops)	Please ensure the wiring connection of H-NET	i.e.: Constant lighting  Flash System number 02 constantly lighting, alarm code 65 flashes in

3 Configuration of Modbus Adapter

Notes and attentions of using

- At the start of air conditioner season, all the indoor units must be test run, and confirm whether the product is correctly running on the next day.
- The computer for management shall be used as the special computer for this system.
- One computer for management can connect to many sets of units, but several units cannot be in the same H-NET bus.

Note

- The following operation is in the precondition that all the test run and adapter installation are completed and the power supply is connected.

3.1 Configuration of Modbus Adapter

Set up the product so that it can communicate with PC.

3.1.1 IP Address Setting

Modbus adapter network configuration plan as shown in Figure 3.1.

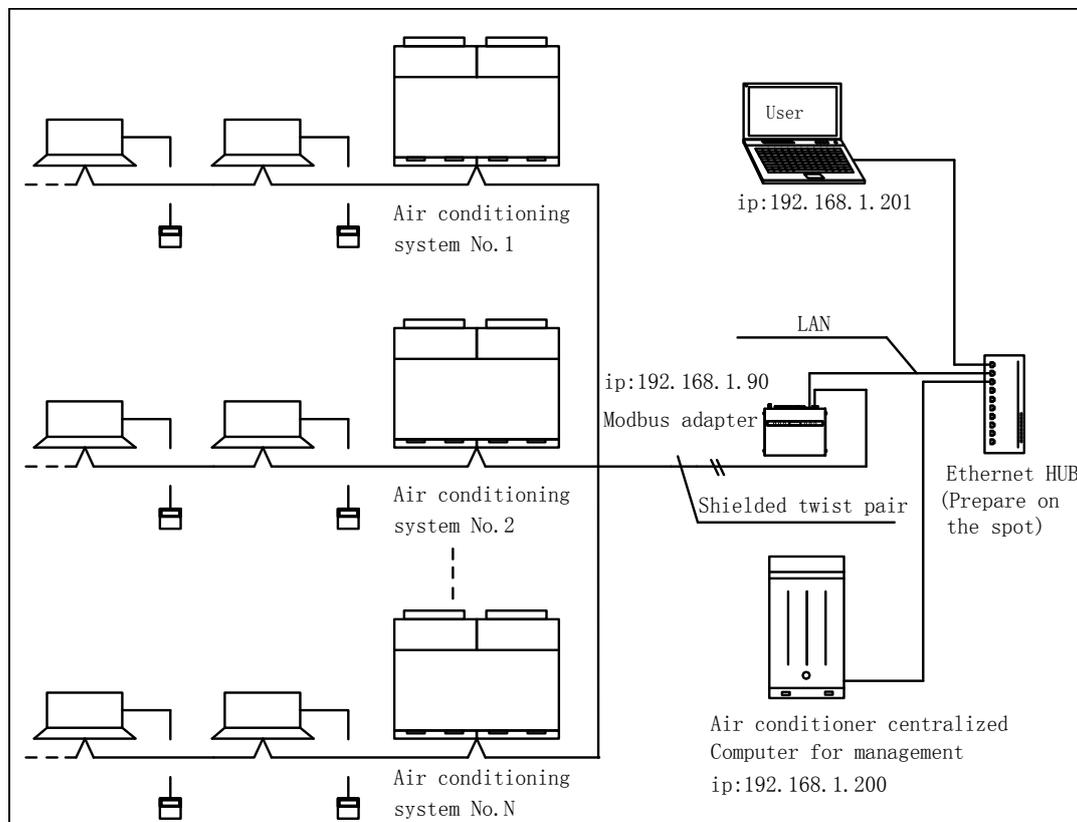


Figure 3.1 Modbus adapter network configuration plan

3 Configuration of Modbus Adapter

Change IP address method 1

Change the initial setting of the product's IP address. When using new setting, as shown in below table, temporarily connect the computer for management and the product in one to one by LAN (Modbus TCP). The network initial value of Modbus adapter is as shown in Table 3.1.

Table 3.1 Modbus adapter network initial value

Name of address	Initial value
IP address	192.168.1.90
Subnet mask	255.255.255.0
Default gateway	192.168.1.1

※ The initial setting of IP address of the adapter is 192.168.1.90. If there's repeated IP address in the same network, LAN cannot communicate properly, therefore when connecting to several adapters, must set one by one.

※ Whether through Ethernet HUB, or connecting directly with computer for management, LAN(Ethernet) wiring should use through line.

※ When computer for management connects with the product one by one, the address of the product is still initial setting (192.168.1.90), it can connect if the IP address setting of computer for management is with the same network value (for example, 192.168.1.201) as the product.

※ Please consult network administrator for the subnet mask and default gateway. When establishing the special LAN of the product, do not need to set subnet mask and default gateway. Please consult the network administrator for the network safety.

The product can act as a server, also can act as client. Enter the Modbus IP address 192.168.1.90 in the web browser URL, enter and access, the browser displays the login interface as shown in Figure 3.2.



Figure 3.2 Login interface

Enter user name: admin, password: password(default), it displays the interface as shown in Figure 3.3 after login, click <Network Setting> and enter IP setting interface.

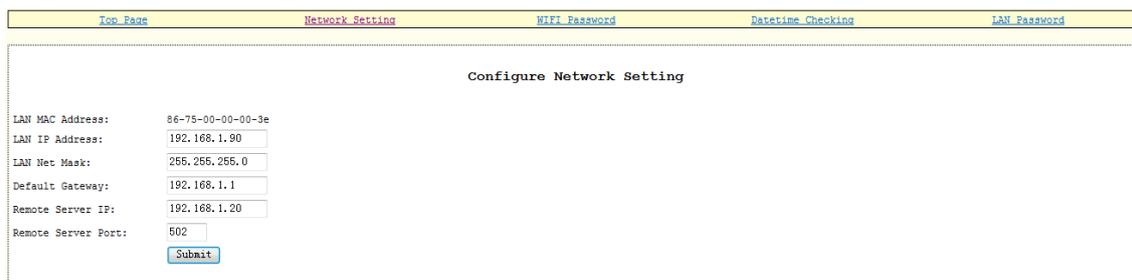


Figure 3.3 Login interface

3 Configuration of Modbus Adapter

The other options shown in above figure have nothing to do with the IP address setting, please do not change it, or it may cause consequences that cannot return!

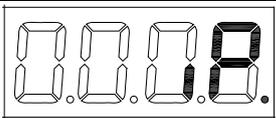
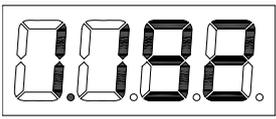
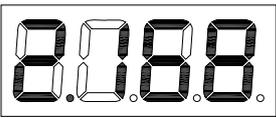
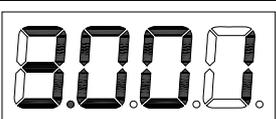
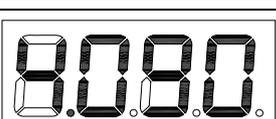
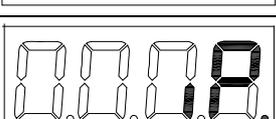
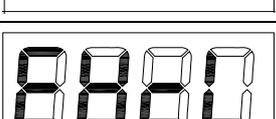
Note	<ul style="list-style-type: none"> • If you want to test the IP setting result or set the IP address again, enter the setting interface after entering the new IP address in the browser address bar, otherwise unable to login. <p>For example: If change the IP address from factory setting 192.168.1.90 into 192.168.1.101, and then enter 192.168.1.90, it will show the prompt that it cannot log in, need to enter the address of 192.168.1.101 to access setting interface. So after set the IP address, you can stick a label with the IP address set on it, or use key + digital tube to spot check IP for convenient of maintenance.</p>
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Change IP address method 2

You can spot check and set IP address through key + digital tube.

Press and hold SW6+SW7 key at the same time for 3s to enter the setting mode, as shown in below Table 3.2, the IP address spot checked is: 192.168.1.90.

Table 3.2 Set IP address with key

NO.		<ul style="list-style-type: none"> · Press Up (SW5) or Down (SW8) to switch until it shows "IP." · In "IP." Menu, press Select key (SW7) to enter IP setting mode. · After set, press Eject/Switch key (SW6) to exit. · Press SW7 so that the IP address becomes editable, and flashes in 1Hz.
1		<ul style="list-style-type: none"> · In the menu, press Select key (SW7) so that the default IP address flashes and becomes editable. · Press Eject/Switch key (SW6) to switch flashing, change editable area. · Press Up (SW5) or Down (SW8) to change the IP number.
2		· As above.
3		· As above.
4		· As above.
5		<ul style="list-style-type: none"> · Finally press Select key (SW7) to confirm, after set, press Eject/Switch key (SW6) to exit. · The display content will disappear automatically if no action within 30s.
6		<ul style="list-style-type: none"> · Factory reset of the IP setting, the operation method is as follows: When there's no content displayed on the digital tube, press the Down key (SW8) until it shows "EHcL." For 1s and disappear to reset IP content, but please note that it is valid within 60s after powered on.

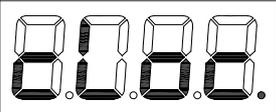
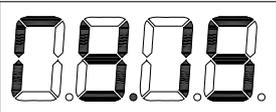
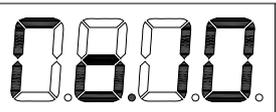
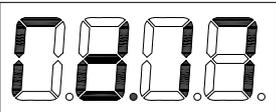
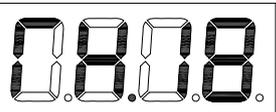
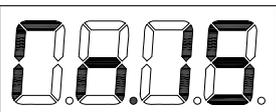
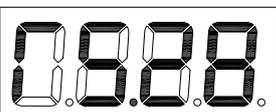
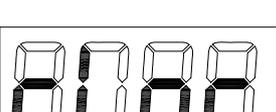
3 Configuration of Modbus Adapter

3.1.2 Clock setting

Change clock method 1

You can spot check and set real time clock through key + digital tube. Press and hold SW6+SW7 key at the same time for 3s and enter setting mode, as shown in below Table 3.3, current spot checked time is 18:15:28s, 17th Oct., 2015.

Table 3.3 Set real time clock with key

NO.		<ul style="list-style-type: none"> ·Press Up (SW5) or Down (SW8) until it shows "cloc." ·In "cloc." Menu, press Select key (SW7) and confirm to enter clock setting mode. ·After setting, please press Eject/Switch key (SW6) to exit. ·Press SW7 so that the number of clock becomes editable, flashing in 1Hz.
1		<ul style="list-style-type: none"> ·In menu, press Select key (SW7) so that the default clock flashes and becomes editable. ·Press Eject/Switch key (SW6) to switch flashing, change the editable area. ·Press Up (SW5) or Down (SW8) to change the clock number.
2		·As above.
3		·As above.
4		·As above.
5		·The clock will keep running, second will be increasing but cannot be set.
6		·As above.
7		<ul style="list-style-type: none"> ·Finally press Select key (SW7) to confirm, after setting, press Eject/Switch key (SW6) to exit. ·The display will disappear automatically if no further action in 30s.

3 Configuration of Modbus Adapter

Change clock method 2

You can set clock and spot check real time clock through LAN WEB server in 3.1.1.

Refer to the log in interface in Figure 3.3, click <Datetime Checking>, it will display the clock setting interface as shown in Figure 3.4.



Figure 3.4 Clock setting

When setting clock, click <Get System Time> to obtain the time of computer for management, click <Correcting Time> to update the computer time shown in the edit box to the Modbus adapter, click <Refresh> to update the time of Modbus adapter.

3.1.3 Change LAN WEB Login Password

Refer to the login interface in Figure 3.3, click <LAN Password>, it will display the LAN WEB login password change interface as shown in Figure 3.5. Please enter a new password as per indicated.



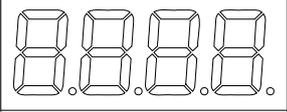
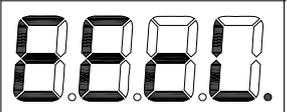
Figure 3.5 LAN WEB password change interface

3 Configuration of Modbus Adapter

3.1.4 One Key to Clear EEPROM

Refer to Table 3.4 content for one key to clear EEPROM operation, after cleared, the product will automatically turn to the indoor unit · outdoor unit handshaking stage, RUN light is constantly on, until RUN light turns to flash the product will enter normal control stage and control the indoor unit.

Table 3.4 Clear EEPROM with key

NO.		·Power on and there's no content displayed on the digital tube, press the Select key (SW7).
1		·Press and hold until the digital tube displays "EEcL." and disappear after 1s to reset factory configuration, but please not it's valid within 60s after powered on.

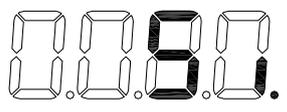
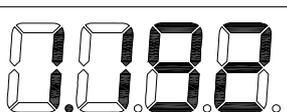
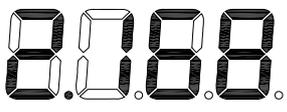
Prompt	•You can also clear EEPROM through Mapping Table control, refer to 4.8 for specific content of clearing EEPROM.
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3.1.5 Remote Server IP Address Setting

Refer to the login interface in Figure 3.3 and enter, click <Network Setting> and enter IP setting interface. <Remote Server IP> will be displayed, this IP address is the IP address when considered Modbus as client, computer for management and host computer as server, based on above operation, please set this IP address with the same IP address as computer for management and host computer, at the same time <Remote Server Port> is the monitoring port of computer for management and host computer, default as 502, range: 0~65535.

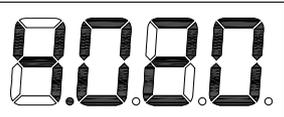
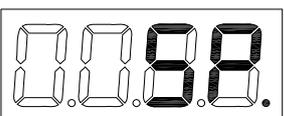
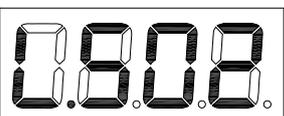
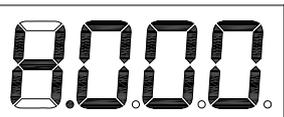
You can also spot check and set remote server IP address and port number through key + digital tube. Press and hold SW6+SW7 key for 3s and enter the setting mode, as shown in below Table 3.5.

Table 3.5 Set the remote server IP address and port number with key

NO.		·Press Up (SW5) or Down (SW8) until it displays "Si." ·In "Si." Menu, press Select key (SW7) to confirm to enter remote server IP setting mode. ·After set, please press Eject/Switch key (SW6) to exit. ·Press SW7 so that the IP number becomes editable, flashing in 1Hz.
1		·In menu, press Select key (SW7) so that default IP flashes and becomes editable. ·Press Eject/Switch key (SW6) to switch the flashing and change editable area. ·Press Up (SW5) or Down (SW8) to change the IP number.
2		·As above.

3 Configuration of Modbus Adapter

Table 3.5 Set remote server IP address and port number with key (continue)

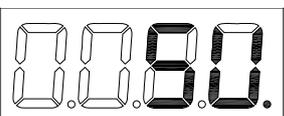
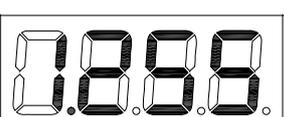
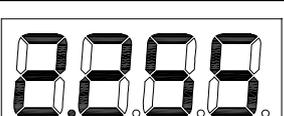
3		·As above.
4		·As above.
NO.		<ul style="list-style-type: none"> ·Press Up (SW5) or Down (SW8) until it displays “SP.” ·In “SP.” Menu, press Select key (SW7) and confirm to enter remote server port setting mode. ·After set, press Eject/Switch key (SW6) to exit. ·Press SW7 so that the port number becomes editable, flashing in 1Hz.
1		·The port number is 3 digits low, decimal values, port number range [high and low combination]:0~65535.
2		·The port number is 2 digits high, decimal values, port number range [high and low combination]:0~65535.

3.1.6 Subnet Mask Setting

Refer to the login interface in Figure 3.3 and enter, click <Network Setting> and enter IP setting interface. Directly set subnet mask <LAN Net Mask>.

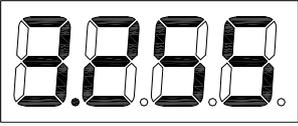
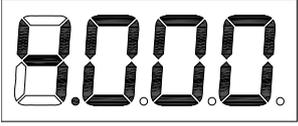
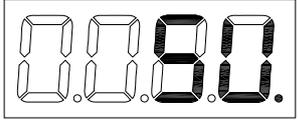
You can also spot check and set the subnet mask through key + digital tube. Press SW6+SW7 key at the same time for 3s and enter the setting mode, as shown in below Table 3.6.

Table 3.6 Set subnet mask with key

NO.		<ul style="list-style-type: none"> ·Press Up (SW5) or Down (SW8) until it displays “SU.” ·In “SU.” Menu, press Select key (SW7) and confirm to enter subnet mask setting mode. ·After set, press Eject/Switch (SW6) key to exit. ·Press SW7 so that the subnet mask number becomes editable, flashing in 1Hz.
1		<ul style="list-style-type: none"> ·In menu, press Select key (SW7) so that the default number flashes and becomes editable. ·Press Eject/Switch key (SW6) to switch flashing, and change editable area. ·Press Up (SW5) or Down (SW8) to change the number.
2		·As above.

3 Configuration of Modbus Adapter

Table 3.6 Set subnet mask with key (continue)

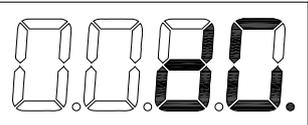
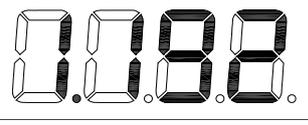
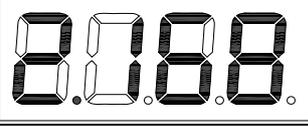
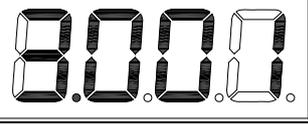
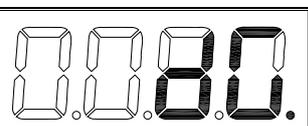
3		·As above.
4		·As above.
5		·Finally press select key (SW7) to confirm, after setting, press Eject/Switch key (SW6) to exit. ·The display content will automatically disappear if no further action within 30 s.

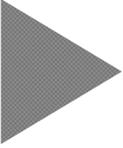
3.1.7 Gateway IP Setting

Refer to the login interface in Figure 3.3 and enter, click <Network Setting> and enter IP setting interface. Can set subnet mask directly < Default Gateway>.

You can also spot check and set gateway IP address through key + digital tube. Press hold SW6+SW7 key at the same time for 3s and enter the setting mode, as shown in below Table 3.7.

Table 3.7 Set gateway IP address with key

NO.		·Press Up (SW5) or Down (SW8) until it displays “dG.”. ·In “dG.” Menu, press Select key (SW7) and confirm to enter gateway IP setting mode. ·After set, press Eject/Switch (SW6) key to exit. ·Press SW7 so that the gateway IP number becomes editable, flashing in 1Hz.
1		·In menu, press Select key (SW7) so that the default number flashes and becomes editable. ·Press Eject/Switch key (SW6) to switch flashing, and change editable area. ·Press Up (SW5) or Down (SW8) to change the number.
2		·As above.
4		·As above.
5		·As above.
6		·Finally press Select key (SW7) to confirm, after setting, press Eject/Switch key (SW6) to exit. ·The display content will automatically disappear if no further action within 30s.



3 Configuration of Modbus Adapter

3.2 External Input and Output Linkage Function

Please refer to <2.3.2 About Wiring Connection> Table 2.2 External Input and Output Table for external input and output linkage function.

Please refer to <2.3.2 About Wiring Connection> Table 2.6 Input and Output Using case for external input and output linkage wiring.

3.3 Single Board Constant Speed Machine Login

If connect single board constant speed machine on the communication bus, please turn bit3 of the slide switch SW11 to ON before power on, otherwise, no single board constant speed machine can be connected in the whole system. Please refer to <2.4 Slide Switch Setting Method> 2.4 Slide Switch Setting Table.

3.4 Check MAC Address

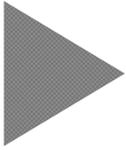
Refer to the login interface in Figure 3.3. and enter, click <Network Setting> and enter IP setting interface. <LAN MAC Address> will be displayed, this MAC address will be considered as the final MAC address of the machine, you can also spot check the MAC address by key + digital tube.

Press and hold SW6+SW key for 3s and enter the setting mode, as shown in below Table 3.8, firstly check MAC menu “EHAd.”.

3 Configuration of Modbus Adapter

Table 3.8 Check or set MAC address with key

NO.		<ul style="list-style-type: none"> · Press Up (SW5) or Down (SW8) until it displays “EHAd.”. · In “EHAd.” Menu, press Select key (SW7) and confirm to enter MAC setting mode. · After set, press Eject/Switch (SW6) key to exit. · Press SW7 so that the MAC address becomes editable, flashing in 1Hz.
1		<ul style="list-style-type: none"> · In menu, press Select key (SW7) so that the default number flashes and becomes editable. · Press Eject/Switch key (SW6) to switch flashing, and change editable area. · Press Up (SW5) or Down (SW8) to change MAC number. · The lowest digit of the MAC address cannot be 1, after set it as 1, it will be deemed as invalid setting.
2		· As above.
3		· As above.
4		· As above.
5		· As above.
6		· As above.
7		<ul style="list-style-type: none"> · Finally press Select key (SW7) to confirm, after setting, press Eject/Switch key (SW6) to exit. · The display content will automatically disappear if no further action within 30s. · After set the MAC address, MCU will reset automatically to ensure successful change of the MAC.



4 Air Conditioner Monitoring

4.1 Modbus Code Composition and Analysis

Modbus adapter can be used as client, also can be used as server as shown in Figure 4.1 Modbus TCP receiving mechanism.

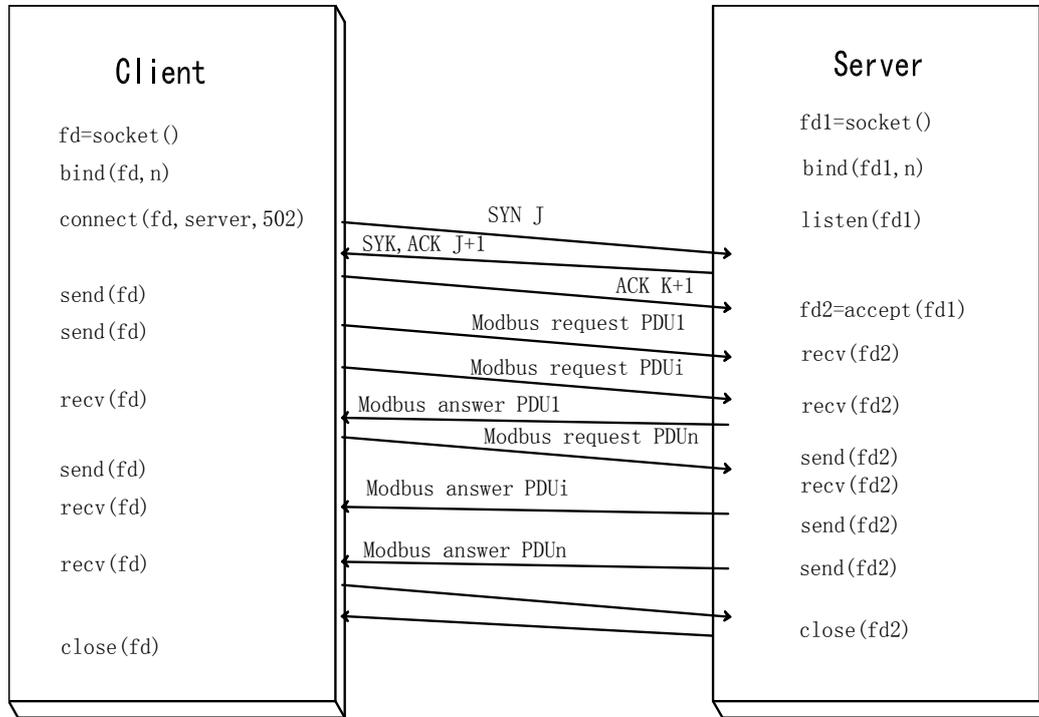


Figure 4.1 Modbus TCP Receiving and Sending Mechanism

Modbus function code as shown in 4.1.

Table 4.1 Function code

Function code	Name of function	Function
0x03	Read hold register	Continuous reading
0x10	Write hold register	Continuous writing

4.1.1 Modbus RTU Code Composition

Modbus protocol defines a simple protocol data unit [PDU] which has nothing to do with basic communication, the Modbus protocol mapping of specific bus or network is able to introduce some additional fields on the application data unit [ADU], as shown in Figure 4.2.

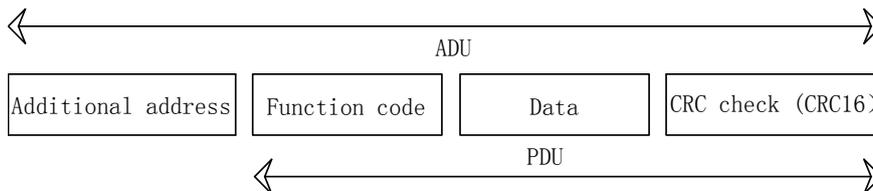
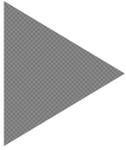


Figure 4.2 General Modbus frame data



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Maximum RS-485 ADU = 256 bytes, limit the length of Modbus PDU, so for serial link communication, Modbus PDU = 256-additional address (1 byte)-CRC(2 bytes) = 253 bytes. Thus RS-485 ADU = (253 bytes) + additional address (1 byte) + CRC (2 bytes) = 256 bytes.

For example: taking the communication address control bit 0x9C8E(40078) of the first indoor unit Mapping Table as example, refer to the Mapping Table for other indoor units as follows:

Modbus RTU code: power on the first indoor unit, write command format.

Additional address	Function code	Data	CRC CHECK
32	10	9C 8E 00 01 02 00 01	65 86
Modbus device	continuous write command	Communication protocol start address Write hold register number Byte Write value	

Modbus RTU code: Modbus adapter write response code.

Additional address	Function code	Data	CRC CHECK
32	10	9C 8E 00 01	4A 71
Modbus device	continuous write command	Communication protocol start address Number of successful write hold register	

Modbus RTU code: Modbus adapter write error response code.

Additional address	Function code	Data	CRC CHECK
32	90	01	7D CF
Modbus device	Function code+0x80		

Modbus RTU code: the first indoor unit system Data0x9C40 (40000), read command format.

Additional address	Function code	Data	CRC CHECK
32	03	9C 40 00 45	AE 7E
Modbus device	continuous read command	Communication protocol start address Number of read hold register (69)	

Modbus RTU code: Modbus adapter read response code.

Additional address	Function code	Data	CRC CHECK
32	03	8A 00 52 00 41 00 53 00 2D 00 32 00 30 00 30 00 46 00 53 00 44 00 4E 00 59 00 32 00 51 00 20 00 08 00 EF ...	9E D3
Modbus device	continuous read command	Number of read bytes Successfully read Data (69 register Data, 138 bytes)	

Modbus RTU code: Modbus adapter read error response code.

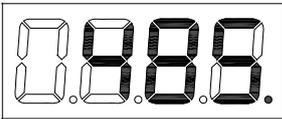
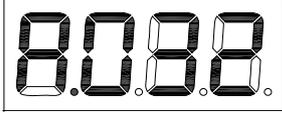
Additional address	Function code	Data	CRC CHECK
32	83	01	70 FF
Modbus device	Function code+0x80		

Note	<ul style="list-style-type: none"> When using Modbus RTU, need to place terminal resistance at both ends of the RS-485 communication line, this Modbus adapter is defaulted as supplied with terminal resistance, bit2 of DSW2 is defaulted as ON.
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In the head code of Modbus RTU, Additional address is defaulted as 0x32, which can be changed by keys, the change method is as shown in Table 4.2. Press the SW6+SW7 key for 3s and enter the setting mode.

Table 4.2 Modbus RTU additional address setting

NO.		<ul style="list-style-type: none"> · Press Up (SW5) or Down (SW8) until it displays “485.” · In “485.” Menu, press Select key (SW7) and confirm to enter additional address setting mode. · After set, press Eject/Switch (SW6) key to exit. · Press SW7 so that additional address becomes editable, flashing in 1Hz.
1		<ul style="list-style-type: none"> · In menu, press Select key (SW7) so that the default Additional address flashes and becomes editable. · Press Eject/Switch key (SW6) to switch flashing, and change editable area. · Press Up (SW5) or Down (SW8) to change the number of additional address.

Prompt	<ul style="list-style-type: none"> • To reset additional address into factory default value, same operation as reset default IP address, please refer to Table 3.2 Set IP address No.6.
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When using Modbus RTU, firstly need to configure it, please refer to Table 4.3 for the configuration parameter.

Table 4.3 Modbus RTU Parameter Matching

Modbus RTU Configuration Name	Configuration Data	Remark
Additional address	0x32	Default value
Baud rate	9600 bps	—
Parity	No Parity	—
Data bit	8bit	—
Stop bit	1bit	—

4.1.2 Modbus TCP Code Composition

On TCP/IP, one special message header is used to identify the Modbus application Data unit, which is called MBAP message header.

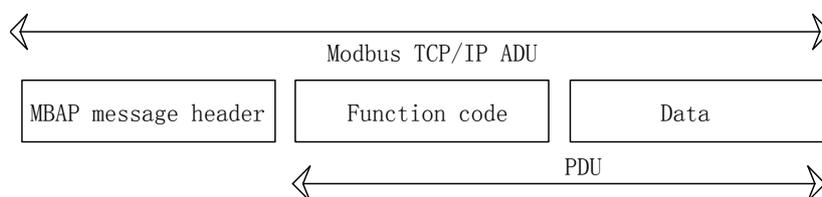


Figure 4.3 Modbus TCP/IP Frame Data

While Modbus TCP ADU = 253bytes + MBAP (7 bytes) = 260bytes.

The length of MBAP message header is 7 bytes:

① Transaction identifier [2 bytes]: pairing for transaction processing. In response, Modbus adapter will copy the requested transaction identifier.

4 Air Conditioner Monitoring

- ② Protocol identifier [2 bytes]: used for multiplexer in the system, 0 at Modbus protocol.
- ③ Length [2 bytes]: length field is the number of bytes in the continuation field, including unit identifier and Data field.
- ④ Unit identifier [1 byte]: this field is used for router selection in the system.

Send ADU of all Modbus TCP to the registered 502 port by TCP.

For example: taking the communication address control bit 0x9C8E(40078) of the first indoor unit Mapping Table as example, refer to the Mapping Table for other indoor units as follows:

Modbus TCP code: the first indoor unit running, write command format.

MBAP message header	Function code	Data			
00 01 00 00 00 09 FF	10	9C 8E	00 01	02	00 01
Modbus device	continuous write command	Communication protocol start address register	Bytes	Write value	Number of write hold register

Modbus TCP code: Modbus adapter write response code.

MBAP message header	Function code	Data			
00 01 00 00 00 06 FF	10	9C 8E	00 01		
Modbus device	continuous write command	Communication protocol start address	Number of successful write hold register		

Modbus TCP code: Modbus adapter write error response code.

MBAP message header	Function code	Data			
00 01 00 00 00 03 FF	90	01			
Modbus device	Function code+0x80				

Modbus TCP code: First indoor unit system Data 0x9C40 (40000), read command format.

MBAP message header	Function code	Data			
00 01 00 00 00 06 FF	03	9C 40	00 45		
Modbus device	continuous read command	Communication protocol start address register (69)	Number of read hold register		

Modbus TCP code: Modbus adapter read response code.

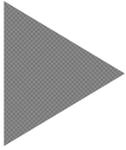
MBAP message header	Function code	Data			
00 01 00 00 00 8D FF	03	8A	00 52 00 41 00 53 00 2D 00 32 00 30 00 30 00 46 00 53 00 44 00 4E 00 59 00 32 00 51 00 20 00 08 00 EF...		
Modbus device	continuous read command	Number of read bytes Successfully read Data (69 register Data,138bytes)			

Modbus TCP code: Modbus adapter read error response code.

MBAP message header	Function code	Data			
00 01 00 00 00 03 FF	83	01			
Modbus device	Function code+0x80				

Note

- When using Modbus TCP, if there's no terminal resistance on the H-NET communication bus, please set bit1 of DSW3 as ON, connect to terminal resistance, bit1 of DSW3 is defaulted as OFF.



4 Air Conditioner Monitoring

4.2 Control Bit Setting

We can see from the Mapping Table that the basic control bit of indoor unit are: taking the first indoor unit as example, run stop (40078), operation mode setting (40079), fan speed setting (40080), swing louver position setting (40081), temperature setting (40082).

Example 1: explain with the first indoor unit communication protocol address, set turn on the unit, cooling, high fan, first segment of swing louver, temperature is 19°C.

Modbus RTU:

32 10 9C 8E 00 05 0A 00 01 00 02 00 02 00 00 00 13 E1 BD

Modbus TCP:

00 01 00 00 00 11 FF 10 9C 8E 00 05 0A 00 01 00 02 00 02 00 00 00 13

Example 2: explain with the first indoor unit communication protocol address, set turn off the unit, heating, low fan, second segment of swing louver, temperature is 30°C.

Modbus RTU:

32 10 9C 8E 00 05 0A 00 00 00 10 00 08 00 02 00 1E 26 28

Modbus TCP:

00 01 00 00 00 11 FF 10 9C 8E 00 05 0A 00 00 00 10 00 08 00 02 00 1E

Note	<ul style="list-style-type: none"> ●In code sending stop, operation mode setting, fan speed setting, swing louver position setting, temperature setting, it is recommended to use continuation write command 0x10 to complete all the setting as above, do not recommend to send one single setting mode as a command. For example: Recommend “run stop”, “operation mode setting”, “fan speed setting”, “swing louver position setting”, “set temperature” as one control command to be sent out. Do not recommend: “run stop”, “operation mode setting”, “fan speed setting”, “swing louver position setting”, “set temperature” as five control command to be sent out separately. ●After sent one control command, need to wait for correct response code returned from the Modbus before sending out next control command. If do not take this as your control method, please set the internal between two control command to be more than 500ms.
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4.3 Filter Clear Setting

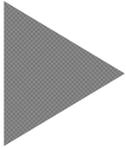
Explain with the first indoor unit communication protocol address, when read the bit5 of communication protocol address 40003 equals to 1, it indicates that the filter of this indoor unit needs to be cleared, please clean the filter, then carry out filter clear operation through Mapping Table.

For example: explain with the first indoor unit communication protocol address, operate 40083 address, refer to the Mapping Table for others, as follows:

Modbus RTU: 32 10 9C 93 00 01 02 00 01 66 0B

Modbus TCP: 00 01 00 00 00 09 FF 10 9C 93 00 01 02 00 01

Note	<ul style="list-style-type: none"> ●After sent one control command, need to wait for the correct response code returned by Modbus before sending out next control command. If do not take this as your control method, please set the internal between two control command to be more than 500ms.
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4.5 Wire Controller All Prohibition Setting

Taking the Mapping Table communication address of the first indoor unit as example, operate 40084 address, refer to the Mapping Table for others, as follows:

Modbus RTU:

Wire controller all prohibited: 32 10 9C 94 00 01 02 00 01 67 BC

Wire controller clear all prohibited: 32 10 9C 94 00 01 02 00 02 27 BD

Modbus TCP:

Wire controller all prohibited: 00 01 00 00 00 09 FF 10 9C 94 00 01 02 00 01

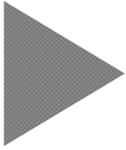
Wire controller clear all prohibited: 00 01 00 00 00 09 FF 10 9C 94 00 01 02 00 02

Note	<ul style="list-style-type: none"> • After sent one control command, need to wait for the correct response code returned by Modbus before sending next control command. If do not take this as your control method, please set the internal between two control command to be more than 500ms. • When using this function, note that wire controller must be installed. • For one wire controller with multiple indoor units, wire controller prohibition function can only be set on the host rather than the slave machine, if it's set, there may be problems (in the same system, the address of main indoor unit is the smallest one, others are slave indoor units). <p>Wire controller prohibition includes: all prohibition and partial prohibition.</p>
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4.6 Wire Controller Partial Prohibition Setting

<p>Wire controller switch on/off prohibition, taking the Mapping Table communication address of the first indoor unit as example, operate 40085 address, and refer to the Mapping Table for others, as follows:</p> <p>Modbus RTU:</p> <p>Wire controller switch on/off prohibited: 32 10 9C 95 00 01 02 00 01 66 6D</p> <p>Wire controller switch on/off clear prohibited: 32 10 9C 95 00 01 02 00 00 A7 AD</p> <p>Modbus TCP:</p> <p>Wire controller switch on/off prohibited: 00 01 00 00 00 09 FF 10 9C 95 00 01 02 00 01</p> <p>Wire controller switch on/off clear prohibited: 00 01 00 00 00 09 FF 10 9C 95 00 01 02 00 00</p>

<p>Wire controller operating mode prohibition, taking the Mapping Table communication address of the first indoor unit as example, operate 40086 address, refer to the Mapping Table for others, as follows:</p> <p>Modbus RTU:</p> <p>Wire controller operating mode prohibited: 32 10 9C 96 00 01 02 00 01 66 5E</p> <p>Wire controller operating mode clear prohibited: 32 10 9C 96 00 01 02 00 00 A7 9E</p> <p>Modbus TCP:</p> <p>Wire controller operating mode prohibited: 00 01 00 00 00 09 FF 10 9C 96 00 01 02 00 01</p> <p>Wire controller operating mode clear prohibited: 00 01 00 00 00 09 FF 10 9C 96 00 01 02 00 00</p>



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Wire controller fan speed prohibition, taking the point table communication address of the first indoor unit as example, operate 40087 address, refer to the Mapping Table for others, as follows:

Modbus RTU:

Wire controller fan speed prohibited: 32 10 9C 97 00 01 02 00 01 67 8F

Wire controller fan speed clear prohibited: 32 10 9C 97 00 01 02 00 00 A6 4F

Modbus TCP:

Wire controller fan speed prohibited: 00 01 00 00 00 09 FF 10 9C 97 00 01 02 00 01

Wire controller fan speed clear prohibited: 00 01 00 00 00 09 FF 10 9C 97 00 01 02 00 00

Wire controller swing louver prohibition, taking the Mapping Table communication address of the first indoor unit as example, operate 40088 address, and refer to the Mapping Table for others, as follows:

Modbus RTU:

Wire controller swing louver prohibited: 32 10 9C 98 00 01 02 00 01 67 70

Wire controller swing louver clear prohibited: 32 10 9C 98 00 01 02 00 00 A6 B0

Modbus TCP:

Wire controller swing louver prohibited: 00 01 00 00 00 09 FF 10 9C 98 00 01 02 00 01

Wire controller swing louver clear prohibited: 00 01 00 00 00 09 FF 10 9C 98 00 01 02 00 00

Wire controller set temperature prohibition, taking the Mapping Table communication address of the first indoor unit as example, operate 40089 address, and refer to the Mapping Table for others, as follows:

Modbus RTU:

Wire controller setting temperature prohibited: 32 10 9C 99 00 01 02 00 01 66 A1

Wire controller setting temperature clear prohibited: 32 10 9C 99 00 01 02 00 00 A7 61

Modbus TCP:

Wire controller setting temperature prohibited: 00 01 00 00 00 09 FF 10 9C 99 00 01 02 00 01

Wire controller setting temperature clear prohibited: 00 01 00 00 00 09 FF 10 9C 99 00 01 02 00 00

Note

- After sent one control command, need to wait for the correct response code returned by Modbus before sending next control command. If do not take this as your control method, please set the internal between two control command to be more than 500ms.
- Confirm whether the indoor unit is among above 5 kinds of wire controller partial prohibition, please read the state of those 5 kinds of wire controller partial prohibition to confirm, as follows: (taking the Mapping Table communication address of the first indoor unit as example, operate 40085 address)
Modbus RTU: 32 03 9C 95 00 05 BE 76
Modbus TCP: 00 01 00 00 00 06 FF 03 9C 95 00 05
- When using this function, please note that wire controller must be installed.
- For one wire controller with multiple indoor units, wire controller prohibition function can only be set on the host rather than the slave unit, if it's set, there may be problems (in the same system, the address of main indoor unit is the smallest one, others are slave indoor units).

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4.7 Do Not Install Wire Controller Setting

The indoor unit which is not installed with wire controller has no information of remote control group, default situation is switch off, air supply, high fan, first segment of swing louver, 28°C.

Note	<ul style="list-style-type: none"> • After sent one control command, need to wait for the correct response code returned by Modbus before sending next control command. If do not take this as your control method, please set the interval between two control command to be more than 500ms. • In code sending run/stop, operation mode setting, fan speed setting, swing louver position setting, temperature setting, it is recommended to use continuation write command 0x10 to complete all the setting, do not recommend to send one single setting mode as a command. For example: recommend “run/stop”, “operation mode setting”, “fan speed setting”, “swing louver position setting”, “set temperature” as one control command to be sent out. Do not recommend: “run stop”, “mode setting”, “fan speed setting”, “swing louver position setting”, “setting temperature” as five control command to be sent out separately.
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4.8 Three Important Function Setting in Mapping Table

When sending control command, and indoor unit • outdoor unit wire controller connection state changes, use the following table to operate if EEPROM needs to be cleared.

Communication protocol address	State information	Message
4997	Check the indoor unit quantity connected to Modbus (read-only)	Modbus RTU: 32 03 13 85 00 02 D4 A5 Modbus TCP: 00 01 00 00 00 06 FF 03 13 85 00 02
4998	Check whether Modbus adapter is controllable (read-only), when it's 1 it shows that the product can send control message.	
4999	Clear EEPROM handshaking information (read and write), write 1, clear EEPROM	Modbus RTU: 32 10 13 87 00 01 02 00 01 1B D7 Modbus TCP: 00 01 00 00 00 09 FF 10 13 87 00 01 02 00 01

4.9 Outdoor Unit • Indoor Unit Connection Confirmation

① Outdoor unit connection confirmation

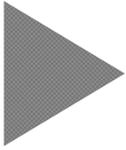
Taking Mapping Table communication address as example, operate 1000 address, refer to Mapping Table for others, as follows:

Modbus RTU:

Read the connection state of 64 outdoor units in the refrigerant system: 32 03 03 E8 00 40 C1 89

Modbus TCP:

Read the connection state of 64 outdoor units in the refrigerant system: 00 01 00 00 00 06 FF 03 03 E8 00 40



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② Indoor unit connection confirmation

Taking Mapping Table communication address as example, operate 1064 address, refer to Mapping Table for others, as follows:

Modbus RTU:

Read the connection state of indoor units in No. 0 refrigerant system: 32 03 04 28 00 08 C0 F7

Modbus TCP:

Read the connection state of indoor units in No. 0 refrigerant system: 00 01 00 00 00 06 FF 03 04 28 00 08

It only reads the value of 8 registers above, actually it can read 123 registers the most at one time.

Note	<ul style="list-style-type: none"> • After sent one control command, need to wait for the correct response code returned by Modbus before sending next control command. If do not take this as your control method, please set the internal between two control command to be more than 500ms. • Though outdoor unit • indoor unit connection confirmation, you can know how many outdoor units and indoor units in each system, and know the system number and address number, can compose into 16 digits data (NodeID) by using the system number + address number, at last calculate the Mapping Table communication address of all connected indoor units in the Mapping Table through NodeID, then monitor and control the data of connected indoor units.
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4.10 Indoor Unit Data Monitoring

Taking the Mapping Table communication address of the first indoor unit as example, operate 40000 address, refer to the Mapping Table for others, as follows:

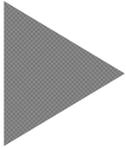
Modbus RTU:

Data read of connected the first indoor unit: 32 03 9C 40 00 1D AF 84

Modbus TCP:

Data read of connected the first indoor unit: 00 01 00 00 00 06 FF 03 9C 40 00 1D

Note	<ul style="list-style-type: none"> • After sent one control command, wait for the correct response code returned by Modbus before sending next control command. If do not take this as your control method, please set the internal between two control command to be more than 500ms. • You can obtain the operating state of current indoor unit, after operated air conditioner by using the control bit of each indoor unit, you can read the data in above indoor unit, and check whether the air conditioner runs according to the control bit operation or not.
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4.11 Batch Processing Command Description

4000~4017 of Mapping Table communication address is batch processing command address stage, can be controlled in batch, also can control the air conditioner indoor units by a single system.

Taking Mapping Table communication address 4000 as example, operate its address, refer to Mapping Table for others, as follows:

Set No. 0 refrigerant system indoor unit (switch on, cooling, high fan, swing louver 1 segment, 19°C):

Modbus RTU: 32 10 0F A0 00 01 02 00 00 01 01

Modbus TCP: 00 01 00 00 00 09 FF 10 0F A0 00 01 02 00 00

Set all refrigerant system indoor units (switch on, cooling, high fan, swing louver 1 segment, 19°C):

Modbus RTU: 32 10 0F A0 00 01 02 00 40 00 F1

Modbus TCP: 00 01 00 00 00 09 FF 10 0F A0 00 01 02 00 40

Note	<ul style="list-style-type: none"> • After sent one control command, need to wait for the correct response code returned by Modbus before sending next control command. If do not take this as your control method, please set the interval between two control command to be more than 500ms. • For indoor unit which is not installed with wire controller, please do not carry out batch processing command related to wire controller prohibition function, for example, do not carry out wire controller all prohibition clear operation for indoor units which are not installed with wire controller. • When set the data as 0~63, 0~63 system responds to the control command, when set the data as 64, all the system will respond to the command.
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4.12 Turn Off Digital Tube Alarm Display Function

When the product is in normal situation (can be controlled by upper computer, when communication protocol address 4998 is 1), if there's alarm failure and other information in the air conditioner group, the digital tube will flash and display alarm code, at this time you can turn off the digital tube display to achieve the purpose of energy saving.

① You can turn off the digital tube display by press and hold SW5+SW8 key for 3s.

② At the same time you can also turn off the digital tube display through the 4996 protocol address of the Mapping Table, write 1 it's valid (off).

Vice versa.

5 Maintenance · After-sales Services

5.1 Abnormal Handling Method

See the handling method of abnormal shown in the following table for details. Please note to turn off the main power supply before the maintenance work.

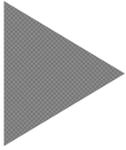
Table 5.1 Abnormal Handling Method

NO	Problem	Content to check	Solution
1	Power on but not working.	Check whether the product is connected to the power supply cable?	Please connect with the power adapter of this product.
		Is the main power supply switched on?	Please switch on the main power supply.
		Is the power supply voltage in the normal range?	Please measure the voltage of main power supply. If exceeding the range of AC100V~240V±10%, please check and investigate the wiring system.
		Is the POWER light on?	If unrelated to above content, the POWER doesn't light up, it may be considered as internal fault of the machine. Please contact the closest repair center.
		Does 7 segment digital tube flash the alarm information?	Please eliminate alarm type and alarm signal.
2	After power on, it cannot confirm connection with the air conditioner	Is the product connected with H-NET line?	Please connect the machine with the H- NET line.
		Whether H- NET line is broken?	Please check the connection situation of the wiring.
		Is the terminal resistance setting on the H- NET wiring normal?	Only 1 terminal resistance can be connected on the H- NET wiring.
		Is the address setting of the air conditioner normal?	Please refer to the air conditioner installation instruction manual to set the indoor and outdoor unit address again.
		Are all the connected air conditioners powered on?	Please power on all the connected air conditioners.
		Does H- NET wiring use the designated specification cable?	Please use cable with cross-sectional area greater than 0.75mm ² and total length within 1000m.
		Does H- NET light continue to light up or off?	Please check whether H- NET wiring is connected properly. If unrelated to above content, it may be considered as internal fault of the machine. Please contact the closest repair center.
		Does RUN light up for more than 20 min?	If RUN light hasn't changed to flashing in 1Hz after 20min, it shows that the connection confirmation is failed, please re-adjust the wiring, after set the address of the air conditioner, carry out connection confirmation again.
3	Cannot connect to the computer for management.	Whether the machine is connected with LAN wiring?	Please connect the LAN wiring of the product. Please confirm if the terminals are matching.
		Whether the computer for management is connected with LAN wiring?	Please connect the LAN wiring of the computer for management. Please confirm if the terminals are matching.
		Whether the IP address designated by the management software of the computer is same as the machine's IP address?	The initial IP address of the machine is 192.168.1.90. If forget the changed IP address, please use the IP address during check in 3.1.1 or reset to initial value.
		Whether the IP address of computer for management belongs to the same segment as the product's IP address? Does the ping request find the product from computer for management?	Please ensure the computer for management is in the same segment as the product, and ensure that ping request can find this product.
		Is HUB powered on? (when HUB is used)	Please power on HUB.

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Table 5.1 Abnormal Handling Method (continue)

NO	Problem	Content to check	Solution
4	Cannot connect to computer for management via Modbus TCP. (LAN)	Is LAN wiring used with the specification?	Please use LAN cable above class 5, less than 100m.
		Is there any abnormal for the LAN wiring (broken, short circuit) (including HUB wiring situation when HUB is used)?	Replace with normal one.
		Is there any abnormal on computer for management?	Replace with normal one.
		Whether LAN wiring is parallel with computer wiring?	The wiring interval shall keep above 150mm.
		The LAN light keeps on?	If computer for management and LAN wiring (including connection has no abnormal, then it may be considered as internal fault of the product. Please contact the closest repair center.
5	Cannot connect to computer for management via Modbus RTU. (RS-485)	Is the RS-485 wiring with designated specification?	Please use cable with cross-sectional area greater than 0.75mm ² and total length within 1000m.
		Is there any abnormal for RS-485 wiring (broken, short circuit)	Replace with normal one, confirm whether it's A-A or B-B.
		Whether the RS-485 wiring is parallel with computer wiring?	The wiring interval shall keep above 150mm.
		Does the RS-485 light remain off?	Please re-confirm whether the wiring connection is normal.
		Does the RS-485 light remain on?	In the circumstance that there's no abnormal on the computer for management, RS-485 wiring (including connection), then it may be considered as internal fault of the product. Please contact the closest repair center.
6	Computer for management (management software) cannot control air conditioner.	Whether all the connected air conditioners are powered on?	Please power on all the connected air conditioners.
		Whether the terminal resistance setting on the H- NET cable is normal?	Only 1 terminal resistance can be connected on the H- NET cable.
		Whether the address setting of the air conditioner is normal?	Please refer to the air conditioner installation instruction manual to set the indoor and outdoor unit address again.
		Whether the H- NET cable is broken?	Please check the wiring connection.
		Whether the H- NET wiring is parallel with computer wiring?	The wiring interval shall remain above 150mm.
		Whether H- NET wiring uses the wiring with designated specification?	Please use cable with cross-sectional area greater than 0.75mm ² and total length within 1000m.
		Does H- NET light remain off?	Please check the connection of H- NET wiring.
		Does H- NET light remain on?	It may be considered as internal fault of the product. Please contact the closest repair center.
7	It flashes alarm code on the digital tube of the machine.	If the alarm code is "60", "61", "64", "65", please confirm the H- NET wiring connection, refer to the lighting condition table of each light in Table 2.6. If the alarm code is not in the above, please refer to the air conditioner installation instruction manual.	If the alarm code is "60", "61", "64", "65", it may be not because that the indoor or outdoor unit is offline, it may be because that the communication bus is busy.



5 Maintenance · After-sales Services

5.2 Regular Check

To ensure the normal operation of the air conditioning system including this system, please regularly check the following content.

(1) Surrounding environment

- Is the product temperature changed very high?
- Does the surface temperature of the product power adapter become very high?
- Is there dust, dirt, line debris, etc. in the product?

(2) Display relationship

- Is the POWER light on?
- does the RUN light flash?
- Have the state indicating lights (H-NET, Modbus, RS-485) been off?
- Is the 7 segment digital tube often in off state?

(3) Installation and connection

- Are the installation screws of the product and screws to fix the top cover loose?
- Is the wiring continuous state normal?

Note	<ul style="list-style-type: none">● Please do not use thinner and the like for cleaning, it may cause surface discoloration, resin melt.● Please wipe with a soft cloth to clean.● Do not use wet cloth to wipe, otherwise, it may cause failure.
------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

6 Notes and Attentions

1. Notes and attentions of control state checking

The control bit of switch on/off, operation mode setting, fan speed setting, swing louver setting, temperature setting, filter reset setting is defaulted as 255, it will return to 255 after successfully sent control commands. At this time if you want to check the running state of indoor unit, please refer to 4.10 indoor unit data monitoring to check whether it runs as per control command, if wire controller all prohibited, or wire controller partial prohibited command setting, you can check its corresponding Mapping Table position.

2. Notes and attentions of LAN WEB

When setting subnet mask through LAN WEB server login, please do not set illegal subnet mask, i.e. 255.255.255.0 is legal, 255.255.255.1 is illegal, after setting, it will be not able to connect even if the network of Modbus adapter and computer for management are in the same IP segment.

Solution: clear Ethernet EEPROM data, factory reset IP setting, please refer to Table 3.2 Set IP address with key.

3. Notes and attentions of auto fan speed setting

Only K3 indoor unit and DC indoor unit can be set as “Auto fan speed”, other machines cannot run auto fan speed even if it’s set.

4. Notes and attentions of AC desiccant unit

Wire controller temperature prohibition cannot be set for AC desiccant unit, please remove it as soon as possible if set.

5. Notes and attentions of one wire controller with multiple indoor units

The indoor units in the same wire controller group are working according to the same control commands, when login the wire controller group, the product will automatically choose one indoor unit as the host, the benchmark is to select indoor unit with smaller refrigerant system number and address number as the host. For example, indoor unit with swing louver and indoor unit without swing louver are in the same wire controller group, to control the indoor unit with swing louver, the indoor unit with swing louver must be set as the host, while indoor unit without swing louver as slave.

In the same system, the indoor unit with the smallest address number is the host, for example, when the host is K3 four directions, the host can do swing louver setting, the slave with swing louver can do swing louver, the slave without swing louver cannot do swing louver. But if the host is embedded and other machine, it does not have swing louver itself, then the host cannot do swing louver setting, while the slave cannot do the swing louver either even if it has swing louver, the solution is to set the indoor unit with more functions as the host.

6. Notes and attentions of being used together with other centralized controllers

When being used with other centralized controllers, do not set remote control prohibition function (all prohibition and partial prohibition), and do not set remote control prohibition function on the centralized controller used together, if remote control prohibition is set, it may not work properly.

7. Notes and attentions of fan speed jump and operating mode jump

Taking the first indoor unit as example, if detected any of the operation mode jump (40005 bit0~3) and fan speed jump (40006) is bit = 1, PC cannot set corresponding operation mode and fan speed, and it cannot work even if it was set.



6 Notes and Attentions

8. Notes and attentions of function selection setting

To carry out function selection setting of indoor unit, the indoor unit must be stopped, if not, sometimes the setting cannot be correctly applied.

The setting content will be different due to different functions of each unit, please refer to indoor unit installation spot checking method for detailed information.

After carried out function selection setting related to indoor unit control, please re-connect the product and confirm (clear EEPROM Data).

After replaced the base plate or wire controller of the indoor unit, please set again, and re-connect the product to confirm.

When being used together with other centralized controllers, after set “Cool and warm automatic function” b8, please make same setting on the centralized controller which can set function selection.

If only connected with light receiving section, need to replace with cable wire controller temporarily.

Carry out b4 setting by the product, filter symbol must be reset, do the setting after the filter symbol of the wire controller disappeared.

When setting function selection, please ensure to consult the service personnel of our company.

9. Notes and attentions of DC desiccant unit

“Dry 1”, “Dry 2” and “Dry 3” can only be set on DC desiccant unit, taking the first indoor unit as example, operate 40077 address to set.

10. Notes and attentions of wire controller installation

Although wire controller is installed, and wire controller prohibition function is not set, but it shows “centralized control” on the wire controller, which leads to that the wire controller cannot be controlled, please check whether the power supply is connected before installation, because there’s possibility that it identifies the air conditioner which is installed with wire controller as without wire controller installed. After connected and confirmed again, clear wire controller prohibition, reconfirm whether the “centralized control” of wire controller is cancelled. In addition, the indoor unit which isn’t installed with wire controller will always be controlled by the product.

For indoor unit which is installed with wire controller, if unload the wire controller in half-way, the product may be not able to control the air conditioner properly, please connect and confirm again (clear EEPROM).

11. Notes and attentions of Modbus RTU CRC CHECK

Modbus RTU CRC check of the product shall adopt CRC16.

12. Notes and attentions of Modbus TCP connection

When using multiple computers for management to operate the same Modbus adapter, as long as one of the computer for management disconnects, if other computers for management want to continue to send code, need to re-establish TCP connection between the client and server.

13. Notes and attentions of connection confirmation

If the connection confirmation takes too long time, in the connection confirmation for more than 20 minutes, please use wire controller to stop the operation of indoor unit, the time of connection confirmation can be shortened.

7 Recommend upper computer Tool

It is recommended to use Modbus Poll tool for debugging, this tool can be connected with Modbus TCP, but also be connected with Modbus RTU. After installation, the interface is as shown in Figure 7.1, Modbus RTU connection interface as shown in Figure 7.2, Modbus TCP connection interface as shown in Figure 7.3.

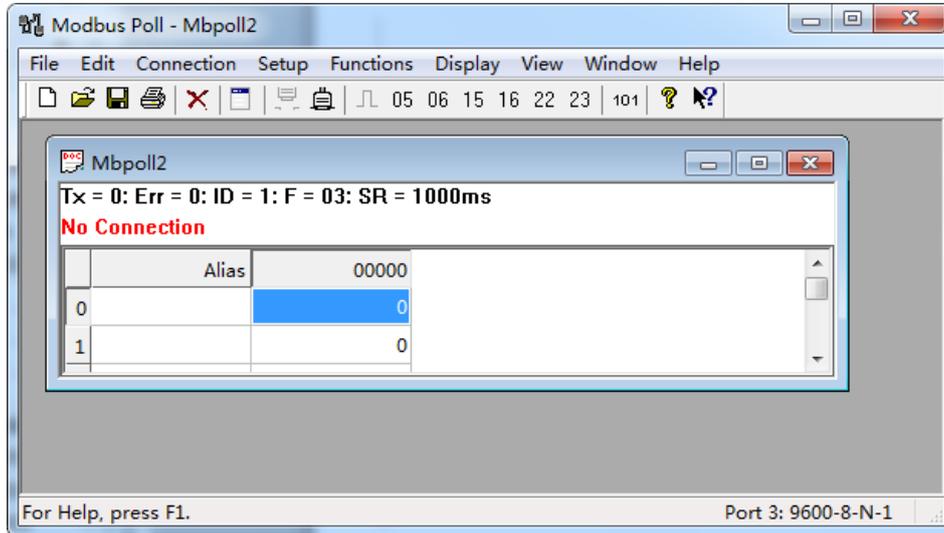


Figure 7.1 Modbus poll interface

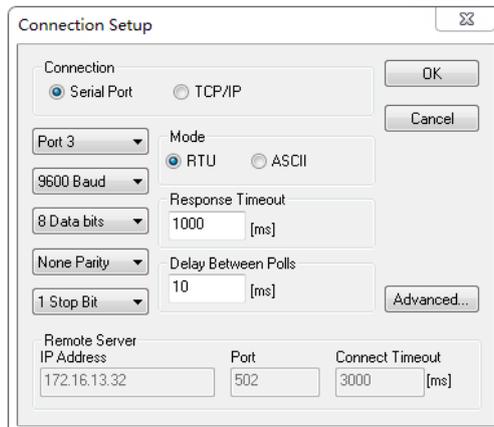


Figure 7.2 Modbus RTU connection interface

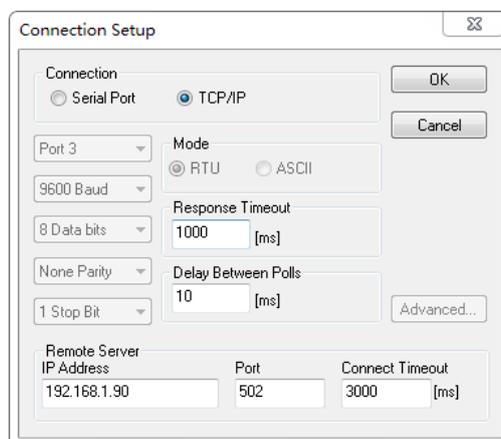


Figure 7.3 Modbus TCP connection interface

集中控制区域·机组登记表(1)

Centralized Control Area · Unit Group Registration Form (1)

ID	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
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※请在表中记录区域中标记连线的室内机情况，按系统号+地址号从小到大依次排列出来。

※Please record in the table the situation of indoor units which are marked to be connected in the area, list in turn from small to large according to the system number + address number.

集中控制区域·机组登记表(2)

Centralized Control Area · Unit Group Registration Form (2)

ID	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
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集中控制区域·机组登记表(3)

Centralized Control Area · Unit Group Registration Form (3)

ID	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
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集中控制区域·机组登记表(4)

Centralized Control Area · Unit Group Registration Form (4)

ID	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
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※Please record in the table the situation of indoor units which are marked to be connected in the area, list in turn from small to large according to the system number + address number.

随机件清单 (Accessory List)

随机件名称 (Name of accessory)	规格 (Specification)	数量 (Quantity)
Modbus 适配器 (Modbus adapter)	HCPC-H2M1C	1
电源适配器 (Power adapter)	INPUT AC220 OUTPUT DC12V	1
安装使用说明书 (Installation instruction manual)	---	1
合格证 (Certificate)	附属安装使用说明书中 (Attached in the installation instruction manual)	---
随机件清单 (Accessory list)	附属安装使用说明书中 (Attached in the installation instruction manual)	---

CERTIFICATE
合格证

Model
型号

HCPC-H2M1C

THIS PRODUCT HAS BEEN INSPECTED AND TESTED. RESULTS ARE ALL IN CONFORMITY WITH CORRESPONDING STANDARDS IN FORCE. IT IS PERMITTED TO LEAVE THE FACTORY.
本产品经检查和试验，结果均符合现行有关标准，产品准予出厂。

检验员	出厂日期
-----	------

条形码

Hisense Corporation
Add: 17, Donghai Xi Road, Qingdao 266071, China