

## MODBUS-RTU COMMUNICATION PROTOCOL APPLICATION GATEWAY COMMUNICATION PARAMETER SETTING

Item	parameter
Transmission mode	Half duplex
Baud rate	9600bps
Start bit	1 Bit
Data bit	8 bits
Check sum	None parity
Stop bit	1 Bit

The above communication specifications can also be passed through the gateway's own WEB Page to make changes

## FUNCTION CODE OF MAIN APPLICATION

Function code Gateway	Effect
<b>0x03 Read Write register</b>	Used to read the status of the air conditioner, One or more registers can be read and operated each time (the register address must be continuous. Each register saves a state parameter of an air conditioner. According to the number of registers read, one or more parameters of an air conditioner can be read at a time (such as switch temperature setting). And so on, you can also read all the parameters of several air conditioners at once.
<b>0x06 Write a single register</b>	Used to write and set a parameter of an air conditioner Only one register can be written at a time Each write operation will make a setting command for a parameter of an air conditioner.

## FUNCTION CODE OF MAIN APPLICATION

Function code Gateway	Effect
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**0x010 Write multiple registers**

Used to write and set multiple parameters of multiple air conditioners. Multiple registers can be written each time (register addresses must be consecutive). According to the number of write registers, one parameter or multiple parameters of an air conditioner can be written at a time, or multiple parameters of multiple air conditioners can be written at one time.

Status parameters, including: switch status, temperature setting value, mode setting status, wind speed setting, room temperature and fault code, and whether it is the host.

Air conditioner performance parameters, including: air conditioner brand, mode information, wind speed information, set temperature information, and special performance information table 3 Correspondence between the address of the state storage register and the address of the air conditioner indoor unit

Air conditioner	State parameter save register address
0-0	0,1,2,3,4,5
0-1	5,7,8,9,10,11
0-2	12,13,14,15,16,17
.....	.....
0-31	186,187,188,189,190,191
1-0	192,193,194,195,196,197
1-1	198,199,200,201,202,203
1-2	204,205,206,207,208,209
.....	.....
1-31	378,379,380,381,382,383
.....	.....
<b>Air conditioning performance information</b>	8000,8001,8002,8003

The start address of the indoor unit state parameter storage register is 4000, and every 4 consecutive address registers store 1 indoor unit control command, including: switch command, temperature setting value command, mode setting command, wind speed setting command, wind direction Setting instruction; Table 4 The corresponding relationship between the address of the control instruction register and the address of the indoor unit of the air conditioner is as follows

Air conditioner indoor unit address	Control instruction register address
0-0	4000, 4001, 4002, 4003
0-1	4004, 4005, 4006, 4007
0-2	4008, 4009, 4010, 4011
.....	.....
0-31	4124, 4125, 4126, 4127
1-0	4128, 4129, 4130, 4131
1-1	4132, 4133, 4134, 4135
1-2	4136,4137,4138,4139
.....	.....
1-31	4252,4253,4254,4255
.....	.....

The point table used to query the air conditioner status (corresponding MODBUS function code 0x03

AC Address AA-BB	External inquiry Deposit at the time of inquiry Device address	B15-B8	B7	B6	B5	B4	B3	B2	B1	B0	
	D0000	0	0	0	0	0	0	0	Failure: 1 normal: 0	ON: 1 OFF: 0	
	D0001	0	Setting temperature								
00-00	D0002	0	Setting Mode								
			0	0	0	0	heating	fan	dry	cool	
	D0003	Wind direction setting	Set Fan Speed								
			0	0	0	0	0	Low	medium	high	
	D0004	B15-B9 = 0 B8 , Host or no Host	Room return air temperature								
	D0005	0	Setting temperature								
	D0006	Current start-stop state 0x01 -> power on, 0X00 -> power off									
	D0007	Current mode setting 0x01 -> cooling, 0X02 -> dehumidification 0X03 -> fresh air 0x04-									
	D0008	Fan 0x05 automatic 0x06 sleep; 0x08 heating									
00-01	D0009	Current wind direction setting 0x00 Swing, left and right air deflector position 0x06 Left and right air deflector position6									
	D0010	0x10 Front and rear air deflector position 1, 0x60 Front and rear air deflector position 6									
	D0011	Front and rear air deflector position 4 Left and right air deflector position 2									
.....	.....	Current wind speed setting: 0x01->high speed; 0x02->medium speed; 0x04->low speed; 0x00->automatic. Current temperature setting: 0x1E->30°C; 0x12->18°C; 0x14->20°C;									

AC Address AA-BB	External inquiry Deposit at the time of inquiry Device address	B15-B8	B7	B6	B5	B4	B3	B2	B1	B0
00-31	D0186	<p>0x1A-&gt;26°C. (Air conditioner with the concept of master and slave) The current status of master and slave: 0x00-&gt;slave; 0x01-&gt;host. Current room temperature: 0x21-&gt;33°C; 0x10-&gt;16°C. Current fault code: 0x00-&gt;no fault; 0x01-&gt;01 (drain pump fault). . . • Air conditioner indoor unit address: AA-BB, AA refers to the refrigeration system address to which the air conditioner indoor unit belongs (Or called outdoor unit address); BB refers to the address of this indoor unit in the refrigeration system. • Query the status of the first indoor unit from the 0x0000 register. The status of each air-conditioning indoor unit is stored in 6 registers. • Calculation of the starting address of the [status] register corresponding to each air conditioner indoor unit: = (AAx32 + BB) x6 such as: Air conditioner indoor unit (0-31) register start address = (0x32 + 31) x6 = 186 Air conditioner indoor unit (3-31) register start address = (3x32 + 31) x6 = 762</p>								
	D0187									
	D0188									
	D0189									
	D0190									
01-00	D0191									
	D0192									
	D0193									
	D0194									
	D0195									
	D0196									
	D0197									

Current start and stop status: 0x01->turn on; 0x00->turn off. Current mode setting: 0x01->cooling; 0x02->dehumidification; 0x04->supply air; 0x08->heating. Current wind direction setting: 0x00->swing; 0x01->left and right wind deflector position 1;... 0x06->left and right wind deflector position 6; 0x10->Front and rear air deflector position 1;... 0x60 Front and rear air deflector position 6; 0x42->Front and rear air deflector position 4, left and right air deflector position 2. Current wind speed setting: 0x01->high speed; 0x02->medium speed; 0x04->low speed; 0x00->automatic. Current temperature setting: 0x1E->30°C; 0x12->18°C; 0x14->20°C; 0x1A->26°C. (Air conditioner with the concept of master and slave) The current status of master and slave: 0x00->slave; 0x01->host. Current room temperature: 0x21->33°C; 0x10->16°C. Current fault code: 0x00->no fault; 0x01->01 (drain pump fault). . .

Air conditioner performance parameters save the register start address as 8000, 5 consecutive addresses of the registers save the current air conditioner performance parameters, including: air conditioner brand, mode information, wind speed information, set temperature information, special performance information

Table 6 Point table for querying air conditioner performance information (corresponding to MODBUS function code 0x03)

AC performance	Register address to be queried	B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0	
	D8000	0							AC Brand									
	D8001	Support mode							Support mode									
		default	default	default	default	Fast Dry	DRY	Sterilization	Sleep	Cooling	DRY	automatic	Dehumidification	Warm up	FAN	Heating	Cooling	
	D8002	0							Fan Speed									
		default	default	Auto	Med & Low	Med & High	Low	Idle	High									
	D8003	Maximum settable room temperature							Minimum settable room temperature									
	D8004	0							Special performance information									
		default	default	default	default	Lift Right Swing	Up dpwn Swing	Default	Master – Slave Achine									

Air conditioner brand: A total of 1 byte is used, and hexadecimal numbers are used to represent the brand  
0x01: Hitachi; 0x02: Daikin; 0x03: Toshiba; 0x04: Mitsubishi Heavy Industries; 0x05: Mitsubishi Electric; 0x06: Gree; 0x07: Hisense; 0x08: Midea; 0x09: Haier; 0x0A: LG; 0x0B: Default; 0x0C: Default; 0x0D: Samsung; 0x0E: AUX; 0x0F: Panasonic; 0x10: York; 0x11: Default; 0x12: Default; 0x13: Gree Fourth Generation; 0x14: Default; 0x15: McQuay; 0x16: Default; 0x17: Default; 0x18: TCL; 0x19: Chigo; 0x1A: Tianjia; 0x1B: Default; 0x1C: Default. . . 0x23: York water machine 0x24: Cool wind; 0x25: Qingdao York; 0x26: Fujitsu; 0x65: Emerson water machine; 0x66: McQuay water machine; 0x29: Default. . . .

0xFF: emulator; Support mode: Occupies 2 bytes (0 means not having this function, 1 means supporting this function)

Data example: 0x00 0x17->Support four modes of dehumidification, air supply, heating and cooling;  
Support wind speed:

Occupies 1 byte (0 means not having this function, 1 means supporting this function) Data example:

0x27->Supports four wind speeds: low speed, medium speed, high speed, and automatic wind speed;

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Temperature upper and lower limit: Occupies a total of 2 bytes Data example: 0x1E 0x10->support temperature range 16-30 degrees Celsius

Special performance information: Occupies one byte (0 means not having this function, 1 means supporting this function) Bit BIT0, 1 means master-slave concept, 0 means no master-slave concept;

bit BIT1, default;

Bit BIT2, 1 is setting with front and rear wind direction, 0 is setting without front and rear wind direction;

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bit BIT1, default;

Bit BIT2, 1 is setting with front and rear wind direction, 0 is setting without front and rear wind direction;

### THE MEANING OF THE CODE SENT BY THE INTEGRATED SYSTEM:

The first byte (01)—the address of the air conditioner gateway device (MODBUS is defined as Slave ID), the factory default is 01, if there are multiple air conditioner gateways connected to an RS485 bus at the same time, in order to distinguish each other, it is necessary to configure each air conditioner gateway address (the gateway address can be set on the WEB page of its configuration), if the RS485 bus has other settings, device, then the device addresses of other devices and the air conditioner gateway cannot conflict.

The second byte (03) - MODBUS function code, its meaning is to read the value of a series of registers.

Bytes 3 and 4 (00 C0) - read a series of register values starting at 00 C0

The 5th and 6th bytes (00 06) - starting from the registers specified by the 3rd and 4th bytes, read 00 06 registers in total.

The 7th and 8th bytes (C5 F4) - the check byte of the frame data (check method: CRC16)



### THE MEANING OF THE INTEGRATED SYSTEM RECEIVING CODE:

1st byte (01) — — Air conditioner gateway device address (MODBUS is defined as Slave ID)

The second byte (03) — — MODBUS function code.

The 3rd byte (0C) — — corresponding to the query command, the air conditioner gateway returns a total of 0C (decimal: 12) bytes of data

Bytes 4~15 — — The air conditioner gateway returns 12 bytes of read data

The 16th and 17th bytes (DC DA) - the check byte of the frame data (check method: CRC16)

Detailed explanation of the 4th to 15th bytes of data: Query the values stored in the 6 registers starting with address 192 (hexadecimal: 00 C0) (query the air conditioner register

Point table, these 6 registers store all the state values of 1-0 indoor unit

00 01 (hex) ----- Air conditioner is running 00 19 (hex) ----- temperature set to 25°C (0x19 = 25) 00

01 (hex) ----- mode is set to cooling

00 01 (hexadecimal) ----- wind speed is set as high speed wind

00 1C (hex) ----- Return air temperature (current room temperature) is 28°C (0x1C = 28)

00 00 (hexadecimal)-----The fault code of the air conditioner is 0 (no fault), if there is a fault, it is the corresponding fault

Query the values of more registers at once: The integrated system sends: 01 03 00 00 00 0C C5 F4 (for example, query the status of 2 air conditioners) Integrated system receive: 01 03 18 00 01 00 19 00 01 00 01 00 1C 00 00 01 00 19 00 01 00 01 00 1E 00 00 DC DA

Table 7 The point table used to control and set the air conditioner (corresponding to MODBUS function code 0x06)

AC address AA-BB	Register address when the air conditioner is controlled externally	B15-B8	B7	B6	B5	B4	B3	B2	B1	B0
00-00	D4000	0	0	0	0	0	0	0	Shut-down	boot
	D4001	0	temperature setting							
	D4002	0	Mode setting							
	D4003	Wind direction setting	0	0	0	0	Heat	FAN	Dry	Cool
00-01	D4004	(Switch setting: 0x01->on; 0x02->off (or 0x00->off								
	D4005	Mode setting: 0x01->cooling; 0x02->dehumidification; 0x04->air supply; 0x08->heating								
	D4006	Current wind direction setting: 0x00->swing; 0x01->left and right wind deflector position 1 . . . 0x06->Left and right wind guide								
	D4007	;board position 6								
----	-----	0x10->Front and rear wind deflector position 1 . . . 0x60 Front and rear wind deflector position 6								
00-31	D4124	.0x42->Position 4 of the front and rear air deflectors, and position 2 of the left and right air deflectors								
	D4125	Wind speed setting: 0x01->high speed; 0x02->medium speed; 0x04->low speed; 0x00->automatic wind speed								
	D4126	°CTemperature setting: 0x1E->30°C; 0x12->18°C; 0x14->20°C; 0x1A->26								
	D4127	VRV air conditioner only needs to control the indoor unit of the air conditioner, and does not need to control the outdoor unit. outdoor unit								
	D4128	All control strategies such as start-stop, frequency conversion, and protection will be automatically performed according to the working conditions of the indoor unit to meet the operation requirements of the indoor unit of the air conditioner								
	D4129	Control the first air conditioner indoor unit from the 0x0FA0 (decimal: 4000) register, each								
01-00	D4130	.The status of the air conditioner indoor unit is stored in 4 registers								
	D4128	Calculation of the starting address of the [Control] register corresponding to each air conditioner indoor unit: = •								
	D4129	:(AAx32 + BB) × 4 + 4000 such as								
	D4130	Air conditioner indoor unit (0-31) register start address = (0x32 + 31)×4+4000 = 4124								
	D4131	Air conditioner indoor unit (3-31) register start address = (3x32 + 31)×4+4000 = 4508								

- 06 (0x06) function code - operate a single register (used to independently operate the switch of the air conditioner, temperature setting, etc.)

Integrated System Send: 01 06 0F A0 00 01 4B 3C

Integrated System Reception: 01 06 0F A0 00 01 4B 3C

The meaning of the code sent by the integrated system:

1st byte (01) — — Air conditioner gateway device address (MODBUS is defined as Slave ID)

The second byte (06) — — MODBUS function code, its meaning is to set the value of a register.

The 3rd and 4th bytes (0F A0) - start from the 0F A0 position to set the value of a register.

The 5th and 6th bytes (00 01) - write the register specified by the 3rd and 4th bytes to the value 00 01

The 7th and 8th bytes (4B 3C) - the check byte of the frame data (check method: CRC16)

The meaning of the integrated system receiving code:

1st byte (01) — — Air conditioner gateway device address (MODBUS is defined as Slave ID)

The second byte (06) — — MODBUS function code, its meaning is to set the value of a register.

The 3rd and 4th bytes (0F A0) - start from the 0F A0 position to set the value of a register.

The 5th and 6th bytes (00 01) - write the register specified by the 3rd and 4th bytes to the value 00 01

The 7th and 8th bytes (4B 3C) - the check byte of the frame data (check method: CRC16)

for example:

— — — — Operation meaning of sending the code “01 06 0F A0 00 01 4B 3C”: Write the value 1 (corresponding to the data bit 00 01 of the sending code) to the register whose address is 4000 (0x0F 0xA0), and check the bit table It is known that this register corresponds to the switch control of 00-00 indoor unit, writing 1 means power on, writing 2 means power off.

— — — — Operation meaning of sending the code “01 06 0F A1 00 13 9A F1”: Write the value 0x13 (corresponding to the data bit 00 13 of the sending code) to the register whose address is 4001 (0x0F 0xA1), and check the point The table shows that this register corresponds to 00-00 indoor unit temperature control, and writing 0x13 means setting the temperature to 19°C

— — — — Operation meaning of sending the code “01 06 0F A2 00 08 2A FA”: Write the value 0x08 to the register whose address is 4002 (0x0F 0xA2) (corresponding to the data bit 00 08 of the sending code), check the point The table shows that this register corresponds to 00-00 indoor unit mode control, and writing 0x08 means setting the mode to “heating”

----- Operation meaning of sending the code “01 06 0F A3 00 04 7B 3F”: Write the value 0x04 (corresponding to the data bit 00 08 of the sending code) to the register whose address is 4003 (0x0F 0xA3), and check the point The table shows that this register corresponds to 00-00 indoor unit fan speed control, and writing 0x04 means setting the mode to “low speed”

- 16 (0x10) function code - operate multiple registers (used to operate the switch to control the air conditioner, temperature setting, etc.)

Integrated system send: 01 10 0F A0 00 04 08 00 01 00 19 00 08 00 02 2C B5

Integrated System Receive: 01 10 0F A0 00 04 C2 FC

The meaning of the code sent by the integrated system:

1st byte (01) — —Air conditioner gateway device address (MODBUS is defined as Slave ID)

The second byte (10) - MODBUS function code, its meaning is to set the value of multiple registers at one time.

The 3rd and 4th bytes (0F A0) - start from the 0F A0 position to set the values of multiple registers at one time.

The 5th and 6th bytes (00 04) - start from the specified position of the 3rd and 4th bytes, and set the value of 4 registers at a time.

Byte 7 (08) - Sets the total number of bytes to be written to 8 (4 registers x 2 bytes/register)

The 8th~15th bytes - the specific values of the 4 registers to be set,

the 8th and 9th bytes are written into the first register, and the 10th and 9th bytes are written into the first register.

11 bytes are written to the 2nd register, 12th, 13th bytes are written to the 3rd register, 14th, 15th Byte write to 4th register

The 16th and 17th bytes (2C B5) - the check byte of the frame data (check method: CRC16)

The meaning of the integrated system receiving code:

1st byte (01) — —Air conditioner gateway device address (MODBUS is defined as Slave ID)

The second byte (10) - MODBUS function code, its meaning is to set the value of multiple registers at one time.

The 3rd and 4th bytes (0F A0) - starting from the 0F A0 position, set the values of multiple registers at one time.

The 5th and 6th bytes (00 04) - start from the specified position of the 3rd and 4th bytes, and set the value of 4 registers at a time.

The 7th and 8th bytes (C2 FC) - the check byte of the frame data (check method: CRC16)

for example:

----- The operation meaning of sending the code "01 10 0F A0 00 04 08 00 01 00 19 00 08 00 02 2C B5": Write the 4 (0x00 0x04 ) registers starting at address 4000 (0x0F 0xA0) with a total of 8 bytes, and write the value 00 in turn 01 00 19 00 08 00 02

00 01 (hexadecimal) ----- Turn on the air conditioner whose address is 00-0

00 19 (hex) ----- Set the air conditioner temperature at address 00-00 to 25°C (0x19 = 25)

00 08 (hexadecimal) ----- Set the air conditioner mode at address 00-00 to heating

00 02 (hexadecimal) ----- Set the air speed of the air conditioner with the address 00-00 as medium speed

----- Operation meaning of sending the code "01 10 0F A1 00 01 02 00 1C xx xx": Write the 1 (0x00 0x01 ) register starting at address 4001 (0x0F 0xA1) with a total of 2 bytes, and write the value 00 1C 00 1C (hex)----- Set the air conditioner temperature at address 00-00 to 28°C (0x1C = 28)

