ECSEAL MODBUS RTU protocol communication statutes

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revised record

revision date	revised version	revised description
2017-11-25	1.02	Publishing the first edition
2020-12-06	1.03	1．Coil: Increase damper linkage output WindValveFlag 2．Increase filter use time FliterUseTime
2017-12-07	1.04	1.Add pu8LinkOutOption display option to 03&06&10Command
2017-12-08	1.05	1．Modify the software version number command rule: Version = M * 100000 + Sub * 1000 + Build
2017-12-21	1.06	1.Add RTDValidbitmap
2018-03-02	1.07	1.Add the clear filter command FiterClearFlg 2.Add Bypass Vent Valve On Flag Bit BypassWindValFlg
2018-03-08	1.08	1.Erratum 03&03&10Register 62 in Command is Saturday P3 Time 2.Add RTC time annotations and agree on the years 2000~2099.
2018-04-13	1.09	1．Add fresh air damper control flag bit FreshSwFlg 2．Change bypass valve to fresh air damper status flag FreshWindValFlg
20-18-4-17	1.10	1．Add fresh air auto adjust enable flag bit FreshAutoEnFlg
2018-06-12	1.11	1．Remove FreshAutoEnFlg. 2．Change FreshSwFlg to RoomCycleEnFlg 3．Add ReturnFanSide, FullFresh_TempHiLmt, FullFresh_TempLoLmt
2018-07-21	1.12	1. Increase the over-temperature fault symbol
2018-08-02	1.13	1. Add Network Manager management item, register address in 03&06&10Command 160~426
2018-11-06	1.14	1. Delete register 31 Read Olny flag in 01&05&0F Command. 2、Tag 01&05&0F Register No.5 in Command is a forced inner loop tag.
2018-12-11	1.15	1、In 01&05&0F Command, add register 32 MixerValOn flag, which is the mixing valve on/off flag. 2、In 03&06&10 Command, add registers 144~150, which are for customer's model setting, 1- speed fan parameter, 2- speed fan parameter, 6-phase fan parameter.
2018-12-11	1.16	1、In 01&05&0F Command add the return air exhaust fan fan speed output marking 2, add register note description and modify the note field
2018-12-18	1.17	1. Add static electricity, negative ion, auxiliary electric heating switch control bits. (Register numbers are located in registers 6~7 in 01&05&0fCommand) 2. Increase the return air fan setting register. (Register number is located in register 12 in 03&06&10Command) 3. Add one week timer on/off setting register. (Register number is located in 03&06&10Command, register 432~459) 4. Increase the preheat electric heating output status register. (Register number is located in register 39 in 01&05&0fCommand) 4. Modify the forced return air internal cycle register description. (Register number is located in register 5 in 01&05&0fCommand) 5. Modify the fan wind speed/fresh air wind speed register seconds. (Register number is located in register 4 in 01&05&0fCommand)
2018-12-18	1.18	1. Increase the preheat electric heating output status register. (Register number is located in register 40 in 01&05&0fCommand)
2018-12-19	1.19	1. Add a status register for the return side ventilation valve. (Register numbers are located in 02Command registers 35 and 36.)
2018-12-19	1.20	1. Add registers for fresh air supply temperature and condenser temperature as well as exhaust air temperature. (The register numbers are located in 04Command 16 and 17, Register 20) 2、Increase the fresh air inlet temperature and indoor temperature Toa and Tra variable name description

2018-12-20	1.21	1. Add the description of filter contamination level (register number is located in register 21 in 04Command)
		2. Increase Frost Output Flag (register number is located in register 40 in 01&05&0fCommand)
2018-12-20	1.22	1. Add fresh air inlet temperature sensing fault, fresh air supply temperature sensor fault, indoor return air temperature sensor fault, condenser temperature sensor fault, indoor exhaust air temperature sensor fault (register number is located in 02Command, registers 42~46)
		2、Modify the password of BA communication parameter interface, adopt 1-register password verification, and modify the password value to 0x5af0.
2018-12-27	1.23	1, increase the defrost time setting, return air valve opening temperature, frost mode temperature, electric heating start temperature, preheating electric heating start temperature
		Degree (register numbers are located in registers 14, 15, 28, 29, 30 in 03&06&10Command)
2019-06-12	1.24	1. Increase output identification registers (Reg42~46 in 01Command)
2019-06-18	1.25	1. Add electric heating prohibition interface in 02Table
		2. Add remote linkage enable signal to 01&05&0f Command.
		3、Modify the description of register 35 in 02Command and delete the function of register 36.
2019-07-01	1.26	1、Increase register No.9 in 01 Command, register No.9 is the enable signal of remote linkage function, when this signal is 1, control
		The controller receives the remote linkage signal to execute the on/off operation, when the signal is 0, the controller ignores the remote linkage signal and executes the set
		Work Status.
2019-09-28	1.27	1. Increase register 10 in 01 Command for the keyboard lock status required by the BA system.
		2. Add register 24 in 0x4Command for BA error code
2019-10-8	1.28	1、Add Modbus RTU Protocol protocol version description (Register 40 in 04 Command) 2、Add BSP Version information description (Register 41, 42 in 04 Command)
		3. Increase controller fault code pu16ErrCode message description (Register 25 in 04 Command)
		4、Increase 01&05&0f Command, humidity control enable, fresh air damper control enable, return air damper control enable, fresh air bypass.
		Damper control room, preheat electric heating control function enable
2019-11-23	1.29	1. Adjustment of 02 register form contents
2019-11-24	1.30	1. Adjust the contents of the 01&05&0f register form to modify the contents to the area with a yellow background color
		2, adjust the 02 register form content, modify the content of the yellow background color of the region
		3, SVN version bit Build44
2019-11-28	1.31	1. Increase the fresh air fan exhaust fan speed reading. In 04Command Register28, 29.
		2、SVN No. Build45
2020-05-15	1.32	1. Add registers 22 and 23 to the 02Command table, where register 22 is for ADU sensor module fault information and register 23 is for HDU module sensor fault information;
		2、In 03&06&10Command table add 50, 51, 52 registers, of which 50 registers for UV lamp running time setting.
		Register 51 is configured for the number of ADU modules and register 52 is configured for the number of HDU modules.
		3, in the 03&06&10Command table to increase the No. 8, No. 9 registers, No. 8 register for the mixing temperature setting value. 9 register bits
		Integral valve opening
2020-05-22	1.33	1. Delete register 50 from the 03&06&10Command table.
		2、In 03&06&10Commad table add 24, 25 registers, 24 registers bit UV lamp cycle control cycle time, 25 registers bit UV lamp cycle control in the runtime
		3, in the 02Command table to add 2, 24, 25, 26 registers, register 2 bit UV lamp failure, 24 registers for the electrical
		Heating failure, #25 is a supply air fan failure, and #26 is an exhaust air fan failure.
2020-6-22	1.35	1、In 01&05&0F Command table, add registers 14 and 15, register 14 is for pump on function, register 15 is for output enable register.
		2, in the 04Command table to add 26 registers, No. 26 for the proportional valve outlet temperature.

2020-07-31	1.36	1. Add register 50 to the 03&06&10Commad table. Register 50 is the indoor air circulation mode (0: auto mode 1.): (Inlet air circulation 2: Internal circulation 3: Mixed air mode)
2020-12-17	1.37	1. Add registers 51,52,53 to the 03&06&10Commad table; register 51 is the number of ADU sensor configurations, register 52 is the number of HDU humidifier board configurations, and register 54 is the linkage input switch.
2021-04-02	1.38	1. Add register No. 2 to the 01&05&0fCommand table as the Clear Wet Film Use Time register. 2. In Table 04, register 23, Wet Film Use Time. 3. Register 36 in Table 02 is the wet film replacement alarm.
2021-05-06	1.39	1. Modify the controller working mode definition, 0:auto,.... 6:Dehumidification
2021-09-16	1.40	1. Increase customer control policy #31 in registers 03, 06, and 10.
2021-10-15	1.41	1, adjust 03, 06, 10 register No. 2 register for setting the room temperature function, set the temperature range of 170 ~ 350
2021-10-29	1.42	1, add 05 command Write 54 (clear the number of times the make-up valve is turned on) 55 (clear the number of times the UV lamp is turned on) No. Register flag function 2, add 03, 06 commands to read and write 157 (humidification control mode) 158 (humidification demand on the need to maintain time) 159 (humidification demand off the need to maintain time) No. register function 3, add 04 command read 30 (HDU humidifier plate UV lamp on times), 31 (HDU humidifier plate water replenishment valve open times) No. registers functionality
2021-11-1	1.43	1.01 Command to add registers 60~82 as the function of monitoring HDU status data, check function code 0x01 data table for specific data.
2022-03-02	1.44	1. Add Protection Temperature Sensor Fault 02 Register Table (Register 48). 2. Increase Protection Temperature Read 04 Register Table (Register 50)
2024-03-01	1.45	1、 Increase the speed setting holding register description of air supply fan and exhaust fan (Register No. 145~156/4.6.9 Holding Register Parameter) (Table)
2024-03-26	1.46	1、 Increase humidification start humidity set point / 55 hold registers 2、 Increase dehumidification start humidity set point / 56 hold registers 3、 Increase the humidity deadband range setpoint / 57 hold registers
2024-03-26	1.47	No. 55, 56, 57, three holding registers have been used in the protocol to program time slots for appointments and are now changed to use the following registers 1、 Increase humidification start humidity set point / 92 hold registers 2、 Increase the dehumidification start humidity set point / 93 hold registers 3、 Increase humidity deadband range setpoint/94 hold registers 4. Maximum Model/55 Holding Registers 5. Add the reservation programming information to the protocol table

1. Introduction

1.1　　Scope of　　application

The <ECSEAL MODBUS RTU communication protocol> applies to all standard products of ECSEAL. It applies to air conditioning controllers, heating controllers, integrated air conditioning and floor heating controllers, fresh air controllers and dew point controllers.

1.2　　　Applicable readers

This document (this guide) is primarily
intended for engineers who are: centralized
control system developers
Electronic Control
System Developer
Product
Developer.

2, the document acronym explanation ID:

the address of the device, the data
length of 1 byte.

FC: Function code, data length is 1 byte.

REG: Register address, data length is 2 bytes.

REGLEN: register length, data length is 2 bytes.
STATE:Coil register closed state, data length 2
bytes. BYTE: data length, data length is n bytes.
CRC16: Check data，data length is 2 bytes.

3. Background overview

With the development of the times and the iteration of technology, many new products have been introduced in the field of HVAC control, and a variety of control systems with different requirements have been derived. In order to adapt to the development requirements of the times, product standardization requirements, and to solve the duplication of development work of products adapted to a variety of protocols, the <ECSEAL MODBUS RTU communication protocol specification> has been formulated.

4. Protocol description

4.1　　Specification requirements for physical communication ports

This communication protocol can be used on RS485 communication links with a maximum communication distance of 700 m. Do not use system balancing resistors at the end of the communication.

4.2　　Communication interface parameter definition

9600 bit communication baud rate, 8 data bits, 1 stop bit, no parity bit.

4.3　　Communication data verification

Adopting 16-bit CRC check principle, the last 2 bytes of each frame are CRC check data, and the low byte of CRC check is in the front, and the high byte is in the back. the polynomial of CRC check is $G(X)=x^{15}+X^{13}+X^{0}$. the initial value of CRC check is 0xffff. the scope of the check is the whole data frame outside the check code.

4.4　　transmission encryption algorithm

The statute definition does not use any encryption during transmission.

4.5　　Basic requirements of the Statute Agreement

The statute requires that all accessed equipment be accessed in the manner defined by the GB/T 19582.1-2008 standard.

4.6　　Description of the communication format

4.6.1　Read coil register status
function code 0x01 Master send frame
format

ID	FC	REG		LEN		CRC16	
01	01	00	00	00	40	3d	fa

Data frames:

01 01 00 00 00 40 3d fa

0 : is the address of the controller being accessed.

0 : is the function code to read the coil register.

00 00: is the starting address for reading the coil register. Indicates that the reading starts from No. 0 in the coil register.

00 40: is the number of registers to read. Indicates the status of reading 64 coil registers.40 is hexadecimal data.

3d fa: is the CRC16 data frame checksum information in communication.

Slave Answer Frame Format

ID	FC	BYTE	DATA								CRC16	
01	01	08	01	20	03	14	02	34	11	CB	E9	92

Data frames:

01 01 08 01 20 03 14 02 34 11 CB E9 92

01 : is the address of the controller being accessed.

01 : is the function code to read the coil register.

08   The length of the answer data for the accessed controller is 8 bytes and does not contain the CRC16 checksum. 64 coil states are encapsulated into 1 byte according to the 8 coil states, and are arranged in descending order starting from the accessed start coil register. The following is a list of the 64 coil states in 1-byte packages.
01 20 03 14 02 34 11 CB: is the number of registers read. 64 accessed coil register states, combined into 8 bytes of data, each containing 8 accessed coil register states.

E9 92: is the CRC16 data frame checksum information in communication.

4.6.2   Set or clear coil register status function code 0x05

a)   Clear coil register closure
status Master sends data
frame

ID	FC	REG		STATE		CRC16	
0x01	0x05	0x00	0x01	0x00	0x00	0x9C	0xA0

Data frames.

01 05 00 01 00 00 9C A0

01 : is the address of the controller being accessed.

05 : is a function code that sets or clears the coil register closure state.

00 01 : is the set coil register number

00 00 : is the clear coil register closure status command.

9C A0 : is the CRC16 data frame checksum information in communication.

slave reply data frame

ID	FC	REG		STATE		CRC16	
0x01	0x05	0x00	0x01	0x00	0x00	0x9C	0xA0

Data frames.

01 05 00 01 00 00 9C A0

01 : is the address of the controller being accessed.

05 : is a function code that sets or clears the coil register closure state.

00 01 : is the set coil register number

00 00 : is the clear coil register closure status command.

9C A0 : is the CRC16 data frame checksum information in communication.

b)   Setting the coil register
closed state Master sends
data frame

ID	FC	REG		STATE		CRC16	
0x01	0x05	0x00	0x01	0xFF	0x00	0xDD	0xFA

Data frames.

01 05 00 01 FF 00 DD FA

01 : is the address of the controller being accessed.

05 : is a function code that sets or clears the coil register closure state.

00 01 : is the set coil register number

FF 00 : is the command to set the closed state of the coil register.

DD FA : is the CRC16 data frame checksum information in communication

slave reply data frame

ID	FC	REG		STATE		CRC16	
0x01	0x05	0x00	0x01	0xFF	0x00	0xDD	0xFA

01	05	00 01	FF 00	DD FA

01 : is the address of the controller being accessed.

05 : is a function code that sets or clears the coil register closure state.

00 01 : is the set coil register number

FF 00 : is the command to set the closed state of the coil register.

DD FA : is the CRC16 data frame checksum information in communication.

4.6.3   Coil Register Reference Table

register number	functional definition	data definition	Applicable products	read-write function
0	Controller switch flag bit	0:Controller off 1:Controller open	Air conditioning equipment/fresh air equipment/heating equipment/integrated air conditioning and floor heating equipment	R/W
2	Timing Flag Bit	0:Timing function off 1:Timing function on	Air conditioning equipment/fresh air equipment/integrated air conditioning and floor heating equipment	R/W
4	Clear the filter flag bit	1: Clearance	Fresh air equipment	R/W
7	Negative Ion Module Switch	1: Negative ion turn on 0: Negative ion off	Fresh air equipment	R/W
8	Electric Auxiliary Heat Module Switch	1: Electric auxiliary heat on 0: Electric auxiliary heat off	Fresh air equipment	R/W
13	UV lamp function switch	0: UV light remains off 1: UV lamp on cycle control	Fresh air equipment	R/W
16	Low-speed air (1 speed)/Fresh air supply 1 speed	0: Closed 1: Work	Air conditioning equipment/fresh air equipment/integrated air conditioning and floor heating equipment	R
17	Medium speed air (2 speeds)/Fresh air supply 2 speeds	0: Closed 1: Work	Air conditioning equipment/fresh air equipment/integrated air conditioning and floor heating equipment	R
18	Sub-high velocity air (3 speeds)/fresh air supply 3 cross-piece	0: Closed 1: Work	Air conditioning equipment/fresh air equipment/integrated air conditioning and floor heating equipment	R
19	High speed (4 speeds)/Fresh air supply 4 speeds	0: Closed 1: Work	Fresh air equipment	R
20	Extreme high speed (5 speeds)/Fresh air supply 5 speeds	0: Closed 1: Work	Fresh air equipment	R
21	Powerful (6 speeds)/Fresh air supply 6 speeds	0: Closed 1: Work	Fresh air equipment	R
22	EC Fan power supply	0: Closed 1: Work	Fresh air equipment	R
25	Heating output	0: Closed 1: Work	Heating equipment/air conditioning and floor heating in one unit/fresh air equipment	R
28	Negative Ion Output Relay	0: Closed 1: Work	Fresh air equipment	R
31	Ventilation valve open sign by return air	0: Closed 1: Open	Fresh air equipment	R
34	Return air exhaust 2 speeds	0: Closed 1: Work	Fresh air equipment	R
35	Return air exhaust 3 speeds	0: Closed 1: Work	Fresh air equipment	R
36	Return air exhaust 4 speeds	0: Closed 1: Work	Fresh air equipment	R
37	Return air exhaust 5 speeds	0: Closed 1: Work	Fresh air equipment	R
38	Return air exhaust 6 speeds	0: Closed 1: Work	Fresh air equipment	R
39	Preheat Electric Heating Relay Output Flag	0: Closed 1: Output	Fresh air equipment	R
47	Electric heating power supply marking	0: off 1: on	Fresh air equipment	R
51	Status of the exhaust side vent valve	0: off 1: on	Fresh air equipment	R

4.6.4 Read input status register
function code 0x02 Master send frame
format

ID	FC	REG		LEN		CRC16	
01	02	00	00	00	40	79	FA

Data frames:

01 02 00 00 00 40 79 FA

01 : is the address of the controller being accessed.

02 : is the function code to read the status of the input register.

00 00 : is the start address of reading input register. Indicates that the reading starts from number 0 in the input register.

00 40 : is the number of input registers to be read. Indicates the status of reading 64 input registers. 40 is hexadecimal data.

79 FA : is the CRC16 data frame checksum information in communication.

Slave Answer Frame Format

ID	FC	BYTE	DATA								CRC16	
01	02	08	01	20	03	14	02	34	11	CB	19	9D

Data frames:

01 02 08 01 20 03 14 02 34 11 CB 19 9D

01 : is the address of the controller being accessed.

02 : is the function code to read the input status register.

08 The length of the answer data for the accessed controller is 8 bytes and does not contain the CRC16 checksum. 64 input states are encapsulated into 1 byte according to the 8 input states, and are arranged in descending order starting from the start input state register of the accessed state.

01 20 03 14 02 34 11 CB: For reading register data. the 64 accessed input status register states are combined to form 8 bytes of data, each containing 8 accessed input status register states.

19 9D: is the CRC16 data frame checksum information in communication.

4.6.5 Input status register reference table

register number	functional definition	data definition	Applicable products	Read/Write Support
0	BA interface no data read alarm	0: BA interface reads data normally 1: No data read on BA interface	Fresh air equipment	R
1	Line controller interface no data read-in alarm	0: Line controller interface reads data normally 1: No data reading from line controller interface	Fresh air equipment	R
14	Load controller parameter failure	0:Normal 1:Failure		
15	Controller Parameter Configuration Error	0:Normal 1:Failure		
22	ADU Module Connection Failure	0:Normal 1:Failure	Fresh air equipment	R
25	Failure of air supply fan	0:Normal 1:Failure	Fresh air equipment	R
26	Failure of exhaust fan	0:Normal 1:Failure	Fresh air equipment	R
32	Filter dust clogging status	0:Filter is not clogged 1: Clogged filter	Fresh air equipment	R
42	Fresh air inlet temperature sensor failure	0:Normal 1:Failure	Fresh air equipment	R

4.6.6 Read Holding Register
Function Code 0x03 Master
Transmit Frame Format

ID	FC	REG		LEN		CRC16	
01	03	00	00	00	04	44	09

Data frames:

01 03 00 00 00 04 44 09

01 : is the address of the controller being accessed.

03 : is the function code to read the status of the holding register.

00 00 : is the starting address for reading the holding register. Indicates that reading starts from No. 0 in the holding register.

00 04 : is the number of holding registers to be read. Indicates that 4 holding registers are read.

44 09 : is the CRC16 data frame checksum information in communication.

Slave Answer Frame Format

ID	FC	BYTE	DATA							CRC16	
01	03	08	01	20	03	14	02	34	11	CB	48	58

Data frames:

01 03 08 01 20 03 14 02 34 11 CB 48 58

01 : is the address of the controller being accessed.

03 is the function code for reading the holding register.

08 The length of the answer data for the accessed controller is 8 bytes and does not contain the CRC16 checksum. 4 holding registers correspond to 8 bytes of data. Each holding register corresponds to 2 bytes of data.

01 20 03 14 02 34 11 CB: The data for reading the holding register. 8 data are 2 bytes each for 1 holding register data. The data is arranged according to the read number of the holding register.

48 58: is the CRC16 data frame checksum information in communication.

4.6.7 Function code for a single write to
the holding register 0x06 Master transmit
frame format

ID	FC	REG		REGDATA		CRC16	
01	06	00	00	00	01	48	0A

Data frames:

01 06 00 00 00 01 48 0A

01 : is the address of the controller being accessed.

06 : for writing to a single holding register function code

00 00 : is the starting address for writing to the holding register. Indicates that the host writes data to Holding Register 0 of the accessed device.

00 01 : is the data written to the holding register. Indicates that the host writes data 1 to Holding Register 0 of the accessed device.

44 0A : is the CRC16 data frame checksum information in communication.

Slave Answer Frame Format

ID	FC	REG		REGDATA		CRC16	
01	06	00	00	00	01	48	0A

Data frames:

01 06 00 00 00 01 48 0A

01 : is the address of the controller being accessed.

06 : is a write to a single holding register function code.

00 00 : is the starting address for writing to the holding register. Indicates that the host writes data to Holding Register 0 of the accessed device.

00 01 : is the data written to the holding register. Indicates that the host has successfully written data 1 to the holding register 0 of the accessed device.

44 0A : is the CRC16 data frame checksum information in communication

4.6.8 Function code for continuous writing to multiple holding registers 0x10 Master transmit frame format

ID	FC	REG		REGLEN		BYTE	DATALEN						CRC16	
01	10	00	10	00	03	06	01	11	20	10	03	13	55	5B

Data frames:

01 : is the address of the controller being accessed.

10 ::Write multiple holding register function codes in succession for

00 10 : is the starting address for continuous writing to the holding register. Indicates that the host continuously writes data to Holding Register 16 of the accessed device.

00 03 : is the number of registers written to the holding register in succession. Indicates that the host continuously writes data to 3 registers in Holding Register No. 16 of the accessed device.

06 : is the length of consecutively written data, and the value is two times the number of registers.

01 11 20 10 02 13: 6 data for 3 holding registers.

55 5B: is the CRC16 data frame checksum information in communication.

Slave Answer Frame Format

ID	FC	REG		REGLEN		CRC16	
01	10	00	10	00	03	E8	03

Data frames:

01 : is the address of the controller being accessed.

10 : for the Write Multiple Holding Registers function code.

00 10 : is the starting address for writing to multiple holding registers. Indicates that the host continuously writes data to the 16 holding registers of the accessed device.

00 03 : is the data written to the holding register. Indicates that the host computer has successfully written 6 consecutive data to the Holding Register No. 16 of the accessed device.

E8 03 : is the CRC16 data frame checksum information in communication.

4.6.9 Holding Register Reference Table

register number	functional definition	data definition	Applicable products	Read/Write Support
1	control mode	0: continuous 1: Programming by appointment 2: Circulation 3: Energy saving	Fresh air equipment/heating equipment/air conditioning and floor heating all-in-one equipment	R/W
4	Setting fan speed/fresh air supply	0: Stop 1: Low speed 2: Medium speed 3: Sub-highway 4: High speed 5: Very high speed 6: Powerful 7~9: EC fan gear 255: Automatic wind	Air conditioning equipment/fresh air equipment/integrated air conditioning and floor heating equipment	R/W
6	Setting the run time in cycle mode	1 to 720 minutes at 15 minute intervals	Fresh air equipment	R/W
7	Setting the pause time in cycle mode	1 to 120 minutes at 15-minute intervals	Fresh air equipment	R/W
11	Timed on/off time	1~720 minutes	Air conditioning equipment/fresh air equipment/integrated air conditioning and floor heating equipment	R/W
17	Backlight activation time	10~30 seconds, set the minimum step of 1 second	Air conditioning equipment/fresh air equipment/heating equipment/air conditioning floor heating one furniture	R/W
20	Power down memory enable	0: No recovery 1~255 Restore the last working mode	Air conditioning equipment/fresh air equipment/heating equipment/air conditioning floor heating one furniture	R/W
32	unit of angle or arc equivalent one sixtieth of a degree	0~59	Fresh air equipment/heating equipment/air conditioning and floor heating all-in-one equipment	R/W
33	minutes	0~59	Fresh air equipment/heating equipment/air conditioning and floor heating all-in-one equipment	R/W
34	hourly	0~23	Fresh air equipment/heating equipment/air conditioning and floor heating all-in-one equipment	R/W
35	dates	0~31	Fresh air equipment/heating equipment/air conditioning and floor heating all-in-one equipment	R/W
36	months	1~12	Fresh air equipment/heating equipment/air conditioning and floor heating all-in-one equipment	R/W
37	last week	0~6	Fresh air equipment/heating equipment/air conditioning and floor heating all-in-one equipment	R/W
38	particular year	00-99, year base 2000	Fresh air equipment/heating equipment/air conditioning and floor heating all-in-one equipment	R/W

48	BA communication interface site number	1~127	Fresh air equipment	R/W
50	Indoor air circulation mode	0: Automatic mode 1: Inlet air circulation 2: Internal circulation 3: Mixed air mode	Fresh air equipment	R/W
55	Customer's largest model		Fresh air equipment	
56~67	Schedule a Programming Session			
68~79	Appointment Programming Temperature			
80~91	Appointment Programming Wind Speed			
144	Customer Model Setting	Reservation Options	/	
145	Air supply 1 setting speed/voltage	500~3500RPM	Fresh air equipment	R/W
146	Air supply 2 speed setting speed/voltage	500~3500RPM	Fresh air equipment	R/W
147	Air supply 3-speed setting speed/voltage	500~3500RPM	Fresh air equipment	R/W
148	Air supply 4 setting speed/voltage	500~3500RPM	Fresh air equipment	R/W
149	Air supply 5 setting speed/voltage	500~3500RPM	Fresh air equipment	R/W
150	Air supply 6 setting speed/voltage	500~3500RPM	Fresh air equipment	R/W
151	Exhaust 1 speed setting speed/voltage	500~3500RPM	Fresh air equipment	R/W
152	Exhaust 2 speed setting speed/voltage	500~3500RPM	Fresh air equipment	R/W
153	Exhaust 3 speed setting speed/voltage	500~3500RPM	Fresh air equipment	R/W
154	Exhaust air 4 speed setting speed/voltage	500~3500RPM	Fresh air equipment	R/W
155	Exhaust air 5 speed setting speed/voltage	500~3500RPM	Fresh air equipment	R/W
156	Exhaust air 6 speed setting speed/voltage	500~3500RPM	Fresh air equipment	R/W

4.6.10 Read input register function code 0x04 Master send frame format

Data frames:

ID	FC	REG		LEN		CRC16	
01	04	00	00	00	04	66	48

01 04 00 00 00 04 66 48

01 : is the address of the controller being accessed.

04 : is the function code to read the input register.

00 00 : is the start address of reading input register. Indicates that the reading starts from number 0 in the input register.

00 04 : is the number of input registers to read. Indicates that 4 input registers are read.

66 48 : is the CRC16 data frame checksum information in communication.

Slave Answer Frame Format

ID	FC	BYTE	DATA								CRC16	
01	04	08	01	20	03	14	02	34	11	CB	04	B3

Data frames:

01 04 08 01 20 03 14 02 34 11 CB 04 B3

01 : is the address of the controller being accessed.

04 : is the function code to read the input register.

08 :The length of the answer data for the accessed controller is 8 bytes and does not contain the CRC16 checksum. 4 input registers correspond to 8 bytes of data. Each input register corresponds to 2 bytes of data.

01 20 03 14 02 34 11 CB: The data of input register is read. 8 data are 2 bytes for 1 input register data. The data is arranged according to the reading number of the input register.

48 58: is the CRC16 data frame checksum information in communication.

4.6.11 Input Register Reference Table

register number	functional definition	data definition	Applicable products	Read/Write Support
6	formaldehyde concentration	0~200	Fresh air equipment	R
7	Sensor Valid Symbols Table	BIT0:VOC BIT1:PM2.5 BIT2:CO2 BIT3:RoomHumidity BIT4:RoomTemperature BIT5:CO BIT6:NH4 BIT7:FreshTemp BIT8~14:Reserved BIT15: Automatic wind effective bit	Fresh air equipment	R
8	Room CO2 concentration	0~5000PPM	Fresh air equipment	R
9	Room VOC Concentration	1.0~50.0PPM, magnification 100	Fresh air equipment	R
10	Room PM2.5 concentration	0~300ug/m3	Fresh air equipment	R
11	room temperature	-20.0~90.0℃, magnification 10	Air conditioning equipment/fresh air equipment/heating equipment/air conditioning floor heating one furniture	R
12	Room humidity	0~100%	Air conditioning equipment/fresh air equipment	
13	Fresh air inlet temperature	-20.0~90.0℃, magnification 10	Fresh air equipment	
14	Running time in cyclic mode	1~720 minutes	Fresh air equipment	R
15	Pause time in loop mode	1~120 minutes	Fresh air equipment	R
18	Filter dust accumulation	0~100%	Fresh air equipment	R
19	Filter use time	0~3000 hours	Fresh air equipment	R
21	Filter contamination level	0~6: Indicates the contamination level of the filter. 0 means no contamination; 6 means serious contamination. Filter needs to be replaced.	Fresh air equipment	R
24	BA System Error Code	0:No system error 1~65536: BA system error code	Fresh air equipment	R
25	Controller Fault Codes	0~65535	Fresh air equipment	R
28	Fresh air fan speed	0~65535	Fresh air equipment	
29	Exhaust fan speed	0~65535	Fresh air equipment	