User Manual

CS3N Model Fresh Air Controller

1、Overview

The CS3N Model Fresh Air Controller can monitor indoor temperature, humidity, PM2.5, and TVOC levels in real time through an environmental monitor. It features a ModBus RTU (RS485) interface, allowing users to connect to smart home systems and other backend monitoring devices via the ModBus interface.

2、 Main Interface Touch Button Function Description

1. key：Power on/off
2. key：Fan Speed Adjustment
3. key：Mode Switching
4. key：Settings

Note: In Smart Mode, the fan speed adjusts based on sensor data (PM2.5, CO_2).

3、Operation and Display Description

1.Power On/Off: When the device is powered on, a short press of the power button will turn the screen on or off.

2.Fan Speed Adjustment: When the device is powered on, a short press of the fan speed button will cycle through the three speed settings: low, medium, and high.

Low：、Medium：、High：;

3.Mode Switching: When the device is powered on, a short press of the mode switch button will cycle through the three modes.

Smart Mode：智能 Fresh Air Mode：新风 Bypass Mode：旁通

4.Filter Reset: When the device is powered on, press and hold the fan speed button for 5 seconds.

5.Fault Code Display: Fault codes are displayed to indicate specific issues. Multiple faults will scroll through the display, while a single fault will be shown continuously.

6.Filter Alarm Notification: The alarm icon will only light up when the filter reaches the set alarm time. At other times, the icon remains off. The notification icon is:。

When the usage time is below 20%, the icon will start flashing. When the usage time is exhausted, the icon will remain illuminated.

4、Technical Specifications

*Dimensions: 86×86×11mm

*Mounting Hole Spacing：60mm(Standard) *Response Time: ≤10 秒

*Wiring Terminal: Maximum 1 mm² wire *Recovery Time: ≤30 秒

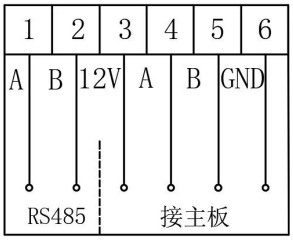
*Rated Voltage: 12V *Operating Temperature: -10℃ --- +50℃

*Standby Power Consumption: ≤2.0W *Operating Humidity

:1%RH——99%RH(Non-condensing) *Storage Temperature

: -20℃ --- +60℃ *Storage Humidity: ≤60%RH

5、 Wiring Diagram



6、Communication Protocol

1. Physical Interface

Serial Port：485

Frame Format： 1 start bit, 8 data bits, no parity, 1 stop bit

Baud Rate：9600 bps。

2. Communication Protocol

Write Single Register

Command Format：

Device Address Code	Function Code	Register Address	Register Value	CRC Check Code
0x01	0x06	0xXXXX	0xXXXX	0xXXXX

Response Command Format：

Device Address Code	Function Code	Register Address	Register Value	CRC Check Code
0x01	0x06	0xXXXX	0xXXXX	0xXXXX

Write Multiple Registers

Command Format：

Device Address Code	Starting Register Address	Number of Registers	Data Length (in bytes)	Register Values	CRC Check Code
0x01	0xXXXX	0xXXXX	0xXX	0xXXXX……0xXXXX	0xXXXX

Response Command Format：

Device Address Code	Function Code	Starting Register Address	Number of Registers	CRC Check Code
0x01	0x10	0xXXXX	0xXXXX	0xXXXX

Read Multiple Registers

Command Format：

Device Address Code	Function Code	Starting Register Address	Number of Registers	CRC Check Code
0x01	0x03	0xXXXX	0xXXXX	0xXXXX

响应命令格式：

Device Address Code	Function Code	Data Length (in bytes)	Register Values	CRC Check Code
0x01	0x03	0xXX	0xXXXX……0xXXXX	0xXXXX

Description：

1) Data Length: Represents the total number of valid data bytes for the registers, calculated as follows: Data Length = Number of Registers × 2.
2) During communication, all data is transmitted with the high byte first and the low byte second. However, for CRC checks, the low byte comes before the high byte.

Description of Register Addresses and Data Types

- Register Addresses and Data Explanation: The read/write attributes are based on the host computer. For example:
  - R: The host computer can only send read commands to the main control board.
  - W: The host computer can only send write commands to the main control board.
  - R/W: The host computer can send either read or write commands to the main control board.

Data Precision: If the data has a certain number of decimal places, it is scaled to an integer multiple for transmission (e.g., a value of 0.001 is multiplied by 1000 before transmission).

Function	Register Address	Register Data Range	Read/Write Attribute
Host Communication Address	**0x1002**	**1 - 254** **Can be directly modified on the panel or adjusted via host computer commands**	**R/W Default 0x02 Preventing Conflicts with Smart Home Systems**
Power On/Off	0x1003	0 -- off; 1 -- open;	R/W
Operating Mode	0x1004	1-- Smart Mode; Fan speed cannot be manually adjusted. 2-- Fresh Air Mode; 5-- Bypass Mode;	
Fresh Air Settings	0x1005	0、1、2、3 = Stop, Low, Medium, High	
Fresh Air Setting 1 Voltage	0x1006	0 .0-- 9.9V (But it should not exceed the voltage of Setting 2)	
Fresh Air Setting 2 Voltage	0x1007	0 .0-- 9.9V (But it should not exceed the voltage of Setting 3)	
Fresh Air Setting 3 Voltage	0x1008	0 .0-- 9.9V (But it should not exceed 10V)	
Exhaust Fan Settings	0x1009	0、1、2、3 = Stop, Low, Medium, High	
Exhaust Fan Setting 1 Voltage	0x100A	0 .0-- 9.9V (But it should not exceed the voltage of Setting 2)	
Exhaust Fan Setting 2 Voltage	0x100B	0 .0-- 9.9V (But it should not exceed the voltage of Setting 3)	
Exhaust Fan Setting 3 Voltage	0x100C	0 .0-- 9.9V (But it should not exceed 10V)	
Fresh Air Valve Switch	0x100D	0 -- off; 1 -- open; **Power On → Power Off: The air valve will close with a 10-second delay after powering off.**	
Exhaust Valve Switch	0x100E	0 -- off; 1 -- open;	
Bypass Valve 1 Switch	0x100F	0 -- off; 1 -- open; AC Valve	
Bypass Valve 2 Switch	0x1010	0 -- off; 1 -- open; DC Valve	
Reserved for Debugging	**0x1011**		
Heater 1 Switch	0x1012	0 -- off; 1 -- open; Electric Auxiliary Heating	
Heater 2 Switch	0x1013	0 -- off; 1 -- open; Electric Preheat	
Debugging Reserved	**0x1014--0x1017**		
Reset Energy Consumption	0x1018	0--No Operation 1--Reset Energy Consumption(Write 1 via Host Computer or Panel) 2--Reset Complete(Write 2 to Main Board)	
Debugging Reserved	**0x1019--0x1FFF**		
Debugging Reserved	**0x2001**		
Main Board Operating Voltage	0x2002	0.0V -- 300.0V	
Main Board Operating Current	0x2003	0.0A -- 30.0A	
Exhaust Fan Switch Status	0x2004	**0 -- Turn off the exhaust fan; 1 -- Turn on the exhaust fan;**	
Pressure Differential Switch Status	0x2005	0 -- off; 1 -- open;	
Debugging Reserved	**0x2006**		
Exhaust NTC2 Data	0x2007	-40℃ -- 100℃, int Type	

Fresh Air NTC1Data	0x2008	-40℃ -- 100℃, int Type	R
Debugging Reserved	**0x2009--0x200A**		
Display Screen PM2.5 Data	0x200B	0 -- 1000 ug/m^3	
Display Screen CO2 Data	0x200C	0 -- 5000 ppm	
Display Screen TVOC Data	0x200D	**0、1、2**	
Display Screen CHCO Data	0x200E	0 -- 1000, Resolution 0.01mg/m^3	
Display Screen Temperature Data	0x200F	0 -- 1000, Resolution 0.1℃	
Display Screen Humidity Data	0x2010	0% -- 100%	R **The display screen parameters are pass-through data from the panel.**
Energy Meter Phase A Voltage	0x2011	0.0 -- 999.9(V)	
Energy Mete Phase A Current	0x2012	0.00 -- 99.99(A)	
Energy Mete Phase A Active Power	0x2013	0.00 -- 99.99(KW)	
Energy Mete Current Total Active Energy	0x2014 0x2015	Long type, unit: 0.01 kWh (0.01 kilowatt-hours) High byte first, low byte second!	
Fresh Air Flow Data	0x2016	0 -- 65535	
Exhaust Air Flow Data	0x2017	0 -- 65535	
Main Board Fresh Air Fan Speed	0x2018	0 -- 65535	
Main Board Exhaust Fan Speed	0x2019	0 -- 65535	
Device Product Code	0x201A	1 -- 65535	
Main Board Firmware Version	0x201B	1 -- 65535; For example, 1001 represents V10.0.1	
Debugging Reserved	**0x201C--0x2FFF**		
Fresh Air Temperature Sensor Fault(NTC1 **)**	0x3002	0 -- No Fault; 1 -- Parameter is in a non-operational range state (E02)	
Exhaust Temperature Sensor Fault(NTC2 **)**	0x3003	0 -- No Fault; 1 -- Parameter is in a non-operational range state (E03)	
Fresh Air Fan Fault(Fresh Air Feedback **)**	0x3005	0 -- No Fault; 1 -- Fresh Air Fan is unable to operate normally (E05)	
Exhaust Fan Fault(Exhaust Feedback **)**	0x3006	0 -- No Fault; 1 -- Exhaust Fan is unable to operate normally (E06)	
PM2.5 Sensor Fault(Environmental Monitor)	0x3007	0 -- No Fault; 1 -- Parameter is in a non-operational range state (E07)	
CO2 Sensor Fault(Environmental	0x3008	0 -- No Fault;	

Monitor)		1 -- Parameter is in a non-operational range state (E08)	
VOC Sensor Fault(Environmental Monitor)	0x3009	0 -- No Fault; 1 -- Parameter is in a non-operational range state (E09)	
HCHO Sensor Fault(Environmental Monitor)	0x300A	0 -- No Fault; 1 -- Parameter is in a non-operational range state (E10)	
Overcurrent Protection	0x300B	0 -- No Fault; 1 -- Parameter is in a non-operational range state (E11)	
Overvoltage Protection	0x300C	0 -- No Fault; 1 -- Parameter is in a non-operational range state (E12)	
Undervoltage Protection	0x300D	0 -- No Fault; 1 -- Parameter is in a non-operational range state (E13)	
Controller Communication Fault	0x300E	0 -- No Fault; 1 -- (E14)	
Environmental Monitor Communication Fault	0x300F	0 -- No Fault; 1 -- (E15)	
Debugging Reserved	0x3010 --0xFFFF		

Note: To obtain the RS485 communication address from the master device, you can send the 0x03 command (considering the uncertainty of the address).

Master device sends: 00 03 1002 0001 20 DB.

The main control board responds with: Address (single byte) 03 02 Address (two bytes) CRC.

Note: To set the RS485 communication address, the master device can send the 0x06 command (similar to the standard 0x06 command).

The controller sends: Original address (single byte) 06 1002 New address (two bytes) CRC.

The main control board responds with: New address (single byte) 06 1002 New address (two bytes) CRC (If the new address is incorrect, data will continue to be transmitted using the original address).