

SC7232

RS485 interface LED displays soil moisture temperature controller User Manual

File Version: V21.7.1



Soil moisture temperature controller, also known as soil temperature and humidity controller, soil temperature and humidity controller, is mainly composed of two parts: controller instrument, soil moisture sensor. The controller has high reliability and stability, It meets the needs of users in many aspects. The product has the characteristics of simple operation, high precision, low cost, etc. It can be widely used in various soil temperature control places. To facilitate real-time monitoring of equipment operation and

control status, the device has designed RS485 communication interface, which is convenient for users. It is connected with computer or network. Due to the widely used MODBUS-RTU communication protocol, the product is easy to integrate into PLC, man-machine interface, configuration software and other equipment or systems. Users can realize control parameters and data according to communication protocol. Query or set. The product is suitable for scientific experiments, water-saving irrigation, greenhouses, flowers and vegetables, grassland pastures, soil rapid measurement, plant cultivation, sewage treatment and measurement and control of various water content of particulate matter.

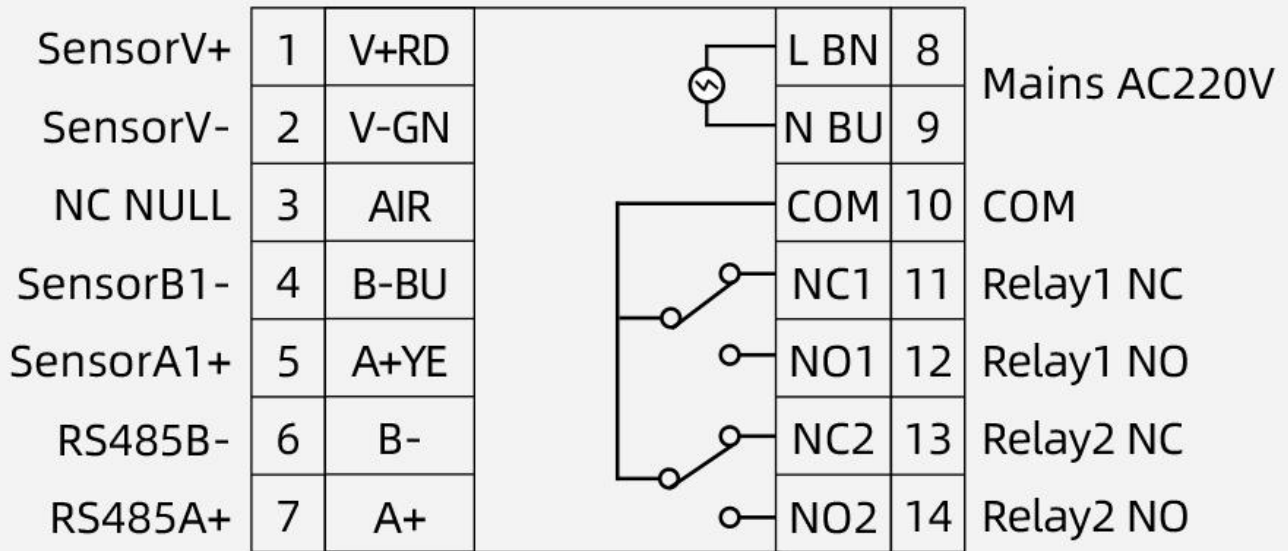
Technical Parameters

Technical parameter	Parameter value
Brand	SONBEST
Moisture measuring range	0~100%
Moisture measuring accuracy	±3% @25℃
Moisture Temperature range	-30℃~80℃
Moisture Temperature accuracy	±0.5℃ @25℃
Communication Interface	RS485
Default baud rate	9600 8 n 1
Power	AC185~265V 1A
Dimensions	77mm×77mm×110mm
Running temperature	-40~80℃
Working humidity	5%RH~90%RH

How to wiring?

WIRING METHOD

Easy-to-understand wiring without complicated operations



Left sensor wiring

- (1)RD SensorV+
- (2)GN SensorV-
- (4)BU SensorB1-
- (5)YE SensorA1+

AC220V wiring on the right

- (8)BN L BN
- (9)BU N BU

HIGH-SENSITIVITY INDUSTRIAL DESIGN

Every detail has undergone many manual tests and repeated modifications to bring you a better experience and carefully create high-quality products

LED DISPLAY

Clear display
Fast response



SETTINGS BUTTON

For threshold setting
and mode change

HIGH-QUALITY SHELL
Vacuum encapsulation process
Long-term soaking work



HIGH-QUALITY PROBE
Resistant to long-term electrolysis
Resistant to acid and alkali salts in soil

DETAILED KEYS

Standard MODBUS-RTU protocol, default baud rate is 9600, invalid check, 8 data bits, software can change parameters such as threshold, and can query lighting data in real time through RS485.



» : Use the select key during setup

^ : Up key

v : Down key

SET : Set key

The fourth page is the mode settings

Mode 1: Upper limit alarm

Mode 2: lower limit alarm

Mode 3: Limit Exceed / Limit Action

※The upper part is the humidity display value, and the lower part is the temperature display value.

◆Click "Set" to enter the upper threshold setting. Press "»" to select the position and press "A" and "V" to adjust the value.

In modes 1 and 3, when the value is greater than the upper threshold, relay 1 will act.

Upper limit:

Minimum humidity 0, maximum 100.0

Minimum temperature -99, maximum 99.9

◆Press SET twice to enter the lower threshold setting. Press "»" to select the position, then press "A" and "V" to adjust the value.

In modes 2 and 3, when this value is less than the lower threshold, relay 2 will function.

Lower threshold:

Minimum humidity 0, maximum 100.0

Minimum temperature -99, maximum 99.9

◆Press SET three times to enter the control hysteresis setting.

Press "»" to select the position and press "A" and "V" to adjust the value.

Hysteresis:

Minimum humidity 0, maximum 5.0

Minimum temperature 0, maximum 5.0

◆Press SET four times to enter the control mode setting.

Press "»" to select the position and press "A" and "V" to adjust the value.

Mode 1. Action exceeding the upper threshold

Mode 2: Action is below the offline threshold

Mode 3, above the upper threshold operation /

below the offline threshold operation

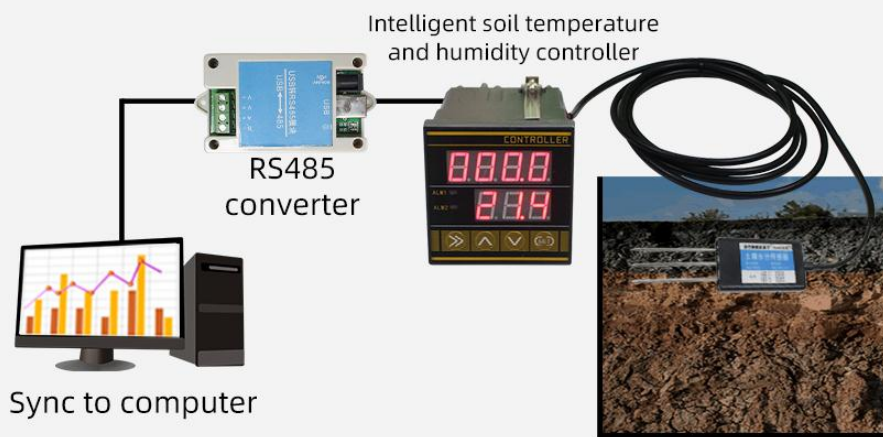
KEY OPERATION

How to use?

APPLICATION OF INTELLIGENT CONTROLLER

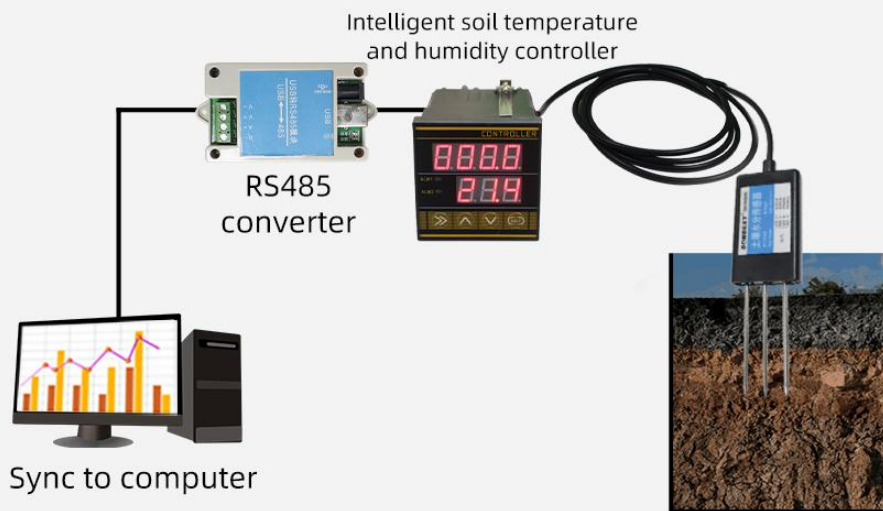
Example: When the water or temperature exceeds / below the threshold during irrigation, the sensor will transmit the humidity and temperature data to the controller, and then the controller will turn off / on the irrigation equipment according to a preset threshold, which can be passed through the RS485 port. Data can be synced to the computer

Burial investigation



Fast measurement

Select a suitable measurement location to avoid stones, plan the topsoil according to the depth required for the measurement, maintain the original tightness of the lower soil, and place the sensor vertically into the soil. Do not shake left or right to ensure close contact with the soil.



VARIOUS OCCASIONS ALL NEED ME

Real-time monitoring every day, wide application range, high detection efficiency, stable and reliable, widely used in agriculture, forestry, greenhouse cultivation, breeding, grassland and other environments that need to measure soil temperature and humidity



■ Flower planting

Flower cultivation requires strict management
According to factory temperature and humidity requirements
Temperature and humidity control with matched sensors

Greenhouse

Effective management with sensors
Create a good temperature and humidity environment for crops
Promote better absorption

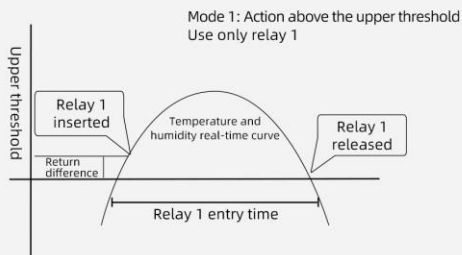


■ Water Saving Irrigation

Long-term monitoring of farmland temperature and humidity
According to field humidity and temperature requirements
Perform intelligently controlled irrigation operations

CONTROL METHODS AND PROCESSES

Actions above the upper threshold, actions below the lower threshold, actions above / below the threshold



Temperature and humidity control equipment opening and closing process

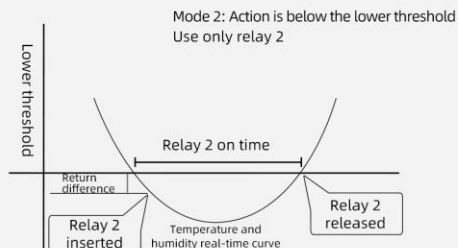
Operating conditions of relay 1:

measured value > upper threshold + hysteresis

Release operating conditions of relay 1:

measured value < upper threshold - return difference

※As shown in the figure above, when the measured value is higher than the upper threshold plus the difference, the controller's internal relay Device 1 plugs in and turns on the device; when the measured value drops to the upper limit minus the difference, it will continue Device 1 is disconnected and the device is turned off.



Temperature and humidity control equipment opening and closing process

Operating condition of relay 2:

measured value < lower limit threshold - return difference

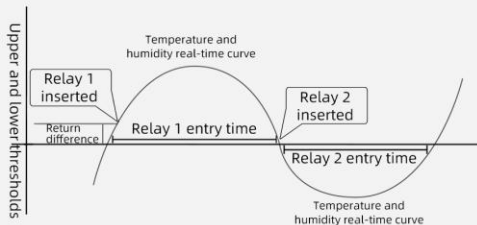
Relay 2 release operating conditions:

measured value > lower limit threshold + return difference

※As shown in the figure above, when the measured value is lower than the lower limit threshold minus the difference, the internal relay 2 of the controller is closed and the device is closed; when the measured value rises to the lower threshold plus the difference, the relay 2 is opened and disconnected Open the device.

Mode 3: Over / under threshold operation

Above the upper threshold, relay 1 operates, and below the lower threshold, relay 2 operates. Generally, the motor of the device is used to control the forward and reverse rotation of the device.



Temperature and humidity control equipment opening and closing process

Relay 1 on condition:

measured value > upper threshold + return difference

Relay 2 on condition:

measured value < lower limit threshold - return difference

※As shown in the figure above, when the measured value is higher than the upper threshold + return difference, the internal relay 1 of the controller is activated, and the motor of the general control equipment runs forward to start the equipment. After starting, when it is lower than the lower threshold - return difference, the relay 2 is closed and the motor of the control device is normally reversed to close the device.

Communication Protocol

The product uses RS485 MODBUS-RTU standard protocol format, all operation or reply commands are hexadecimal data. The default device address is 1 when the device is shipped, the default baud rate is 9600, 8, n, 1

1. Read Data (Function id 0x03)

Inquiry frame (hexadecimal), sending example: Query 1# device 1 data, the host computer sends the command:01 03 00 00 00 02 C4 0B .

Device ID	Function id	Start Address	Data Length	CRC16
01	03	00 00	00 02	C4 0B

For the correct query frame, the device will respond with data:01 03 04 00 7A 00 00 DB EA , the response format is parsed as follows:

Device ID	Function id	Data Length	数据 1	数据 2	Check Code
01	03	04	00 79	00 7A	DB EA

Data Description: The data in the command is hexadecimal. Take data 1 as an example. 00 79 is converted to a decimal value of 121. If the data magnification is 100, the actual value is $121/100=1.21$. Others and so on.

2. Data Address Table

Address	Start Address	Description	Data type	Value range
40001	00 00	1#soil Moistureregister	Read only	0~65535
40002	00 01	2#soil Moistureregister	Read only	0~65535
40101	00 64	model code	read/write	0~65535
40102	00 65	total points	read/write	1~20
40103	00 66	Device ID	read/write	1~249
40104	00 67	baud rate	read/write	0~6
40105	00 68	mode	read/write	1~4
40106	00 69	protocol	read/write	1~10

3 read and modify device address

(1) Read or query device address

If you don't know the current device address and there is only one device on the bus, you can use the command FA 03 00 64 00 02 90 5F Query device address.

Device ID	Function id	Start Address	Data Length	CRC16
FA	03	00 64	00 02	90 5F

FA is 250 for the general address. When you don't know the address, you can use 250 to get the real device address, 00 64 is the device model register.

For the correct query command, the device will respond, for example the response data is: 01 03 02 07 12 3A 79, the format of which is as shown in the following table:

Device ID	Function id	Start Address	Model Code	CRC16
01	03	02	55 3C 00 01	3A 79

Response should be in the data, the first byte 01 indicates that the real address of the current device is, 55 3C converted to decimal 20182 indicates that the current device main model is 21820, the last two bytes 00 01 Indicates that the device has a status quantity.

(2)Change device address

For example, if the current device address is 1, we want to change to 02, the command is:01 06 00 66

00 02 E8 14 .

Device ID	Function id	Start Address	Destination	CRC16
01	06	00 66	00 02	E8 14

After the change is successful, the device will return information: 02 06 00 66 00 02 E8 27 , its format is parsed as shown in the following table:

Device ID	Function id	Start Address	Destination	CRC16
01	06	00 66	00 02	E8 27

Response should be in the data, after the modification is successful, the first byte is the new device address. After the general device address is changed, it will take effect immediately. At this time, the user needs to change the query command of the software at the same time.

4 Read and Modify Baud Rate

(1) Read baud rate

The device default factory baud rate is 9600. If you need to change it, you can change it according to the following table and the corresponding communication protocol. For example, read the current device's baud rate ID, the command is: 01 03 00 67 00 01 35 D5 , its format is parsed as follows.

Device ID	Function id	Start Address	Data Length	CRC16
01	03	00 67	00 01	35 D5

Read the baud rate encoding of the current device. Baud rate encoding: 1 is 2400; 2 is 4800; 3 is 9600; 4 is 19200; 5 is 38400; 6 is 115200.

For the correct query command, the device will respond, for example the response data is: 01 03 02 00 03 F8 45, the format of which is as shown in the following table:

Device ID	Function id	Data Length	Rate ID	CRC16
01	03	02	00 03	F8 45

coded according to baud rate, 03 is 9600, ie the current device has a baud rate of 9600.

(2)Change the baud rate

For example, changing the baud rate from 9600 to 38400, ie changing the code from 3 to 5, the command is: 01 06 00 67 00 05 F8 1601 03 00 66 00 01 64 15 .

Device ID	Function id	Start Address	Target Baud Rate	CRC16
01	03	00 66	00 01	64 15

Change the baud rate from 9600 to 38400, changing the code from 3 to 5. The new baud rate will take effect immediately, at which point the device will lose its response and the baud rate of the device should be queried accordingly. Modified.

5 Read Correction Value

(1) Read Correction Value

When there is an error between the data and the reference standard, we can reduce the display error by adjusting the correction value. The correction difference can be modified to be plus or minus 1000, that is, the value range is 0-1000 or 64535 -65535. For example, when the display value is too small, we can correct it by adding 100. The command is: 01 03 00 6B 00 01 F5 D6 . In the command 100 is hex 0x64 If you need to reduce, you can set a negative value, such as -100, corresponding to the hexadecimal value of FF 9C, which is calculated as 100-65535=65435, and then converted to hexadecimal to 0x FF 9C. The correction value starts from 00 6B. We take the first parameter as an example. The correction value is read and modified in the same way for multiple parameters.

Device ID	Function id	Start Address	Data Length	CRC16
01	03	00 6B	00 01	F5 D6

For the correct query command, the device will respond, for example the response data is: 01 03 02 00 64 B9 AF, the format of which is as shown in the following table:

Device ID	Function id	Data Length	Data value	CRC16
01	03	02	00 64	B9 AF

In the response data, the first byte 01 indicates the real address of the current device, and 00 6B is the first state quantity correction value register. If the device has multiple parameters, other parameters operate in this way. The same, the general temperature, humidity have this parameter, the light generally does not have this item.

(2)Change correction value

For example, the current state quantity is too small, we want to add 1 to its true value, and the current value plus 100 correction operation command is:01 06 00 6B 00 64 F9 FD .

Device ID	Function id	Start Address	Destination	CRC16
01	06	00 6B	00 64	F9 FD

After the operation is successful, the device will return information: 01 06 00 6B 00 64 F9 FD, the parameters take effect immediately after successful change.

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