

SM7001B

RS485 interface tipping rain sensor

User Manual

File Version: V23.5.5

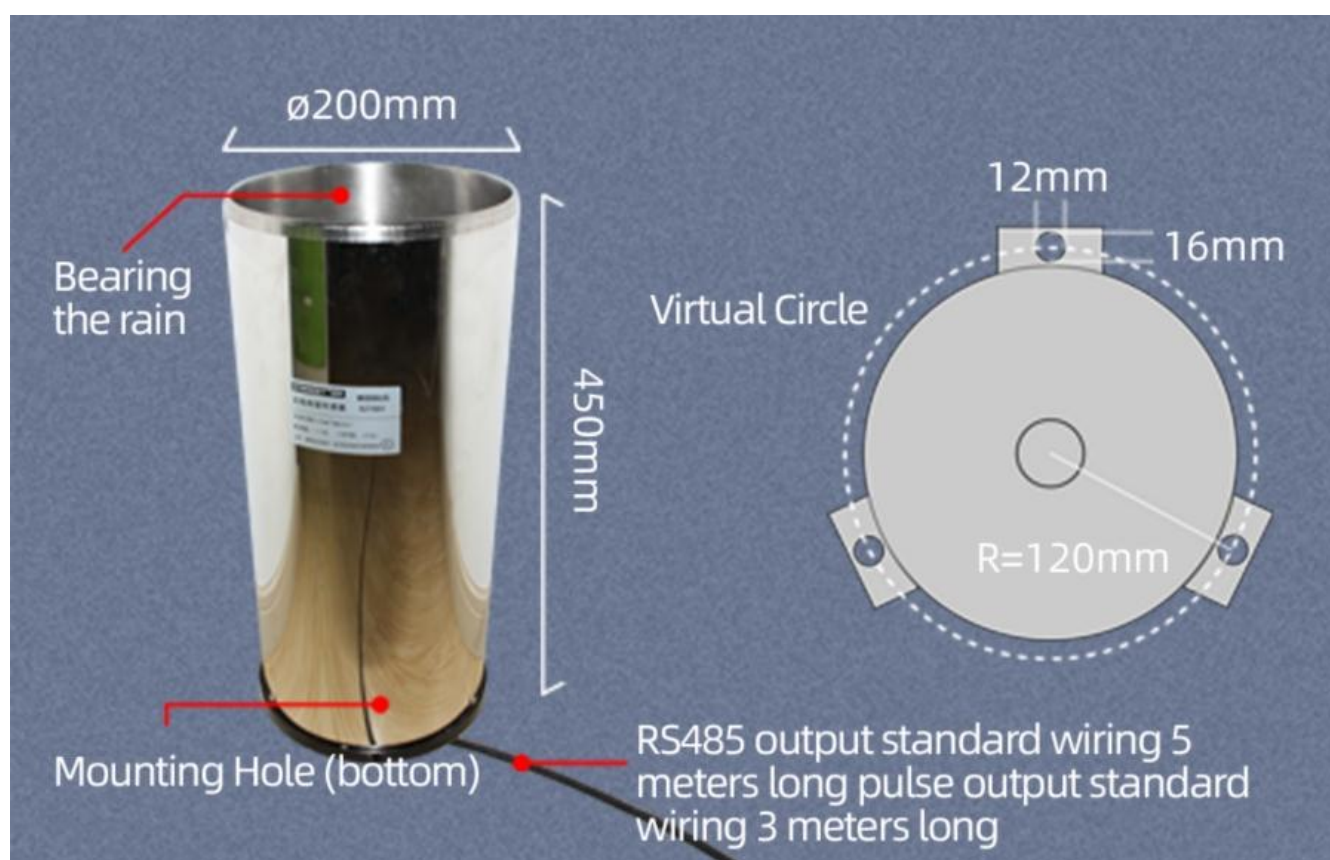


SM7001B using the standard RS485 bus MODBUS-RTU protocol,easy access to PLC, DCS and other instruments or systems for monitoring rainfall state quantities.The internal use of high -precision sensing core and related devices to ensure high reliability and excellent long-term stability,can be customized RS232,RS485,CAN,4-20mA,DC0~5V\10V,ZIGBEE,Lora,WIFI,GPRS and other output methods.

Technical Parameters

Technical parameter	Parameter value
Brand	SONBEST
Rainfall range	0.01mm~4mm/min
Rainfall Resolution	0.01mm~4mm/min
Rain inlet size	φ 200mm
Rainfall Sharp edge	40°~45
Rainfall accuracy	± 3%
Communication Interface	RS485
Default baud rate	9600 8 n 1
Power	DC9~24V 1A
Running temperature	-30~85℃

Product Size



Meet the requirements of the National Standard

Size of rain bearing mouth $\varnothing 200\text{mm}$

Bearing the rain $\varnothing 200\text{mm}$



Our product height is 450mm without bottom bracket

The height of other products is 380mm

Wiring instructions

In the case of broken wires, wire the wires as shown in the figure. If the product itself has no leads, the core color is for reference.

Precautions

1、试验工具：专用雨量量筒 1 个、小型滴管 1 个；

2、试验前的检查：

试验前先取下不锈钢外筒检查仪器水平泡是否居中、翻斗是否翻转灵活、无卡滞现象，并检查水路是否畅通，然后用清水对引水漏斗、翻斗进行充分润湿；

3、注水试验

用双速滴水法检验仪器测量准确度，其方法为：

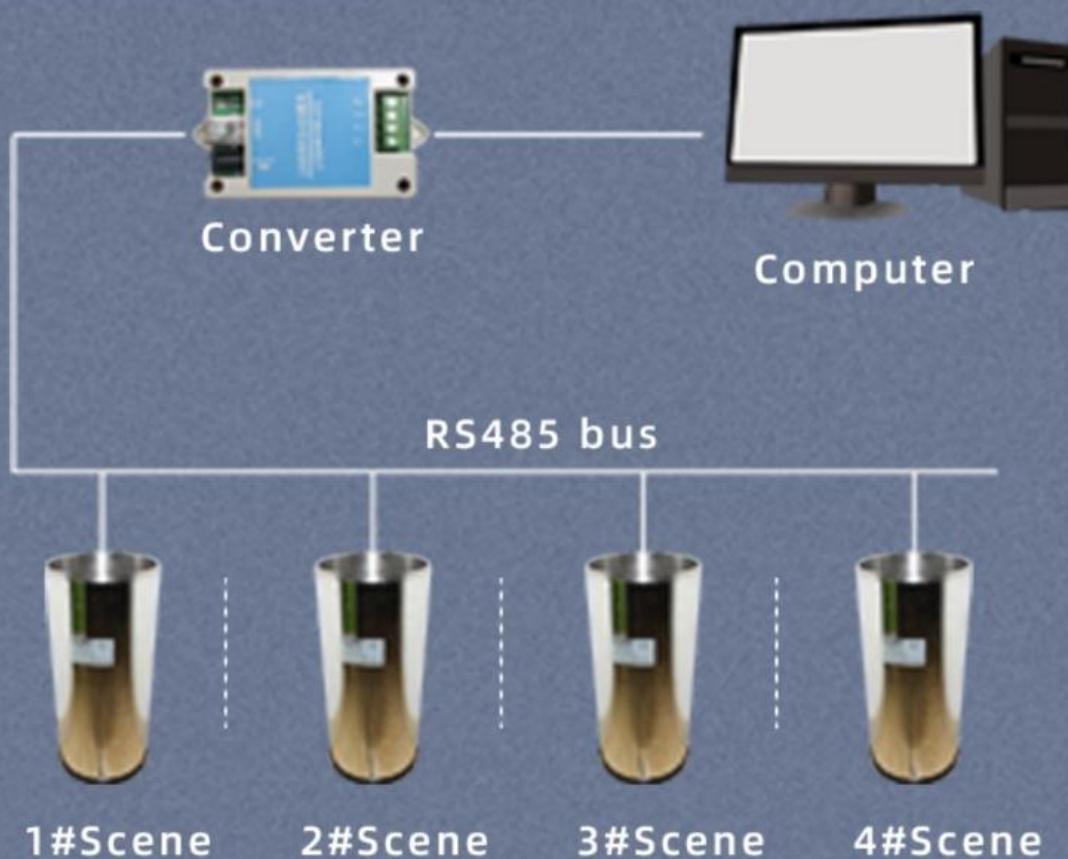
用专用雨量量筒量取 10mm 的清水，通过引水漏斗以 0~4mm 雨强之间任意雨强缓缓倒入上翻斗的引水斗内，待下翻斗最后一斗欲翻未翻时，即停止注水，然后用滴管量取定量清水，一滴一滴加入到翻斗内直到下翻斗翻转即停止滴水，依次反复试验，记录翻斗翻转次数与耗用水量。0.2mm 翻斗翻转 50 次，耗用水量为 9.80~9.90mm，则可认定仪器翻斗倾角基点正当倒水量<9.80mm，说明翻斗倾斜角度过小，应适当降低调节螺钉高度；一般讲，调节螺钉转一圈，能使精度改变 2~3%。

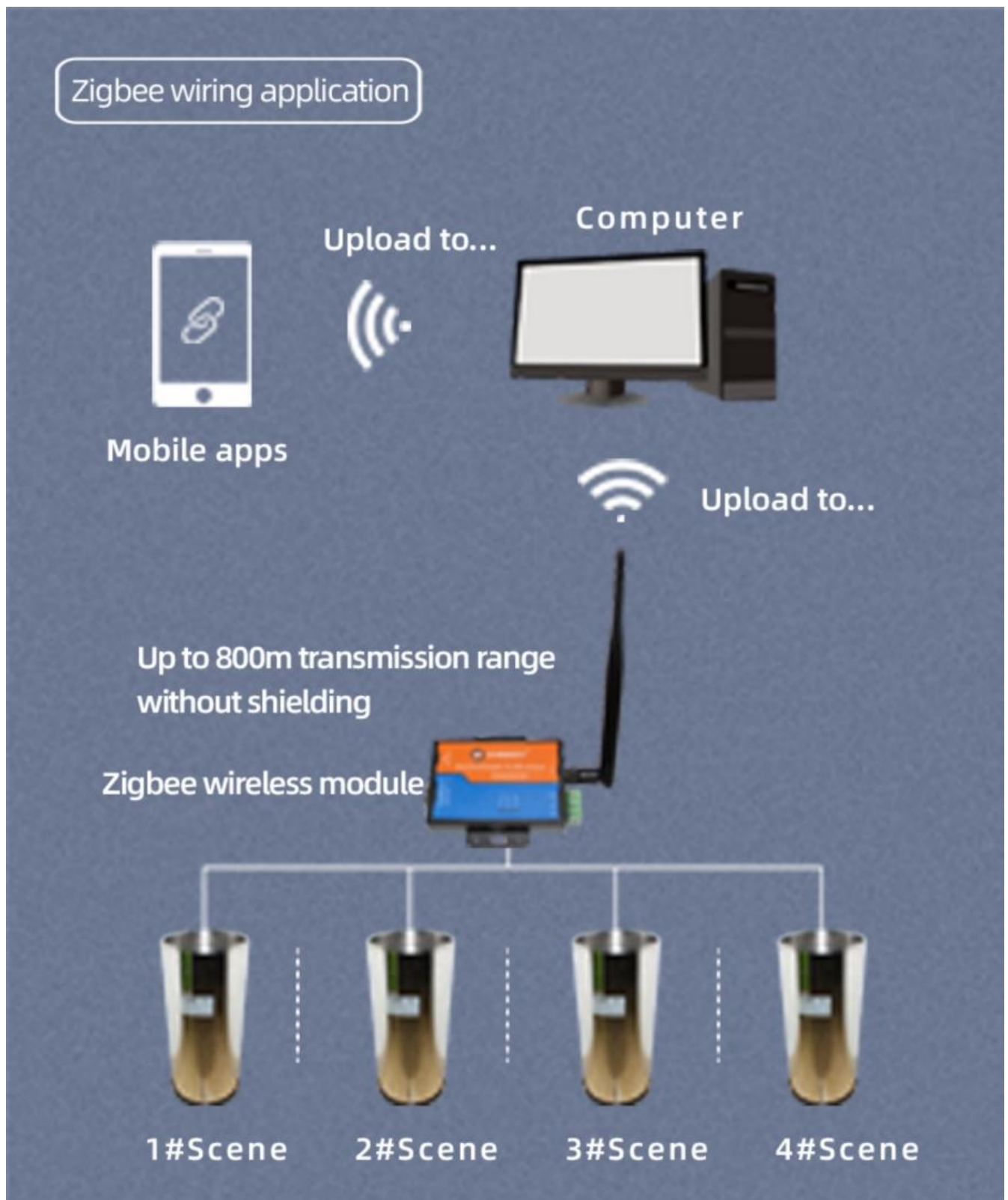
注：本方法只作为现场应急校准仪器误差用。精确校准仪器误差必须按照国家标准 GB/T11832-2002《翻斗雨量计》的要求在雨强试验台上进行校准或将仪器返回厂家校准。

Application solution

Application scenario

RS485 wiring application





Product List

What is included after the purchase



Rain sensor



Warm Reminder card



Certificate

Gentle Reminder



IN ORDER TO PREVENT INTERNAL DAMAGE IN THE COURSE OF TRANSPORTATION, THERE IS A RUBBER BAND USED FOR FIXING INSIDE THE GOODS, WHICH NEEDS TO BE REMOVED WHEN IN USE.



Precautions

使用前打开设备顶盖，取出固定用皮筋方可正常使用。

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 leaves the factory, and the module or NON-Recorder default baud rate is 9600,8,n,1 ,but data recorder default baud rate is 115200 .

1. Read data (function code 0x03)

Inquiry frame (hexadecimal), sending example: query 1 data of 1# device, the upper computer sends the command: 01 03 00 00 00 01 84 0A .

Address	Function Code	Start Address	Data Length	Check Code
01	03	00 00	00 01	84 0A

For the correct query frame, the device will respond with data: 01 03 02 00 79 79 A6 , response format:

Address	Function Code	Length	Data 1	Check Code
01	03	02	00 79	79 A6

Data description: The data in the command is hexadecimal, take data 1 as an example, 00 79 is converted to decimal value as 121, then the switch count is 121, switch count * 0.2mm = rainfall.

2. Common data address table

Configuration Address	Register Address	Register Description	Data Type	Value Range
40001	00 00	rainfall	Read Only	0~65535
40101	00 64	Model Code	Read/Write	0~65535
40102	00 65	total number of measuring points	read/write	1~20
40103	00 66	device address	read/write	1~249
40104	00 67	baud rate	read/write	0~6
40105	00 68	communication mode	read/write	1~4
40106	00 69	protocol type	read/write	1~10
40107	00 6A	timeinterval	read/write	0~36000

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 query the device address through the command FA 03 00 66 00 01 71 9E .

Device Address	Function Code	Start Address	Data Length	Check Code
FA	03	00 66	00 01	71 9E

FA means 250 is the general address, when you don't know the address, you can use 250 to get the real device address, 00 66 is the device address register.

For the correct query command, the device will respond, for example, the response data is: 01 03 02 00 01 79 84, and its format parsing is shown in the following table:

Device Address	Function Code	Start Address	Model Code	Check Code
01	03	02	00 01	79 84

In the response data, the first byte 01 represents the real address of the current device.

(2) Change device address

For example, if the current device address is 1 and we want to change it to 02, the command is: 01 06 00 66 00 02 E8 14 .

Device Address	Function Code	Register Address	Target Address	Check Code
01	06	00 66	00 02	E8 14

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

Device Address	Function Code	Register Address	Target Address	Check Code
02	06	00 66	00 02	E8 27

In the response data, after the modification is successful, the first byte is the new device address. Generally, after the device address is changed, it will take effect immediately. At this time, the user needs to change the query command of his software accordingly. .

4 Read and modify baud rate

(1) Read baud rate

The default factory baud rate of the device is 9600. If you need to change it, you can change it according to the following table and the corresponding communication protocol. For example, to read the

baud rate ID of the current device, the command is: 01 03 00 67 00 01 35 D5 , the format is parsed as follows.

Device Address	Function Code	Start Address	Data Length	Check Code
01	03	00 67	00 01	35 D5

Read the baud rate code of the current device. Baud rate code: 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, and its format analysis is shown in the following table:

Device Address	Function Code	Data Length	Baud Rate Code	Check Code
01	03	02	00 03	F8 45

According to the baud rate code, 03 is 9600, that is, the baud rate of the current device is 9600.

(2) Change the baud rate

For example, change the baud rate from 9600 to 38400, that is, change the code from 3 to 5, the command is: 01 06 00 67 00 05 F8 16 .

Device Address	Function Code	Register Address	Target Baud Rate	Check Code
01	06	00 67	00 05	F8 16

Change the baud rate from 9600 to 38400, that is, change the code from 3 to 5. The new baud rate will take effect immediately, and the device will lose response at this time, and the baud rate of the device needs to be checked accordingly Modified.

5 Rainfall value reset

(1) Read correction value

When the user needs to clear the current rainfall value to 0, the function code 6 can be used to clear it, that is, the value range is 0-65535. The command is: 01 06 00 6C 00 01 88 17 .

Precautions

本表列出了仪器可能发生的一般故障现象、原因及故障排除方法。

中心站表现形式	故障现象描述	解决方法
降雨时收不到数	1、干簧管失效。</BR> 2、磁钢与干簧管距离过远。</BR> 3、焊线脱落或信号线断。</BR> 4、翻斗卡住。</BR> 5、仪器堵塞	1、更换干簧管</BR> 2、调整干簧管距离</BR> 3、修复</BR> 4、排除</BR> 5、清除堵塞
信号不稳定	1、雨量传感器翻斗翻转倾角失调，但这种误差一般不超过±10%。 </BR> 2、磁钢与干簧管距离过远。</BR> 3、焊线脱落或信号线断。</BR> 4、翻斗卡住。</BR> 5、仪器堵塞	1、更换干簧管</BR> 2、调整干簧管距离</BR> 3、修复</BR> 4、排除</BR> 5、清除堵塞
雨量一直计数，实际情况不下雨	检查插座是否浸水，这种现象往往在下大雨后易发生	处理进水，重新安装

注意：表中所列故障现象不一定是雨量计自身故障，在检查仪器自身排除故障之后还应该检查仪器传输出线、数据采集装置、遥测终端机等设备是否存在故障，并逐一排除解决。

Precautions

本仪器属精密的电子产品，正确的的维护和保养有助于保护仪器性能、延长仪器的使用寿命，请注意以下

几点：

- 1、请依据使用说明书的要求正确使用说明书，接钱有误有可能导致仪器损坏。
- 2、不要用挥发性液体擦拭仪器，否则可能导致仪器变色变形；软布擦拭，避免仪器外部保护膜划伤，延长仪器使用寿命。
- 3、仪器应轻拿轻放，不得摔落或重压，否则将导致仪器变形、内部电路板损坏。
- 4、不要在仪器带电的情况下触摸感应部位，以影响量结果或导致仪器内部电路的损坏。
- 5、请勿私自拆卸和改装本仪器，以免对仪器造成损坏。
- 6、仪器使用时应用螺丝牢固固定，否则有可能损坏仪器。
- 7、本仪器为精密型单翻斗式雨量计，使用过程中要定期维护、清洗翻斗和引水漏斗出水口。
- 8、定期检查仪器电源电压，确保仪器正常运行。

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