

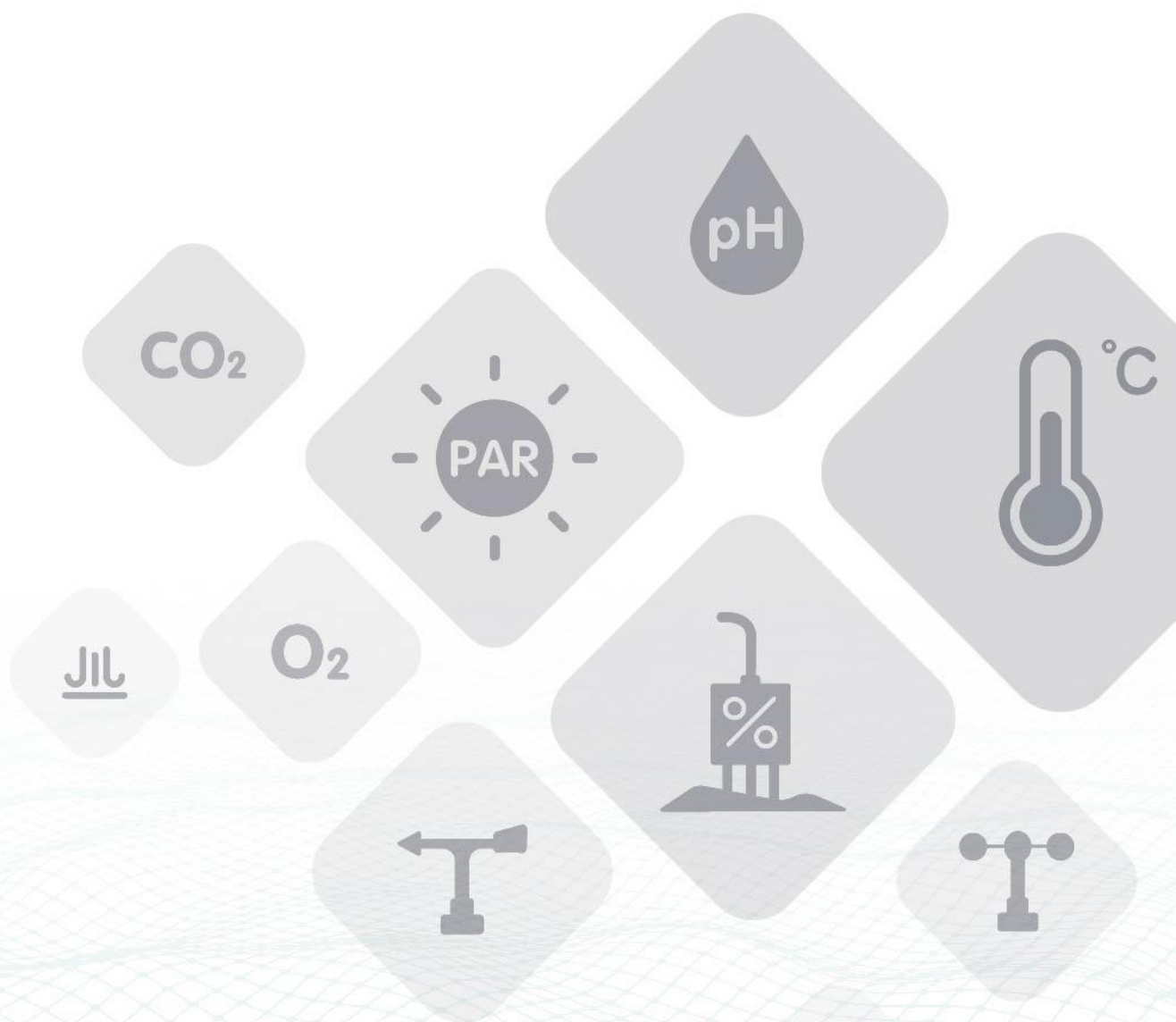


SENSECAP

# UV Radiation Sensor Datasheet

Module: S-ZW-01

Version: V1.0



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# 1. Introduction

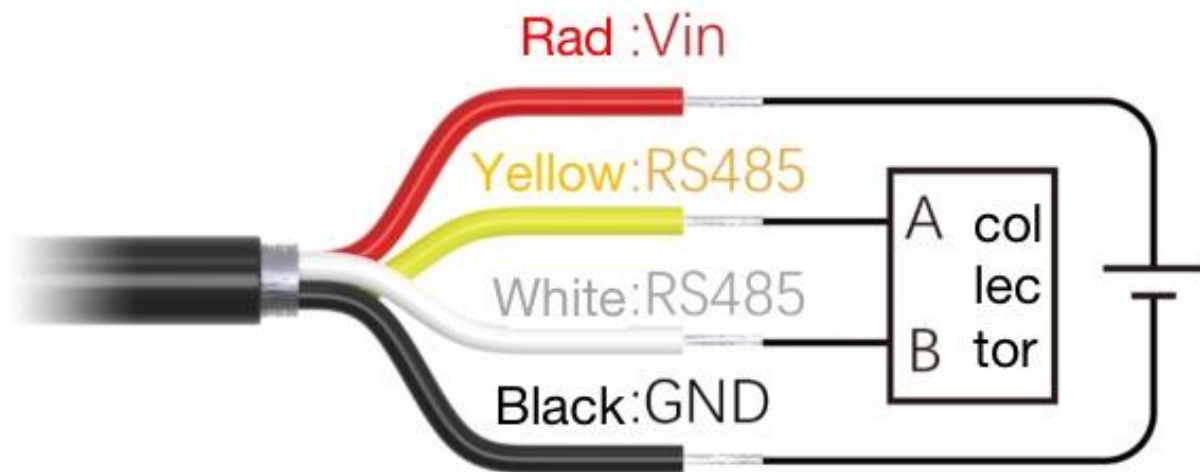
An ultraviolet radiation meter is primarily used to measure ultraviolet radiation values. It employs a photoelectric detector and utilizes optical filters. When exposed to ultraviolet radiation, it generates a current signal that is directly proportional to the intensity of the incident radiation. Additionally, its sensitivity is proportional to the cosine of the angle of direct incidence of the incoming light. Each ultraviolet radiation meter provides its own sensitivity value and allows for direct reading of measurement values in units of  $W/m^2$ . It is user-friendly and can be easily connected to data collectors, suitable for use under all weather conditions. It finds extensive applications in agricultural meteorology, crop growth analysis, and ecological research.

| Technical Parameters   |                                 |
|------------------------|---------------------------------|
| Measurement Parameters | Ultraviolet radiation           |
| Measuring unit         | $W/m^2$                         |
| Measuring range        | $0 \sim 200W/m^2$               |
| Accuracy               | $\pm 3\%$                       |
| Resolution             | $1W/m^2$                        |
| Response spectrum      | 240~395nm                       |
| Linearity              | Maximum offset 1%               |
| Operating Temperature  | $-30^{\circ}C \sim 75^{\circ}C$ |
| Response Time          | 200ms                           |
| Stability              | Change $< 2\%$ within one year  |

| Other Parameters |                             |
|------------------|-----------------------------|
| Output Signal    | Digital Signal Modbus RS485 |
| Supply voltage   | 5 to 24V DC (12VDC typical) |
| Cable length     | 2m                          |

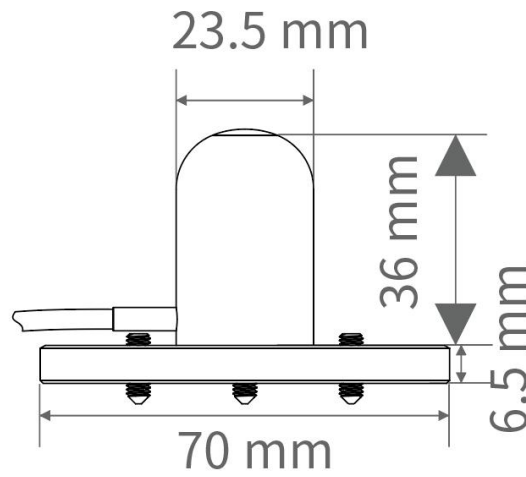
## 2. Sensor wiring

The UV radiation sensor can be connected to a variety of devices containing differential input data collectors, data acquisition cards, remote data acquisition modules and other equipment. The specific wiring is shown in the figure to the right:



Wiring diagram of RS485 signal

### 3. External Dimensions



## 4.RS485 communication and protocols

### 4.1. Modbus communication protocol

Modbus is a serial communication protocol, is a variety of instrumentation as well as intelligent sensors in the communication interface of the standard, in the intelligent sensor has a wide range of applications. Modbus protocol is a master-slave architecture of the protocol. There is a master node and other nodes that participate in communication using the Modbus protocol are slave nodes. Each slave device has a unique device address.

The sensor has an RS485 interface and supports the Modbus protocol. The factory default values for the communication parameters are: baud rate 9600 bps, one start bit, 8 data bits, no parity, and one stop bit. The communication protocol is Modbus RTU. The communication parameters can be changed by the setup program or Modbus commands, and the sensor needs to be re-powered to take effect after the communication parameters are changed.

## 4.2. Address Modification

For example: Changing the address of Sensor 01 to 02.

Default UV Radiation Sensor Address (Decimal): 47

| Original Address | Function Code | High Data Address | Low Data Address | High Data | Low Data | Low CRC16 | High CRC16 |
|------------------|---------------|-------------------|------------------|-----------|----------|-----------|------------|
| 01               | 06            | 01                | 00               | 00        | 02       | 08        | 0B         |

### 4.3. Address Modification via Broadcast Command

If you forget the address of the sensor, you can use the broadcast command FE to change it to a new address, for example, the new address being 03.

| Broadcast Command | Function Code | High Data Address | Low Data Address | High Data | Low Data | Low CRC16 | High CRC16 |
|-------------------|---------------|-------------------|------------------|-----------|----------|-----------|------------|
| FE                | 06            | 01                | 00               | 00        | 03       | DD        | C4         |

If the sensor receives the command correctly, it will return it as-is.

**Note:** When using the broadcast address FE, the master can communicate with only one slave at a time.

## 4.4. Data Inquiry

Inquire data from sensor (address 01) for ultraviolet radiation. Master → Slave:

| Address | Function Code | High Start Register Address | Low Start Register Address | High Register Length | Low Register Length | Low CRC16 | High CRC16 |
|---------|---------------|-----------------------------|----------------------------|----------------------|---------------------|-----------|------------|
| 01      | 03            | 00                          | 00                         | 00                   | 01                  | 84        | 0A         |

If the sensor receives correctly, it returns the following data. Slave → Master:

| Address | Function Code | Data Length | Register 0 High Data                            | Register 0 Low Data | Low CRC16 | High CRC16 |
|---------|---------------|-------------|-------------------------------------------------|---------------------|-----------|------------|
| 01      | 03            | 02          | 00                                              | 50                  | B8        | 78         |
|         |               |             | Ultraviolet Radiation<br>Unit: W/m <sup>2</sup> |                     |           |            |

The above data indicates an ultraviolet radiation value of: 80 W/m<sup>2</sup>.

## 4.5. Communication Using Serial Debugging Software

Users can utilize any serial debugging software to communicate with the sensor. During communication, it is essential to select the correct serial port, baud rate, and other serial communication parameters. The data to be sent and received should be transmitted and displayed in hexadecimal format.



## 5. Precautions for Use

1. Upon receiving the product, please inspect the packaging for any damage and verify that the sensor model and specifications match your purchased product.
2. The installation location should be far from chemically corrosive environments.
3. Keep the sensor and wires away from high-voltage electricity, heat sources, and similar hazards.
4. The sensor is a precision device; please refrain from disassembling it on your own to prevent potential damage to the product.
5. Do not connect wires while they are powered. Only power on after completing the connections and ensuring everything is correct.