

CWT-Soil-THCPH-S

Soil Sensor Manual

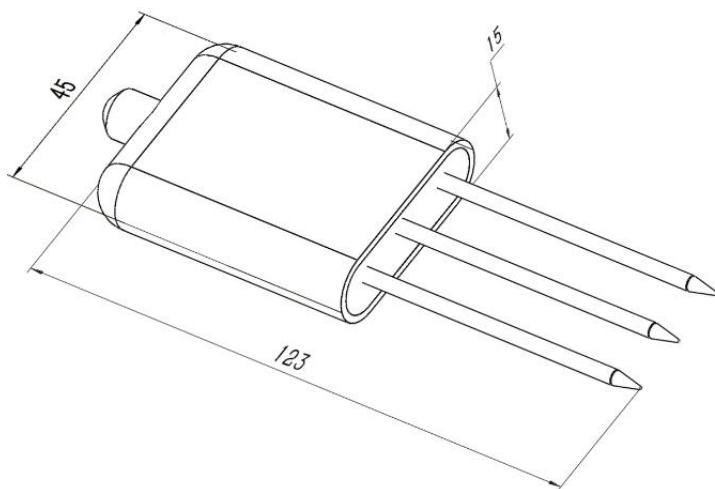
Soil parameters measuring

| | |
|-------------------|--|
| Temperature | <ul style="list-style-type: none"> Measuring range: -40℃-80℃ Accuracy: $\pm 0.5^{\circ}\text{C}$ (25℃) Long-term stability: $\leq 0.1\%^{\circ}\text{C}/\text{y}$ Response time: $\leq 15\text{s}$ |
| Humidity | <ul style="list-style-type: none"> Measuring range: 0-100%RH Accuracy: 3% within 0-50%, 5% within 50-100% Long-term stability: $\leq 1\%\text{RH}/\text{y}$ Response time: $\leq 4\text{s}$ |
| Conductivity (EC) | <ul style="list-style-type: none"> Measuring range: 0-20000us/cm Accuracy: 0-10000 us/cm range is $\pm 3\%$; 10000-20000 us/cm range is $\pm 5\%$ Long-term stability: $\leq 1\%\text{uS}/\text{cm}$ Response time: $\leq 1\text{s}$ |
| PH | <ul style="list-style-type: none"> Measuring range: 3-9 PH Accuracy: $\pm 0.3\text{PH}$ Long-term stability: $\leq 5\%/\text{year}$ Response time: $\leq 10\text{S}$ |

Specification

| | |
|-----------------------|--|
| Power supply | DC4.5-30V |
| Max Power consumption | 0.5W@24V DC |
| Protection class | IP68, long-term immersion in water use |
| Cable length | 2M |
| Operating environment | -40℃-80℃ |
| Overall dimensions | 45 * 15 * 123mm |

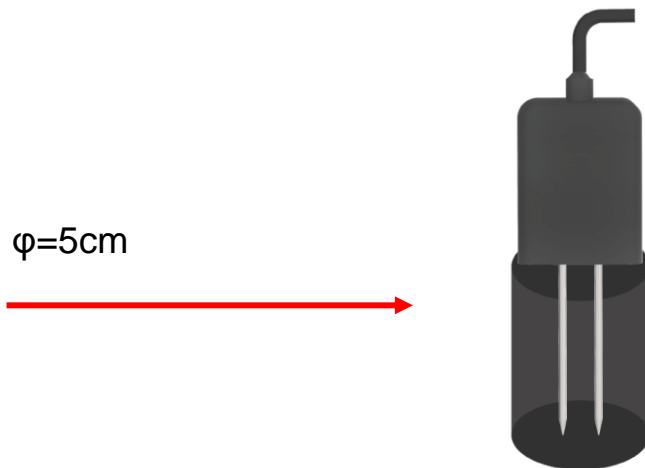
Size



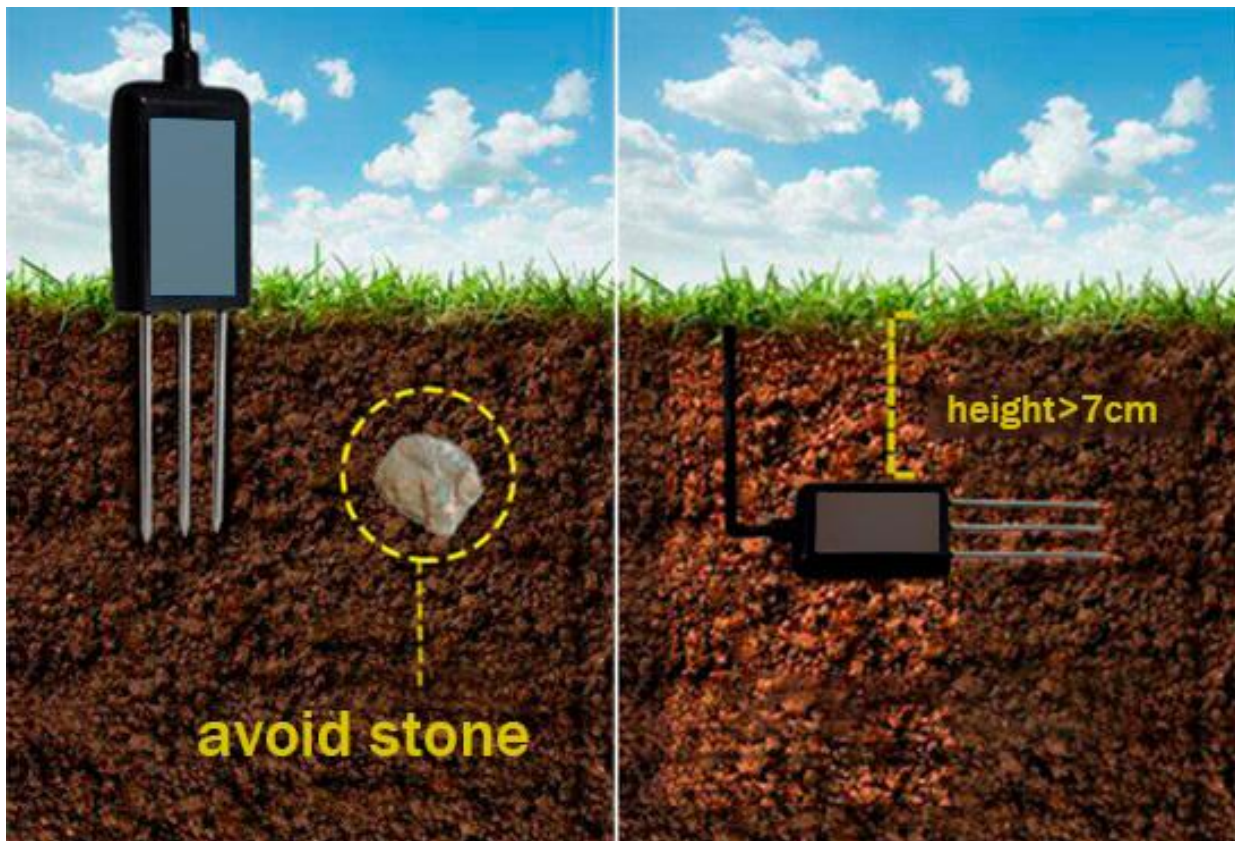
Wiring

| Cable color | description |
|-------------|-------------------|
| Brown | Power + (DC5-30V) |
| black | Power - |
| yellow | RS485 A+ |
| blue | RS485 B- |

Measuring range



Installation



RS485 communication

Default parameters: 4800,n,8,1

Default device address is 1

Modbus RTU protocol

| Read status registers, read function code: 0x30 | | | | | |
|---|-----------------------|---------------------|-----------------|--|---|
| Register address (Hex) | PLC Address (decimal) | meaning | Number of bytes | content | remark |
| 0000 | 40001 | Humidity | 2 | 0.1%RH | read |
| 0001 | 40002 | Temperature | 2 | 0.1℃ | read |
| 0002 | 40003 | Conductivity | 2 | 1 | read |
| 0003 | 40004 | PH | 2 | 0.1 | read |
| 0007 | 40008 | Salinity | 2 | 1 | read |
| 0008 | 40009 | TDS | 2 | 1 | read |
| 0022 | 40035 | Conductivity factor | 2 | 0-100 correspond to 0.0%-10.0% Default 0.0% | read / write |
| 0023 | 40036 | Salinity factor | 2 | 0-100 correspond to 0.00-1.00 Default 55 (0.55) | read / write |
| 0024 | 40037 | TDS factor | 2 | 0-100 correspond to 0.00-1.00 Default 50 (0.5) | read / write |
| 0050 | 40081 | Temperature offset | 2 | 0.1 | read / write |
| 0051 | 40082 | Humidity offset | 2 | 0.1 | read / write |
| 0052 | 40083 | Conductivity offset | 2 | 1 | read / write |
| 0053 | 40084 | PH offset | 2 | 1 | read / write |
| Parameters registers, read function code: 0x30, write function code: 0x60 | | | | | |
| 07D0 | 42001 | Slave ID | 2 | | 1-254 |
| 07D1 | 42002 | baud rate | 2 | | 0: 2400 1: 4800 2: 9600 Default 4800 |

E.g., read Humidity, temperature, conductivity, PH together:

Master sends

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | Number of Points (Hi) | Number of Points (Lo) | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------------------|-----------------------|------------------|------------------|
| 0x01 | 0x03 | 0x00 | 0x00 | 0x00 | 0x04 | 0x44 | 0x09 |

Sensor responds:

| Address | Function Code | Number of byte | humidity | temperature | conductivity | PH | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|----------------|--------------|--------------|--------------|--------------|------------------|------------------|
| 0x01 | 0x03 | 0x08 | 0x02 0x92 | 0xFF 0x9B | 0x03 0xE8 | 0x00 0x38 | 0x38 | 0x75 |

Temperature: FF9B H= -101 => temperature= -10.1℃

Humidity: 292 H= 658 => humidity= 65.8%

Conductivity: 3E8 H= 1000 => Conductivity = 1000 us/cm

PH: 3E8 H= 56 => PH= 5.6

Set slave ID

E.g., set slave ID=2, Master sends

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | ID | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------|------------------|------------------|
| 0x01 | 0x06 | 0x07 | 0xD0 | 0x00 0x02 | 0x08 | 0x86 |

Sensor responds:

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | ID | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------|------------------|------------------|
| 0x01 | 0x06 | 0x07 | 0xD0 | 0x00 0x02 | 0x08 | 0x86 |

Set baud rate

E.g., set baud rate to 9600, Master sends

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | command | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------|------------------|------------------|
| 0x01 | 0x06 | 0x07 | 0xD1 | 0x00 0x02 | 0x59 | 0x46 |

Sensor responds:

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | command | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------|------------------|------------------|
| 0x01 | 0x06 | 0x07 | 0xD1 | 0x00 0x02 | 0x59 | 0x46 |

Enquiry slave ID

Master sends

| Address | Function Code | Start Address (Hi) | Start Address (Lo) | Number of Points (Hi) | Number of Points (Lo) | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|--------------------|--------------------|-----------------------|-----------------------|------------------|------------------|
| 0xFF | 0x03 | 0x07 | 0xD0 | 0x00 | 0x01 | 0x91 | 0x59 |

Sensor responds:

| Address | Function Code | Number of Points | address | Error Check (Lo) | Error Check (Hi) |
|---------|---------------|------------------|-----------|------------------|------------------|
| 0xFF | 0x03 | 0x02 | 0x00 0x01 | 0x50 | 0x50 |