

Soil Doctor- Smart Agriculture Monitoring for Soil 3 Elements, RS485 Modbus RTU

ES103-Soil-RS485

Multi-Parameter Measurement

- Soil moisture content, conductivity, temperature, Salinity, TDS, Die-Electric Constant
- Supports Temperature Compensation–EC, Salinity , TDS

Fully Sealed, Durability, Widely Application

- Special treated alloy material for electrode x 3 , 316 stainless
- IP68 fully sealed, resistant to acid-alkali corrosion for long term dynamic detection in soil, or fully submerged in soil with water
- Low power consumption with 10-30V wide operating voltage
- 2-wire RS485 Modbus RTU communication

Optional IoT Router and Cloud Platform - ThingsMaster

- NB-IoT / Cat.M1 Modbus RTU Gateway –SCB111-485
- LTE Cat.4/ Ethernet to Modbus RTU Gateway – WR222
- Remote cloud security and visual management
- Solar/ Battery Pack Support with SCB111-485



Features & Benefits

Soil Measuring Parameters

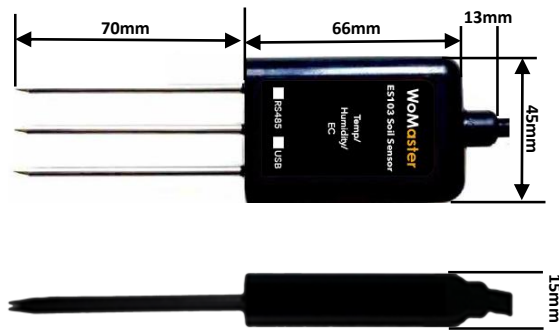
Electro-Conductivity (E.C.)	Measuring Range: 0~20000uS. /cm Resolution: 10uS/cm (1~10000uS); 50uS/cm (10000~20000) Accuracy: ± 3% (0~10000uS/cm at Full. Scale.) ± 5% (10000~20000uS/cm at Full Scale) Temperature compensation: 0~50°C
Soil Moisture	Measuring Range:0~100%; FDR (Frequency Domain Reflectometry) Resolution: 0.03% (< 50% F.S.), 1%(>50% F.S.) Accuracy: ± 2% (< 50% F.S.) ± 3% (> 50% F.S.) (Brown Soil, 60% Humidity, 25°C soil temperature.)
Soil Temperature	Measuring Range: -40~80°C Resolution: 0.1°C Accuracy: ±0.5°C at 25°C

System operating specification

Operating Power	RS485 Model: 12/24V (Typical), rating 10~30Vdc; Power consumption: 0.3W at DC24V
Operating Temperature	-40°C~85°C; 0~80%RH; Kernel processor up to 85°C
Physical parameters	Electrode Probe length: 70 mm ; Probe diameter 3mm Sealing material: Epoxy resin (Black flame retardant) Cable length: standard 2 meters (RVV 4 * 0.3) Protection class: IP68
Dimension (mm.)	45x15x149 (electrode included); Electrode Length: 70mm

Dimension, Wiring

Dimension with Electrode



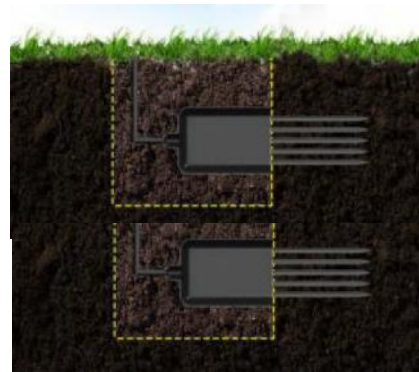
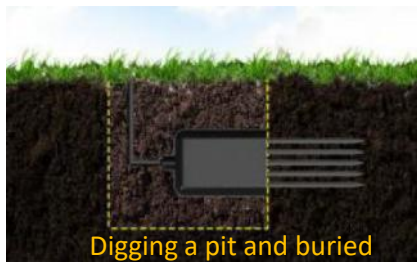
Cable wiring code



Farmland measurement installation, Android System

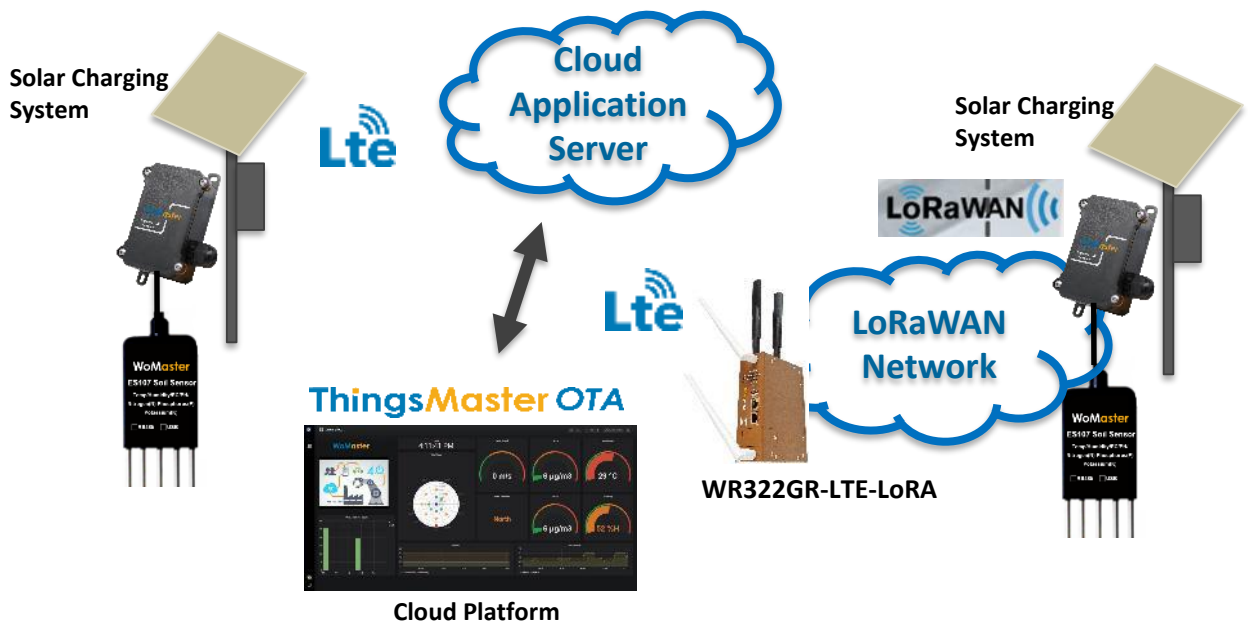


Vertical Insertion method (refers 5-Pin)



Multi-layer Soil measuring
Buried method

Integrated with IoT Gateway



Modbus Register Information (Only for RS485 Modbus Model) -1/2			
Parameters Function	Register Add. (HEX/DEC)	PLC Add. (Index Number)	Note
Modbus RTU Device Control Register			
RTU Device ID	0x0200/ 512	513	Factory Default RTU ID:01 , Available Range: 1~254
Modbus Baud Rate	0x0201 / 513	514	0:1200; 1:2400; 2: 4800; 3:9600 (Default) ; 4:19200; 5:38400 /bps Baud Rate, No Parity Check, 8 bits, 1 parity check
Modbus Type	0x0202 / 514	515	0:Modbus RTU protocol (Default) ; 1:Modbus ASCII
Parity Check	0x0203 / 515	516	0: No Parity Check (Default) ; 1: Even; 2:Odd
Data bit	0x0204/ 516	517	1: 8 bits (unchangeable)
Stop bit	0x0205/ 517	518	0: 1 stop (default) ; 1: 2 stop /bit
Response Delay	0x0206/ 518	519	0~255: the number should be multiplied by 10 to determine the delay time in m.S. Default value is 0, no response delay.
Actively send data	0x0207/ 519	520	0~255 second, default: 0, disable
Soil Sensor Register Table			
Temperature	0x0000 / 0	1	Function Code: 3/ 4; INT 16, R/O; (-4000~8000) /100= - 40.00~80.00°C
Humidity	0x0001 / 1	2	Function Code:3/ 4, UNIT 16, R/O; (0~10000) / 100 = 0~100% Humidity
Electric Conductive	0x0002 / 2	3	Function Code:3/ 4, UNIT 16, R/O; 0~20000 (0~20000us/cm)
Salinity	0x0003/ 3	4	Function Code:3/ 4, UNIT 16, R/O; 0~20000 (0~ 20000mg/L)
Total Dissolved Solid (TDS)	0x0004/ 4	5	Function Code:3/ 4, UINT 16, R/O; 0~20000 (0~20000mg/L)
Permittivity Constant	0x0005/ 5	6	Function Code:3/4, UNIT 16, R/O; 0~8200 (0.00~82.00) F/m
Soil Type	0x0020/ 32	33	Function Code:3/6/16, UNIT 16, R/W; 0:Mineral Soil , 1:Sandy Soil, 2:Clay, 3:Organic Soil (default 0: mineral soil)
Temperature Symbol	0x0021/ 33	34	Function Code:3/6/16, UNIT 16, R/W; 0: Celsius (°C) ; 1:Fahrenheit (°F) Default "0"

Modbus Register Information (Only for RS485 Modbus Model) -2/2

Parameters Function	Register Add. (HEX/DEC)	PLC Add. (Index Number)	Note
Modbus RTU Device Control Register			
Temperature coefficient of conductivity	0x0022 / 34	35	Function Code:3/6/16, UNIT 16, R/W; 0~100 corresponding to 0.0% ~ 10.0% Default 20 (2%)
Temperature coefficient of salinity	0x0023/ 35	36	Function Code:3/6/16, UNIT 16, R/W; 0~100 corresponding to 0.00% ~ 1.0% Default 55 (0.55)
Temperature coefficient of T.D.S.	0x0024/ 36	37	Function Code:3/6/16, UNIT 16, R/W; 0~100 corresponding to 0.00% ~ 1.0% Default 50 (0.5)



Ordering Information

Model	Description
ES103-Soil-485	Soil Sensor, Temp/Humidity/EC, Modbus RS-485 2-wires,2 meters cable, DC 10~30V
	Package List
	1 x Sensor Device
	1 x QIG