

Soil Quality Sensor

- 45*15*123mm, Probe length: 70 mm
- RS485 2-Wire Modbus Output, 5-30VDC Power Input
- Probe material: Anti-corrosion special electrode
- Sealing material: IP68 Epoxy resin (black flame retardant)
- Cable length: standard 2 meters (Can be customized)
- 2-Wire RS485 Modbus output to connect to optional cellular gateway WR222 or LC144/LR140
LoRa/LoRaWAN nodes



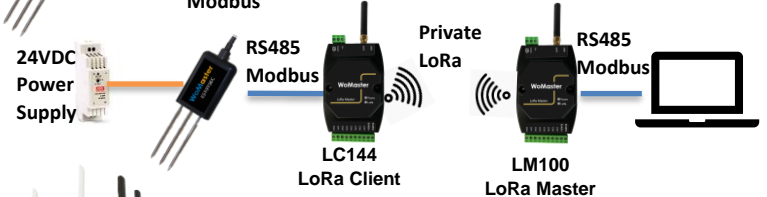
Model		Measurement	Accuracy
ES101-SM	Soil Moisture Temperature Sensor	0~100% RH -40°C~80°C	Moisture accuracy : 0-50% ±2%RH, 50-100% ±3%RH, Temperature accuracy : ±0.5°C
ES101-SPH	Soil pH sensor	0~14ph	±0.5pH
ES101-SEC	Soil EC and Moisture Sensor	EC:0-20000us/cm Moisture: 0~100%RH Temperature: -40~80°C	EC: 10us/cm, 0-10000us/cm: ± 3%; 10000-20000us/cm: ± 5% Moisture:0.02%, 0-50% 2%; 50-100% 3% Temperature: 0.1°C, ±0.5°C

Application

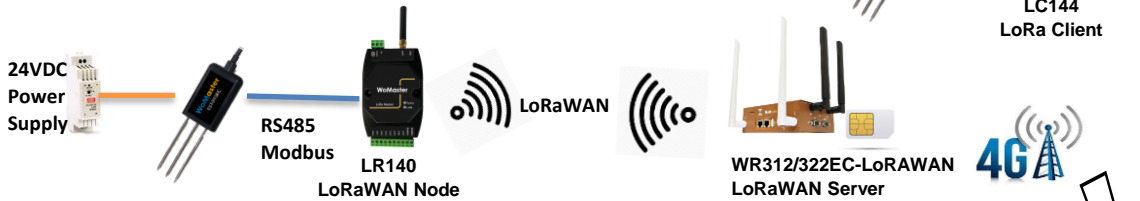
1) Sensor Connect to PC/HMI/PLC



2) Sensor Connect to Private LoRa to PC/HMI/PLC



3) Sensor Connect to LoRaWAN Gateway



4) Sensor Connect to LTE NBloT Gateway SCB111-485-NB



5) Sensor Connect to WiFi + LTE Gateway WR222-WLAN+LTE



Item

MDR-40-24	Din-Rail Power Supply INPUT:85-264VAC, 120-370VDC, OUTPUT: 24VDC/1.7A, -20 ~ +70°C
ThingsMaster OTA-5GW	ThingsMaster OTA for 5 gateways, One Year License
LM100	LoRa Master / Modbus RTU Client (Must work with LC144) (with LoRa antennas)
LC144	LoRa End-Node, 8CH AIO, 1 Modbus RTU 485 2-wire, 2 x 0~10V input, 2 x 4~20mA input, 1 x 0~10V Output, Open Collect (O.C.), 1 x 4~20mA Output, 1 x PWM Output (0~5V), 1 x PWM (0~10V), Open Collect (O.C.) Type, 1 x SMA /LoRa Antenna (Must work with LM100 or LM200)
LR140	LoRa WAN End-Node, 4CH AI, 1 Modbus RTU 485 Host, 1 x RS485 Host, 2-wire, 1 x SMA /LoRa Antenna Connector (with LoRa antennas)
WR322GR-EC-LTE-LORAWAN	Industrial LoRaWAN Gateway, 2GbE+2COM, LTE 2SIM, (with LTE and LoRa antennas)(Must work with LR140)
WR312GR-EC-LORAWAN	Industrial LoRaWAN Gateway, 2GbE+2COM (Must work with LR140)
WR222-WLAN+LTE	Industrial Wireless IIoT Field Router, 2FE+1COM, SD, 802.11b/g/n WLAN, 1SIM (with WiFi, LTE Antennas)
SCB111-485-NB-DC	Outdoor Modbus RS485 to NB-LoT / LTE Cat M1 Gateway

Outdoor Soil Moisture Temperature Sensor ES101SM

Soil temperature affects plant growth indirectly by affecting water and nutrient uptake as well as root growth. At a constant moisture content, a decrease in temperature results in a decrease in water and nutrient uptake. At low temperatures, transport from the root to the shoot and vice versa is reduced. Therefore a real-time data of soil temperature and moisture is vital for soil management. ES101SM sends measured data through Modbus RS485 output to IoT gateway, and IoT gateway collects all sensor data to the cloud platform for real-time information.

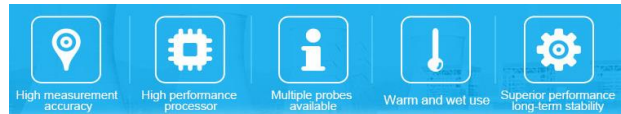


Optional IoT Router and Cloud Platform - ThingsMaster

- Support Modbus to connect optional NBloT Gateway WR222 for one or many sensors
- Real-time online monitoring, analysis, reporting
- Remote cloud security and visual management



Features & Benefits



Moisture measurement range:	0~100% RH
Temperature measurement range:	-40°C~80°C
Signal output	RS485 2-Wire output (Modbus protocol)
Working voltage	5~30VDC
Maximum power consumption	≤0.5w (24VDC)
Accuracy	Moisture accuracy : 0-50% ±2%RH, 50-100% ±3%RH, Temperature accuracy : ±0.5°C
Work environment	-20°C~60°C; 0~80%RH
Physical parameters	45*15*123mm, Probe length: 70 mm Probe material: Anti-corrosion special electrode Sealing material: Epoxy resin (black flame retardant) Cable length: standard 2 meters (Can be customized) Protection class: IP68

Register Address	PLC or Configuration Address	Content	Description
0000 H	40001	Mositure	Range : 0~100% ; Real Value = (Read Data /10)
0001 H	40002	Temperature	Range : -40°C~80°C ; Real Value = (Read Data /10)
07D0 H	42001	Slave ID	1 ~ 254 (Factory Default 1)
07D1 H	42002	Baud Rate	0=2400 1=4800 2=9600(Default)



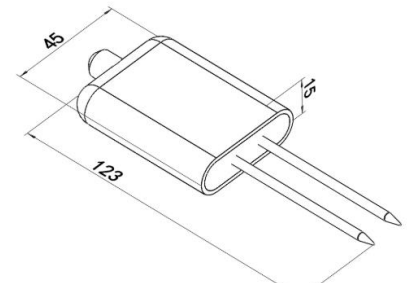
Ordering Information

Model Name	Description
ES101SM	Outdoor Soil Moisture and Soil Temperature, 40~80°C, 0~100%RH, 70mm Probe, RS485 Modbus, 10-30V Power
Package List	
1 x Product Unit, 1 x Quick Installation Guide	

*4~20mA output by request

Outdoor Soil pH sensor ES101SPH

Soil pH is considered a master variable in soils as it affects many chemical processes. It specifically affects plant nutrient availability by controlling the chemical forms of the different nutrients and influencing the chemical reactions they undergo. The optimum pH range for most plants is between 5.5 and 7.5; however, many plants have adapted to thrive at pH values outside this range. The SPH sensor gives you real-time data by the connectivity of gateway and cloud platform.

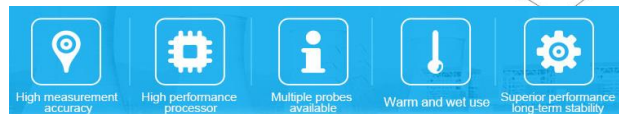


Optional IoT Router and Cloud Platform - ThingsMaster

- Support Modbus to connect optional NBloT Gateway WR222 for one or many sensors
- Real-time online monitoring, analysis, reporting
- Remote cloud security and visual management



Features & Benefits



Measurement Range:	3~9ph
Digital Signal output	RS485 2-Wire output (Modbus protocol)
Working Voltage	5~30VDC
Power consumption	≤0.4w(@12VDC,25°C)
Accuracy	±0.3pH
Long term stability	≤5%/year
Response Time	≤10S
Working Environment	-20-+60°C , 0% - 80%RH
Physical parameters	45*15*123mm, Probe length: 70 mm Probe material: Anti-corrosion special electrode Sealing material: Epoxy resin (black flame retardant) Cable length: standard 2 meters (Can be customized) Protection class: IP68

Register Address	PLC or Configuration Address	Content	Description
0000 H	40001	PH	Range : 3~9 ; Real Value = (Read Data /10)
07D0 H	42001	Slave ID	1 ~ 254 (Factory Default 1)
07D1 H	42002	Baud Rate	0=2400 1=4800 2=9600(Default)



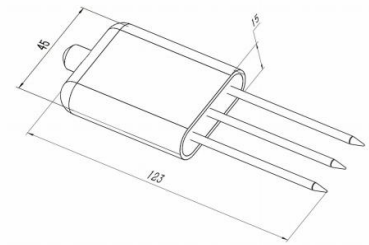
Ordering Information

Model Name	Description
ES101PH	Outdoor Soil pH Sensor, 0~14pH, RS485 Modbus, 12~24V Power
	Package List
	1 x Product Unit, 1 x Quick Installation Guide

*4~20mA / 0~5V / 0~10V output by request

Outdoor Soil EC and Moisture Sensor ES101SEC

Soil electrical conductivity (EC) sensor measures of the amount of salts in soil (salinity of soil). It is an important indicator of soil health. Soils containing excess salts occur naturally in arid and semiarid climates. The salinity of the soil, irrigation water or fertilizer solution is an important parameter affecting the root zone. Any of these factors can have a significant effect on plant growth and quality. The presence of high salt levels indicate adjustments are required. Low-salt levels could also lead to nutrient deficiencies. The SEC sensors gives you real time data by the connectivity of gateway and cloud platform.



Optional IoT Router and Cloud Platform - ThingsMaster

- Support Modbus to connect optional NBloT Gateway WR222 for one or many sensors
- Real-time online monitoring, analysis, reporting
- Remote cloud security and visual management



Features & Benefits

High measurement accuracy	High performance processor	Multiple probes available	Warm and wet use	Superior performance long-term stability
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Measurement Range:	EC:0-20000us/cm Moisture: 0~100%RH Temperature: -40~80°C
Digital Signal output	RS485 2-Wire output (Modbus protocol)
Working Voltage	4.5-30VDC
Power consumption	≤0.7w(@24VDC,25°C)
EC Accuracy	0-10000us/cm: ±3%; 10000-20000us/cm: ±5%
Moisture Accuracy	0-50% 2%; 50-100% 3%
Temperature Accuracy	±0.5°C
EC Resolution	10us/cm
Moisture Resolution	0.1%
Temperature Resolution	0.1°C
Working Environment	-40~+80°C , 0% - 100%RH
Physical parameters	45*15*123mm, Probe length: 70 mm Probe material: Anti-corrosion special electrode Sealing material: Epoxy resin (black flame retardant) Cable length: standard 2 meters Protection class: IP68

Register Address	PLC or Configuration Address	Content	Description
0000 H	40001	Moisture	Range : 0~100%RH ; Real Value = (Read Data /10)
0001 H	40002	Temperature	Range : -40~80°C ; Real Value = (Read Data /10)
0002 H	40003	EC	Range : 0-20000us/cm ; Real Value
0051 H	40082	Moisture Calibration	Integer ; Value x10
0052 H	40083	EC Calibration	Integer
07D0 H	42001	Slave ID	1 ~ 254 (Factory Default 1)
07D1 H	42002	Baud Rate	0=2400 1=4800 2=9600(Default)



Ordering Information

Model Name	Description
ES101SEC	Outdoor Soil EC and Moisture Sensor, EC:0-20000us/cm, Moisture: 0~100%RH, RS485 Modbus, 10-30V Power