

# WxSC800-22B021

LTE Cat1 Soil Humidity Smart Sensors & RTU 2-in-1 Terminal

## Product Highlights

- ❖ LTE Cat1 Soil Humidity Smart Sensors & RTU 2-in-1 Terminal
- ❖ 2-in-1 smart sensor(s) and RTU terminal product
- ❖ Optional DC 5V/DC 12V power supply
- ❖ Optional Battery power supply (ER34615H 19,000mAh/ER34615M 13,500mAh)
- ❖ It can monitor soil humidity, with high measurement accuracy and good interchangeability, suitable for various soil properties
- ❖ Expandable with additional Polysense PSS sensors
- ❖ Expandable with 2 of 14 types PSS gas sensors with aluminum sleeve enclosure
- ❖ Up to 8 working simultaneously including sensors and controllers; Customization needed if more than 8 working at the same time
- ❖ RTU controlling signal and interfaces OD/PWR triggered by sensor(s) data or OTA command for solenoid valve or other devices
- ❖ Optional (Public/Private) IoT cloud platform PolySuite iView

## Products includes following parts:

- ❖ WxSC800 LTE Cat1 Smart IoT and RTU 2-in-1 Terminal
- ❖ ENC-102001 WxS Series 4.0 Enclosure(  $\phi$  145x90x55mm, IP67)
- ❖ PSS-22B021 Soil Humidity Sensor(Power supply 3.3VDC)

## Configuration Tool

- ❖ iEdge4.0 WxS IoT Terminal products can be configured with PolySuite software-visual based Configuration Tool or CLI interface command or OTA via IoT platform, such as PolySuite PaaS platform iView.
- ❖ Download link <http://ota.polysense.online/wincc/ConfigurationTool.rar>

## Product Image

- ❖ The shell is WxS Series 4.0 Enclosure(  $\phi$  145x90x55mm, IP67) , as shown in the figure below
- ❖ The sensor is externally connected. See the following document PSS-22B021 for the sensor picture



# WxSC800

## LTE Cat1 Smart IoT and RTU 2-in-1 Terminal

### Related Products

Product	Interf.	Descriptions
WxSC800	11MPI+RS485+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx00,PSB-BD01,&Enclosure)
WxSC801	RS485+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal (Inc.WxSC8xx,PSM-xx01,PSB-BD01,&Enclosure)
WxSC802	0-20mA*1+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx02,PSB-BD01,&Enclosure)
WxSC803	0-20mA*4+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx03,PSB-BD01,&Enclosure)
WxSC804	0-3.3V*2+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx04,PSB-BD01,&Enclosure)
WxSC805	0-3.3V*4+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx05,PSB-BD01,&Enclosure)
WxSC806	0-10V*2+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx06,PSB-BD01,&Enclosure)
WxSC807	0-10V*4+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx07,PSB-BD01,&Enclosure)
WxSC808	PT100*1+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx08,PSB-BD01,&Enclosure)
WxSC809	PT100*5+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx09,PSB-BD01,&Enclosure)
WxSC80A	Switch*1+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx0A,PSB-BD01,&Enclosure)
WxSC80B	Switch*5+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx0B,PSB-BD01,&Enclosure)
WxSC80C	Unibus*1+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx0C,PSB-BD01,&Enclosure)
WxSC80D	Unibus*18+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx0D,PSB-BD01,&Enclosure)
WxSC80E	IIC*1+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx0E,PSB-BD01,&Enclosure)
WxSC80F	SPI*1+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx0F,PSB-BD01,&Enclosure)
WxSC80G	Uart*2+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx0G,PSB-BD01,&Enclosure)
WxSC80H	Uart*3+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx0H,PSB-BD01,&Enclosure)
WxSC80J	Uart*1+RS485+OD*2+PWR*2	LTECat1 Smart IoT and RTU 2-in-1 Terminal(Inc.WxSC8xx,PSM-xx0J,PSB-BD01,&Enclosure)
WxSC850	Ai/Ao/Di/Pi/Ro/IIC/SPI/Ci + RS232/485/Ro/RJ45	LTE Cat1 Smart RTU

### Product Highlights

- ❖ Interfaces supported:
  - MPI:(AIN(0-20mA)\*2, PT100\*1, VIN(0-10V/0-3.3V)\*2, Switch\*1 ,Unibus\*1, IIC \*1, SPI\*1, Uart(3.3V TTL)\*2), RS485\*1
  - RTU interfaces
    - OD\*2 output for external devices controlling
    - PWR\*2 output for external devices/sensors power supply or customization usage
- ❖ 2-in-1 DC(5V/12V)+Battery(3.6V Li-SOCl2 ER34615H/M) Power Supply, DC in priority
- ❖ Up to 8 working simultaneously including sensors and controllers; Customization needed if more than 8 working at the same time
- ❖ Built-in sensor options including:
  - PSS-403011 IIC Temperature and Humidity Sensor (Indoor)
  - PSS-403012 RS485 Temperature and Humidity Sensor (Indoor)
  - PSS-403013 IIC Temperature and Humidity Sensor (IP67,Outdoor)
  - PSS-403014 RS485 Temperature and Humidity Sensor (IP67,Outdoor)
  - PSS-403015 IIC Temperature and Humidity Sensors (Indoor)

- PSS-403016 RS485 Temperature and Humidity Sensors (Indoor)
- PSS-403017 IIC Temperature and Humidity Sensors (IP67,Outdoor)
- PSS-403018 RS485 Temperature and Humidity Sensors (IP67,Outdoor)
- PSS-403019 IIC Temperature and Humidity Sensors (Indoor)
- PSS-40301A RS485 Temperature and Humidity Sensors (Indoor)
- PSS-40301B IIC Temperature and Humidity Sensors (IP67,Outdoor)
- PSS-40301C RS485 Temperature and Humidity Sensors (IP67,Outdoor)
- PSS-33B011 RS485 illumination Sensor(Indoor)
- PSS-423011 Uart AQI(PM2.5/10, SO2,NO2, O3, CO,Temp,Humidity) PPM Level Sensors
- PSS-423031 Uart IAQ(PM2.5/10, CO2, HCHO, Temp,Humidity) Sensors
- PSS-423041 Uart IAQ(PM2.5/10, CO2, TVOC, Temp,Humidity) Sensors
- PSS-423051 Uart IAQ(PM2.5/10, CO2, HCHO, TVOC,Temp,Humidity)Sensors
- PSS-318711 Uart GPS/Beidou Positioning Sensor
- PSS-318712 RS485 GPS/Beidou Positioning Sensor
- PSS-319311 0-3.3V Tilt / Inclination Sensor (SHM- Structure Health Monitoring)
- PSS-333051 0-3.3V PIR Sensor (3-4 Meters)
- PSS-333052 0-3.3V PIR Sensor (up to 20 Meters)
- PSS-334061 0-3.3V UV Sensor (Range:0-15 grade, outdoor)
- PSS-355051 Switch Uni-Call Button&Controller
- PSS-362011 Uart Sound/Noise Sensor (30~130dB range, Indoor)
- All Gas Sensors with Product No. PSS-21xxxx

❖ Support 1-8 enclosure externally connected sensors

- All enclosure external PSS sensors w/o separate power supply

❖ RTU OD&PWR(PWM) output control interfaces

- OD output control interface for controlling external devices such as electric relay,AC contactor, beeper, draught fan, lamps and lantern etc.
- PWR\*2 output, one default for external devices/sensors power supply voltage output, one with 3.3V voltage; or customization usage,such as for PWM port
- PWR port signal can be used as PWM output to control stepper moter or lamp
- Sensor(s) data or OTA Command triggered OD/PWR controlling signal&interfaces

❖ Power supply options:

- PSB-BT01 WxS Terminal Battery Power (3.6VDC Output) (3.6V Li-SOCI2 ER34615H/M)
- PSB-BT02 WxS Terminal Battery Power Board (3/5/9/12VDC Output) (3.6V Li-SOCI2 ER34615H/M)
- PSB-DC01 WxS Terminal DC Power Board (Inc.PSP-DC012V)
- PSB-BD01 WxS Terminal Battery (3.6V Li-SOCI2 ER34615H/M)&DC Power Board(Inc.PSP-DC012V)
- Battery capacity ER34615H: 19000mAh/ER34615M: 13500mAh

❖ iEdge 4.0 terminal enclosure options

- ENC-102001 WxS Series 4.0 Enclosure(φ145x90x55mm, IP67)
- ENC-102002 WxS Series 4.0 Poromeric Enclosure(φ145x90x59mm)

- ENC-102003 WxS Series 4.0 High Poromeric Enclosure(φ145x90x70mm)
- ❖ Terminal and sensor parameters configurable with Configuration Tool running on PC
  - LTE Cat1 Bands Supported and SW Configurable
  - LTE Cat1 Uplink Transmission Cycle Configurable
  - Sensor Parameters Configurable
  - Sensor Data Report Cycle Configurable
- ❖ FOTA (Over The Air) firmware upgrade, including to upgrade loader and application images
- ❖ OTA (Over The Air) terminal running parameters supported including output signal
- ❖ Low power consumption, years of battery operational life with 3.6V Li-SOCI2 ER34615H/M Battery with various scenarios
- ❖ Integrated internal antenna, or optional external SMA/IPEX antenna
- ❖ LTE Cat1 Compliance

## Specifications

Parameters	Value
<b>Smart Terminal</b>	
Interfaces	MPI Interfaces-Any Mixture of Following: MPI:(AIN(0-20mA) *2, PT100 *1, VIN(0-10V/0-3.3V) *2, Switch *1 ,Unibus*1, IIC *1, SPI*1, Uart(3.3V TTL)*2), RS485*1 Output Control: OD*2&PWR*2
Data Report	Cross-threshold report, plus periodic report (the threshold and the periodic report cycle are both user-configurable)
Intensive data sampling and averaging	Support intensive data sampling and averaging to improve data accuracy
<b>Wireless</b>	
Regional Parameters	LTE-TDD:B34/B38/B39/B40/B41 LTE-FDD:B1/B3/B5/B8
Data	LTE-TDD: Up and down matching 2 8Mbps (DL) max/2Mbps (UL) max Up and down matching 1 6Mbps (DL) max/4Mbps (UL) max LTE-FDD: Max 10Mbps (DL)/Max 5Mbps (UL)
Sensitivity	FDD B1: -99dBm (10M) FDD B3: -99dBm (10M) FDD B5: -99dBm (10M) FDD B8: -99dBm (10M) TDD B34: -100dBm (10M) TDD B38: -100dBm (10M) TDD B39: -100dBm (10M) TDD B40: -100dBm (10M) TDD B41: -100dBm (10M)
Bandwidth	1.4/3/5/10/15/20MHz

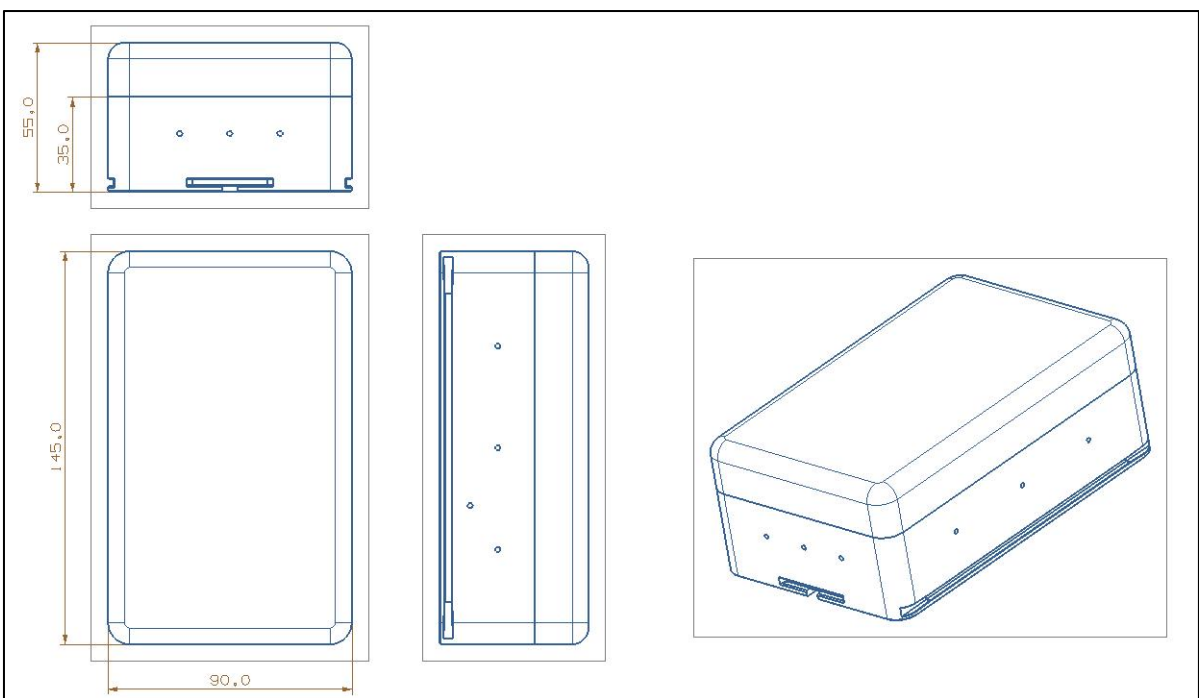
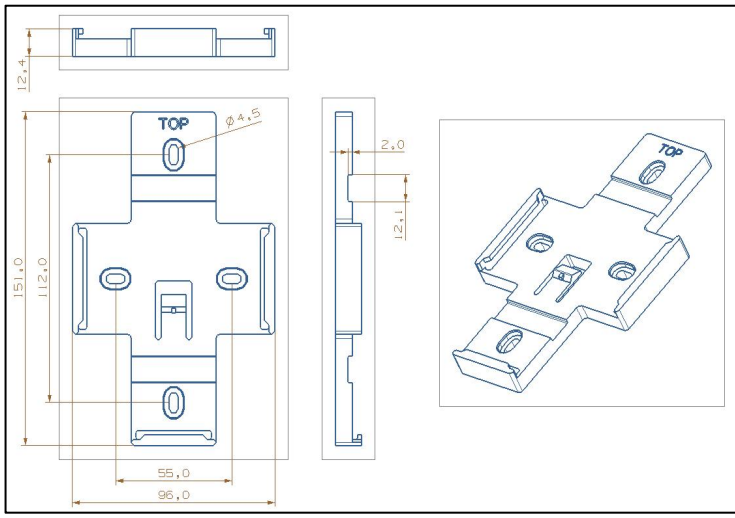
Output power	LTE-TDD: Class3 (23dBm+1/- 3dB) LTE-FDD: Class3(23dBm+-2dB)
Power consumption	1uA @ power off 0.6mA @ Sleep, typical
Interface	1 USB 2.0 high-speed interface (up to 480Mbps); Dual 1.8V/3.0V (U) SIM card interface 2 NETLIGHT interfaces (NET_STATUS and STATUS) 1 channel digital I2S interface, supporting external codec 3 UART interfaces (main serial port, universal serial port, debugging serial port) 1 SPI LCD interface 1 SPI Camera interface PWRKEY (valid at low level) 1 channel ADC interface
Antenna	Integrated internal antenna or external 1/2 wavelength whip antenna (SMA)
<b>Mechanical</b>	
Dimension	3 Enclosure options with different size WxS Series 4.0 Enclosure(φ145x90x55mm, IP67) WxS Series 4.0 Poromeric Enclosure(φ145x90x59mm) WxS Series 4.0 High Poromeric Enclosure(φ145x90x70mm)
IP rating	IP65&IP67
Operating Temperature	-40C to +85C
Total Weight	150 g
<b>Electrical</b>	
Supply Voltage	3.6VDC
Power Type	Replaceable 1 ER34615H/M 3.6V Li-SOCI2 Battery (H/M); DC 4.5V – 12V optional

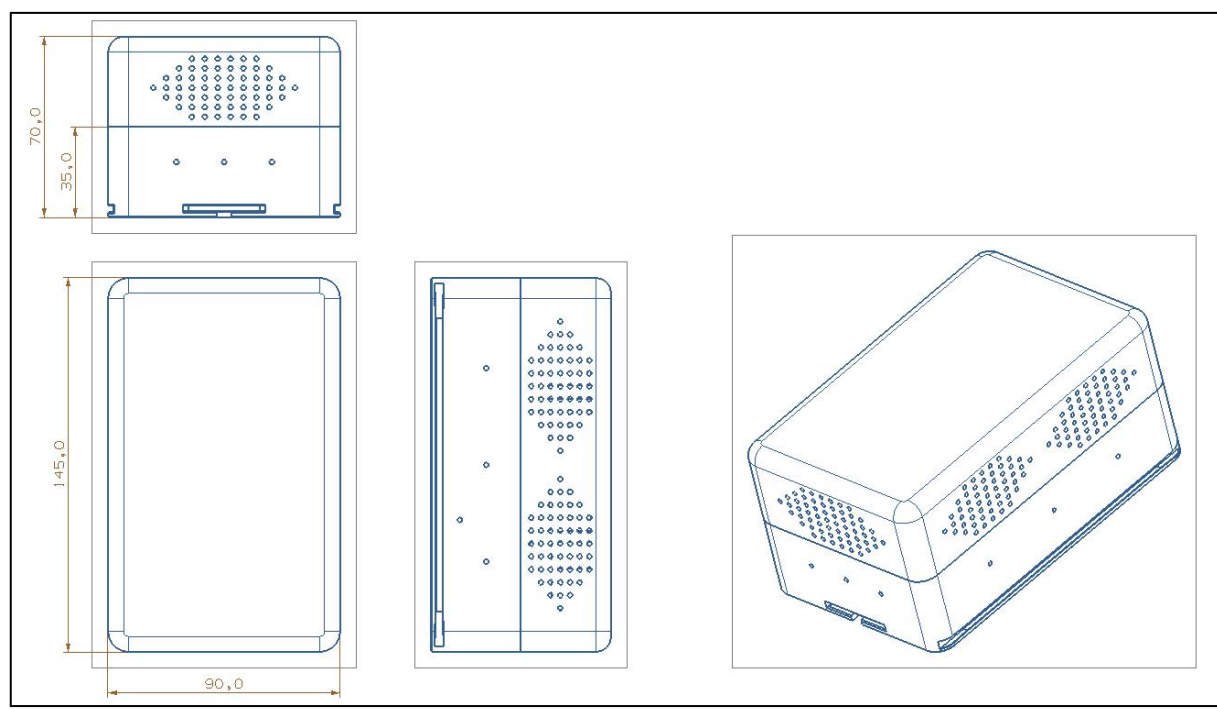
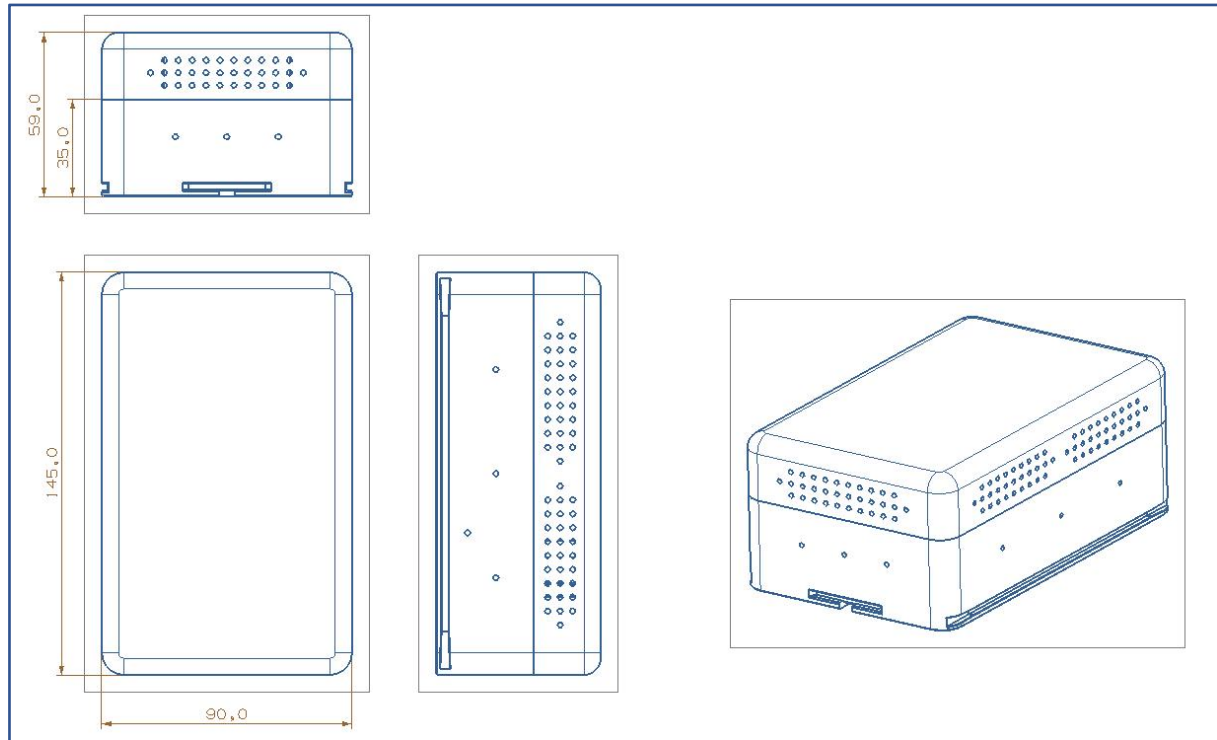
## Configuration Tool

- ❖ iEdge4.0 WxS IoT Terminal products can be configured with PolySuite software-visual based Configuration Tool or CLI interface command or OTA via IoT platform, such as PolySuite PaaS platform iView.
- ❖ Download link <http://ota.polysense.online/wincc/ConfigurationTool.rar>

## Installation Guide

- ❖ Below diagram shows the general installation guide for WxSC800, it can be installed on any flat and solid surface:

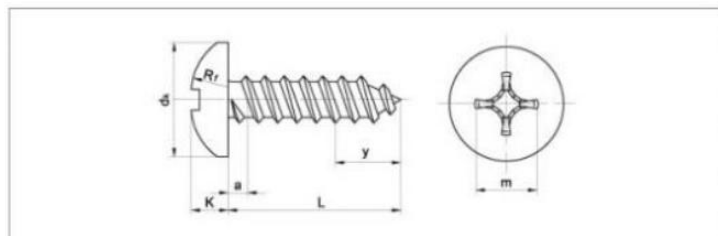






❖ Below is the recommendation of the self-tapping screw and its sizes:

螺纹规格		ST2.2	ST2.9	ST3.5	ST4.2	ST4.8	ST5.5	ST6.3
dk	min	3.7	5.3	6.64	7.64	9.14	10.57	11.57
K	min	1.4	2.15	2.35	2.8	3.4	3.7	4.3
	m	1.9	3	3.9	4.4	4.9	6.4	6.9
L		4.5mm~100mm						



### Product Images

❖ WxS Series 4.0 Enclosure(φ145x90x55mm, IP67)



❖ WxS Series 4.0 Poromeric Enclosure(φ145x90x59mm)



❖ WxS Series 4.0 High Poromeric Enclosure(φ145x90x70mm)



# PSS-22B021

## Soil Humidity Sensor

### Related Products

Product No.	Interf.	Descriptions
PSS-22B011	RS485	Soil Temperature and Humidity Sensor(Power supply 5-12VDC)
PSS-22B021	0-3.3V	Soil Humidity Sensor(Power supply 3.3VDC)
PSS-232061	RS485	Soil Conductivity Sensor(Power supply 5-12VDC)
PSS-232071	RS485	Soil NPK Sensor(Power supply 5-12VDC)
PSS-232072	RS485	Soil NPK Sensor(Power supply 3.3VDC)
PSS-234021	RS485	Soil pH Sensor(Power supply 5-12VDC)
PSS-234022	RS485	Soil pH Sensor(Power supply 3.3VDC)
PSS-423061	RS485	Soil Temperature+Humidity+Conductivity Sensor(Power supply 5-12VDC)
PSS-423062	RS485	Soil Temperature+Humidity+Conductivity Sensor(Power supply 3.3VDC)

### Product introduction

The PSS-22B012 soil humidity sensor is applicable to the measurement of soil humidity and consists of power module, transmission module, drift compensation module, data processing module, etc. The user interface is simple and convenient. Small and light, easy to carry and connect.

### Detection principle

FDR frequency domain reflection principle is adopted for soil humidity. FDR (Frequency Domain Reflectometry) uses the principle of electromagnetic pulse to measure the apparent permittivity of soil according to the propagation frequency of electromagnetic wave in the medium, so as to obtain the relative humidity content of soil. FDR has the advantages of simple, safe, fast and accurate, continuous fixed point, automation, wide range, less calibration, etc. It is a recommended instrument for measuring soil humidity .

### Product features

- ❖ Intelligent sensor detection project: soil humidity sensor
- ❖ High measurement accuracy, fast response and good interchangeability.
- ❖ It is less affected by soil salt content and can be applied to various soil properties.
- ❖ The electrode is made of specially treated stainless steel, which can withstand strong external impact and is not easy to be damaged.
- ❖ Fully sealed, acid and alkali resistant, can be buried in soil or directly put into water for long-term dynamic detection.
- ❖ The probe plug-in design ensures accurate measurement and reliable performance.
- ❖ IP68 protection grade



### Product parameters

Parameters	
Monitoring content	Soil humidity sensor
Detection range	Humidity 0~100% RH

Maximum power consumption	28mA
Measurement accuracy	± 3%
Resolution	0.1%
Cable length	2 meters (standard configuration) cable length can be customized
Degree of protection	IP68
<b>Interface</b>	
Output signal	0-3.3V
<b>Warranty</b>	
Warranty period	>3 years
<b>Mechanical</b>	
Size	45*15*123mm
texture of material	Probe material: anti-corrosion special electrode, sealing material: black flame retardant epoxy resin
Operating temperature	-40℃~85℃
Operating humidity	0~100% RH
<b>Power</b>	
Power	Replaceable ER34615 series 3.6V Li-SOCI2 battery

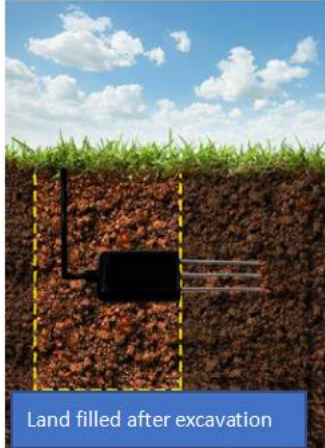
### Quick measuring method

Select an appropriate measurement site, avoid rocks, ensure that the steel needle will not touch hard objects, throw away the topsoil according to the required measurement depth, maintain the original tightness of the soil below, firmly hold the sensor and insert it vertically into the soil, do not shake it from left to right when inserting, and it is recommended to measure the average value for many times within a small range of a measurement point.



### Buried survey

Dig a pit with a diameter of >20cm vertically, insert the sensor steel needle horizontally into the pit wall at a given depth, and fill the pit tightly. After it is stabilized for a period of time, it can be measured and recorded for several days, months or even longer.



### Matters needing attention

- ❖ The steel needle must be completely inserted into the soil during measurement.
- ❖ Avoid high temperature caused by direct sunlight on the sensor. Pay attention to lightning protection in field use.
- ❖ Do not bend the steel needle violently, do not pull the sensor lead wire forcibly, and do not hit or hit the sensor violently.
- ❖ The protection grade of the sensor is IP68, and the sensor can be immersed in water.
- ❖ Due to the presence of radio frequency electromagnetic radiation in the air, it is not suitable to be energized in the air for a long time.

### Application

It is widely used in scientific experiments, agricultural irrigation, water-saving irrigation, greenhouse, flowers and vegetables, grassland and pasture, soil rapid measurement, plant cultivation, sewage treatment, grain storage and measurement of moisture content and temperature of various particles.

### Ordering Guide

- ❖ PSS-22B021 sensor is a sensor only, it needs to use with WxS terminals to combine to different product series; On the basis of the combination, multiple PSS sensors can be loaded through the Multiple Purpose Interface (MPI) of the intelligent IoT terminal.
- ❖ According to the specific scenario of use case, the enclosure and antenna of intelligent IoT terminal will be replaced to ensure the product quality and performance.
- ❖ PSS sensors can be integrated with the WxS terminal via the MPI interface to form different product series.
- ❖ Example of products are as follows:
  - WxS7800-22B021 WiFi Series Soil Humidity Smart Sensor & RTU 2-in-1 Terminal
  - WxS8800-22B021 LoRaWAN Series Soil Humidity Smart Sensor & RTU 2-in-1 Terminal
  - WxS9800-22B021 NB-IoT (China) Series Soil Humidity Smart Sensor & RTU 2-in-1 Terminal
  - WxS9900-22B021 NB-IoT (Global) Series Soil Humidity Smart Sensor & RTU 2-in-1 Terminal
  - WxSC800-22B021 LTE Cat1 Series Soil Humidity Smart Sensor & RTU 2-in-1 Terminal
  - WxSC900-22B021 LTE Cat1 w/GPS Series Soil Humidity Smart Sensor & RTU 2-in-1 Terminal
  - WxSD800-22B021 LTE Cat4 Series Soil Humidity Smart Sensor & RTU 2-in-1 Terminal

- CxS1800-22B021 Ethernet (RJ45) Series Soil Humidity Smart Sensor & RTU 2-in-1 Terminal