WxS Ext-054

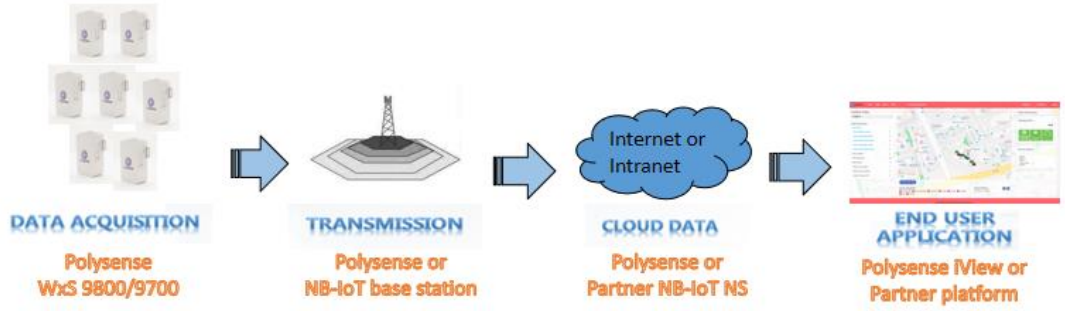
Soil Humidity sensor 3.3V

Product highlights

- ✓ Soil Humidity sensor 3.3V
- ✓ Measurement range: 0~100%, Measurement accuracy:±3%.
- ✓ Probe length： 5.5cm, Diameter:3mm.
- ✓ Good tightness, epoxy resin material.
- ✓ The sensor is small and compact design , easy to carry, easy to install, operate and maintain.
- ✓ Reasonable structure design, the stainless steel probe guarantees the service life.
- ✓ Fast response speed and high data transmission efficiency.
- ✓ High measurement accuracy, reliable performance, ensure normal operation
- ✓ Edge calculation and cloud data processing and analysis
- ✓ Deployed in a cellular topology, Support service providers, the municipal governments and the enterprises to deploy public and private IOT networks
- ✓ The sensitivity of NB-IoT module is 129 dBm±1 dB, excellent penetration, the network coverage is 20dB stronger than GSM, LTE and other networks.
- ✓ Support the communication protocol frequency band published by the international organization agreement 3GPP.
- ✓ Support two kinds of configuration for data transmission.Single-tone transmission,15kHz/3.75kHz Subcarrier interval:25.2kbps(Downlink) , 15.625kbps(Uplink);Multi-tone transmission, 15kHz Subcarrier interval:25.2kbps(Downlink),54kbps(Uplink)
- ✓ Switch freely between Active/Idle/PSM modes, and ensure that the un-received data is retransmitted.
- ✓ Support IPv4/IPv6/UDP/CoAP/LwM2M/Non-IP/DTLS/TCP/MQTT protocol stack.

- ✓ Intelligent terminal provides multi-function interface (MPI), it can be connected with external analog and digital quantity sensors. (RS232/RS485 interface is optional.)
- ✓ Integrated internal antenna or optional external SMA/IPEX antenna.
- ✓ OTA (Over The Air) firmware upgrade, including to upgrade loader and application images
- ✓ Support wide voltage 5~12V DC input, 5 – 10 years of battery operational life with 2 x AA Li-SOCI2 Battery.
- ✓ IP67 enclosure rating.

Application architecture



Sensor specifications

Parameter	Value	
Sensor		
Measurement range	0-100%	
Probe length	5.5cm	
Probe diameter	3mm	
probe material	Stainless steel	
Sealing material	Epoxy resin	
Measurement accuracy	±3%	
Measuring Stable time	2s	
Operating Mode	Active	The terminal is active, all functions are available and data can be sent and received. In this mode, the terminal can switch to Idle mode or PSM mode.

	Idle	The terminal is in the state of light sleep and the network is connected. Paging messages are accepted and the terminal can switch to Active mode or PSM mode in this mode.
	PSM	Only the RTC is working, the network is disconnected, and paging messages are not acceptable. When DTE (Data Terminal Equipment) actively sends Data or the timer T3412 (associated with periodic updates) times out, the terminal is awakened.
MPI	Analog input 0 - 3/5/10V:4-20mA;Digital interface:RS232/RS485/UART	
Upgrade	The serial port or DFOTA	
Data report	For any of the above sensor types, support for cross-threshold data reporting and periodic data reporting every 2 hours (both threshold and periodic reporting cycles can be configured by the user)	
Wireless specification		
Sensitivity	- 129dBm±1dB	
Frequency band	B1 @H-FDD: 2100MHz B3 @H-FDD: 1800MHz B8 @H-FDD: 900MHz B5 @H-FDD: 850MHz B20 @H-FDD: 800MHz B28 @H-FDD: 700MHz	
Protocol	IPv4 / IPv6 IP/UDP/CoAP/LwM2M/Non-IP/ DTLS/TCP/MQTT	
Distance	NLOS（Non-line-of-sight） 2km;	
Antenna	Integrated internal antenna or external IPEX antenna (SMA)	
Mechanical		
Dimension	114mm x 80mm x38mm The overall height increases with the increase of sensors.	
Shell IP rating	IP67	
Operating Temperature	-40℃to +85℃	
Storage Temperature	-40℃ to +90℃	
Total Weight	150g	
Electrical		
Supply Voltage	Low power consumption, 3.1V~3.66V; 1or2 Li-SOCI2 Battery; 5VDC optional.	

Installation guide

The following figure shows the installation guide of the soil moisture sensor,which is divided into two installation methods according to its testing methods.

rapid test

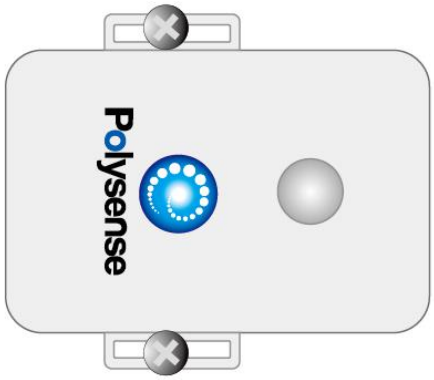
Select an appropriate measurement site, avoid rocks and similar hard objects, dig the topsoil according to the required measurement depth, keep the original slack of the soil below, grip the sensor, and insert it vertically into the soil, and do not shake it from side to side

buried test

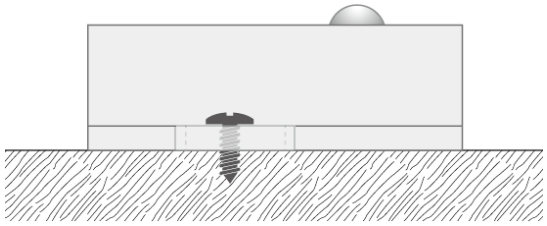
The hole with diameter of > 30cm is dug vertically, and the depth is determined according to the need of measurement. Then, the steel needle of the sensor is inserted into the pit horizontally and the hole is compacted. After a period of time, the measurement and recording can be carried out for several days, months and longer

Note: Within small range of a measuring points, it is recommended to calculate the average value after multiple measurements.

Below figure shows the general installation guide for WxS9800, it can be installed on any flat and solid surface, the lid is contacted with the surface and fixed via 2 self-tapping screws:

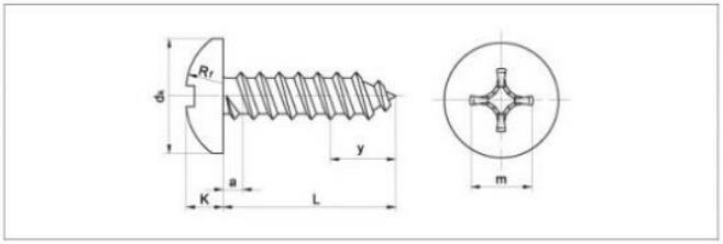


Wall mounting



Mount it on a pole

Below is the recommendation of the self-tapping screws and its size:



Thread specification		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 process description

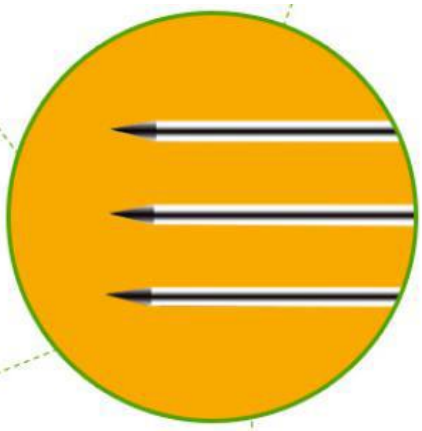
The sensor is compact in size, easy to carry, easy to install, operate and maintain.Reasonable structure design, non - embroidered steel probe to guarantee service life.The exterior is encapsulated with epoxy pure colloid with good sealing performance, which can be directly embedded into the soil and is free from corrosion.

Ultra-low power consumption

Low power consumption,Average current <10MA

Made of superior material

Made of high-quality stainless steel probes, isolated design, never electrolysis, more resistant to corrosion of acid and alkali salts in the soil.



Good sealing

Vacuum potting, excellent sealing, completely prevent water from invading from any direction, can be soaked in water for a long time, or buried in the soil for a long time.

Product Sample Applications

- **Intelligent agriculture**

By measuring the water requirement of crops and analyzing the reason of the change of the soil moisture to the growth and yield of the crops,automatic irrigation of agricultural moisture content was carried out.

- **Greenhouse**

Through real-time-monitoring to soil moisture,the fruit and vegetable plants in the greenhouse are guaranteed to develop and mature under the optimal environment and can be irrigated automatically.

- **Slope engineering of roads**

Through the measurement of soil moisture,ensure the stability and reliability of slop engineering,prevent soil erosion,and timely inform maintenance personnel for maintenance and nursing.

- **Scientific Experiments**

Accurate data of soil moisture were collected for scientific experimental analysis.

About Polysense

Polysense Technologies Inc., Located in Santa Clara, California, with offices in St. Paul, Brazil, Beijing, Luo Yang ,Shanghai and Guangzhou, China, develops Universal Sensing and communicating Solutions with Distributed Data Analytic for IoT.

Polysense focuses on fiber and wireless IoT products, solutions, and engineering services for service providers, enterprises, government agencies, and consumers, including 3G/4G LTE based WxS 6x00, Wi-Fi/BLE based WxS 7x00, LoRa based WxS 8x00, and NB-IoT/eMTC based WxS 9x00, enabling a rich array of applications such as Smart City, Industrial Internet of Things, Smart Retail and SMB, Precision Agriculture, Water Treatment, Environmental Protection, Energy and Power. Polysense currently supports over 100 sensing parameter, iEdge edge computing turnkey software,iView data visualization cloud PaaS platform, and iServer scalable Network Server, with a goal to offer the industry's broadest portfolio of sensors over 140 sensing parameters, including temperature, humidity, light, pressure, acoustic, accelerometer, tilt, vibration, displacement, environmental and industrial gases, water quality, PIR/IR motion, ultrasonic, soil sensors, thermal imaging, and 18 types gases with flammable, explosive, poisonous, or bad odor attributes.

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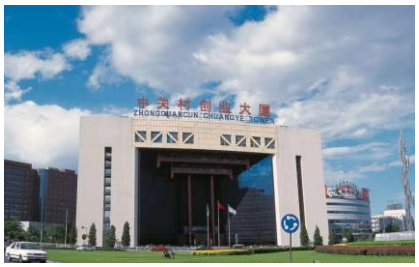

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