Wireless Soil Moisture/Temperature/Electrical Conductivity Sensor

User manual

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2. Introduction

The R718PB15A is a Class A type device based on the LoRaWAN protocol.
The R718PB15A can be connected to the 5TE soil sensor, and the soil moisture /conductivity/temperature collected by the sensor is reported to the corresponding gateway.

LoRa Wireless Technology:
LoRa is a wireless communication technology dedicated to long distance and low power consumption. Compared with other communication methods, LoRa spread spectrum modulation method greatly increases to expand the communication distance. Widely used in long-distance, low-data wireless communications. For example, automatic meter reading, building automation equipment, wireless security systems, industrial monitoring. Main features include small size, low power consumption, transmission distance, anti-interference ability and so on.

LoRaWAN:
LoRaWAN uses LoRa technology to define end-to-end standard specifications to ensure interoperability between devices and gateways from different manufacturers.

3. Main Characteristics

- Using SX1276 wireless communication module
- 2 ER14505 batteries AA SIZE (3.6V / cell) power supply in parallel
- Host protection grade IP65 / IP67
- Soil moisture content detection
- Soil temperature detection
- Soil conductivity
- Compatible with LoRaWAN™ Class A
- Using frequency hopping spread spectrum technology
- Configurable parameters via third-party software platform, reading data and setting alarms via SMS text and email (optional)
- Applicable to third-party platforms: Actility / ThingPark, TTN, MyDevices / Cayenn
- The product has low power consumption and supports longer battery life.

Note *: The battery life is determined by the frequency and other variables reported by the sensor.
Please refer to http://www.netvox.com.tw/electric/electric_calc.html
On the website, users can find various models of battery life in different configurations

4. Operation

On/Off

Power on	Insert batteries. (users may need a flat blade screwdriver to open)
Turn on	Press and hold the function key for 3 seconds till the green indicator flashes once.
Turn off (Restore to factory setting)	Press and hold the function key for 5 seconds till the green indicator flashes for 20 times.
Power off	Remove batteries
Note:	1. At 1st-5th second after power on, the device will be in engineering test mode. 2. Remove and insert the battery; the device is at off state by default. Turn on the device to use again. 3. On/off interval is suggested to be about 10 seconds to avoid the interference of capacitor inductance and other energy storage components.

Network Joining

Never joined the network	Turn on the device to search the network to join. The green indicator stays on for 5 seconds: success The green indicator remains off: fail
Had joined the network (not at factory setting.)	Turn on the device to search the previous network to join. The green indicator stays on for 5 seconds: success The green indicator remains off: fail
Fail to join the network (when the device is on)	First two mins: wake up every 15 seconds to send request. After two mins: enter sleeping mode and wake up every 15 minutes to send request. Note: Suggest to remove batteries if the device is not used to save power. Suggest to check the device verification information on the gateway or consult your platform server provider.

Function Key

Press and hold for 5 seconds	Restore to factory setting / Turn off The green indicator flashes for 20 times: success The green indicator remains off: fail
Press once	The device is in the network: The green indicator flashes once and sends a data report The device is not in the network: the green indicator remains off

Sleeping Mode

The device is on and in the network	Sleeping period: Min Interval. When the reportchange exceeds setting value or the state changes: send a data report according to Min Interval.
The device is on but not in the network	First two mins: wake up every 15 seconds to send request. After two mins: enter sleeping mode and wake up every 15 minutes to send request. Note: Suggest to remove batteries if the device is not used. Suggest to check device verification on gateway.

Low Voltage Warning

Low Voltage	3.2V

5. Data Report

The device will immediately send a version report report and soil moisture, soil conductivity and report data of soil temperature and voltage values;
The device sends data in the default configuration before any configuration is done.

Maximum time: Max Interval

Note: The device send data cycle has been programmed to be correct. There is no minimum time supported.
R718PB15A defaults Max Interval = 60min.

The R718PB15A device does not support the ReportChange function. That is, the configuration is invalid. The sent report data string is always sent according to the ReportMaxTime cycle.

Note: The real data sending cycle will be programmed before shipment.

R718PB15A Report data type: soil moisture, soil conductivity and soil temperature.

Data report configuration and sending period are as following:

Description	Device	Cmd ID	DeviceType	NetvoxPayLoadData		
ConfigReportReq	R718PB15AA	0x01	0x58	Reserved (2bytes Unit:s)	MaxTime(2bytes Unit:s)	Reserved
ConfigReportRsp		0x81		Status(0x00_success)	Reserved (8Bytes,Fixed 0x00)	
ReadConfigReportReq		0x02		Reserved (9Bytes,Fixed 0x00)		
ReadConfigReportRsp		0x82		MinTime(2bytes Unit:s)	MaxTime(2bytes Unit:s)	Reserved

Configure device parameters MaxTime = 1min

Downlink: 01580000003C0000000000

The device returns:

8158000000000000000000 (Configuration succeeded)

8158010000000000000000 (Configuration failed)

Read device configuration parameters

Down: 0258000000000000000000

The device returns:

82580000003C0000000000 (device current configuration parameters)

6. Installation

METHOD 1. HORIZONTAL INSTALLATION

1. Excavate a hole or trench a few centimeters deeper than the depth at which the sensor is to be installed.
2. At the installation depth, shave off some soil from the vertical soil face exposing undisturbed soil.
3. Insert the sensor into the undisturbed soil face until the entire sensor is inserted. The tip of each prong has been sharpened to make it easier to push the sensor into the soil. Be careful with the sharp tips!
4. Backfill the trench taking care to pack the soil back to natural bulk density around the sensor body of the 5TE.

METHOD 2. VERTICAL INSTALLATION

1. Auger a 3-in hole to the depth at which the sensor is to be installed.
2. Insert the sensor into the undisturbed soil at the bottom of the auger hole using a hand or any other implement that will guide the sensor into the soil at the bottom of the hole. Many people have used a simple piece of PVC pipe with a notch cut in the end for the sensor to sit in, with the sensor cable routed inside the pipe.
3. After inserting the sensor, remove the installation device and backfill the hole taking care to pack the soil back to natural bulk density while not damaging the black overmolding of the sensor and the sensor cable in the process.

Note: The installation method is from page 7 of 20435_5TE_Manual_Web.pdf.

7. Important Maintenance Instruction

Your device is a product of superior design and craftsmanship and should be used with care. The following suggestions will help you use the warranty service effectively.

• Keep the equipment dry. Rain, moisture, and various liquids or moisture may contain minerals that can corrode electronic circuits. In case the device is wet, please dry it completely.
• Do not use or store in dusty or dirty areas. This can damage its detachable parts and electronic components.
• Do not store in excessive heat. High temperatures can shorten the life of electronic devices, destroy batteries, and deform or melt some plastic parts.
• Do not store in a cold place. Otherwise, when the temperature rises to normal temperature, moisture will form inside, which will destroy the board.
• Do not throw, knock or shake the device. Rough handling of equipment can destroy internal circuit boards and delicate structures.
• Do not wash with strong chemicals, detergents or strong detergents.
• Do not apply with paint. Smudges can block debris in detachable parts and affect normal operation.
• Do not throw the battery into a fire to prevent the battery from exploding. Damaged batteries may also explode.

All of the above suggestions apply equally to your device, battery and accessories. If any device is not working properly.
Please take it to the nearest authorized service facility for repair.