netvox R718PB13 Wireless Soil Moisture Sensor User Manual

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User Manual

Wireless Soil Moisture Sensor

R718PB13
User manual

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Contents

Introduction

The R718PB13 is a Class A type device based on the LoRaWAN protocol.
R718PB13 is connected with EC-5 soil sensor.
As detectors for soil VWC (volumetric water content), the value collected by the sensor are 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.

Appearance
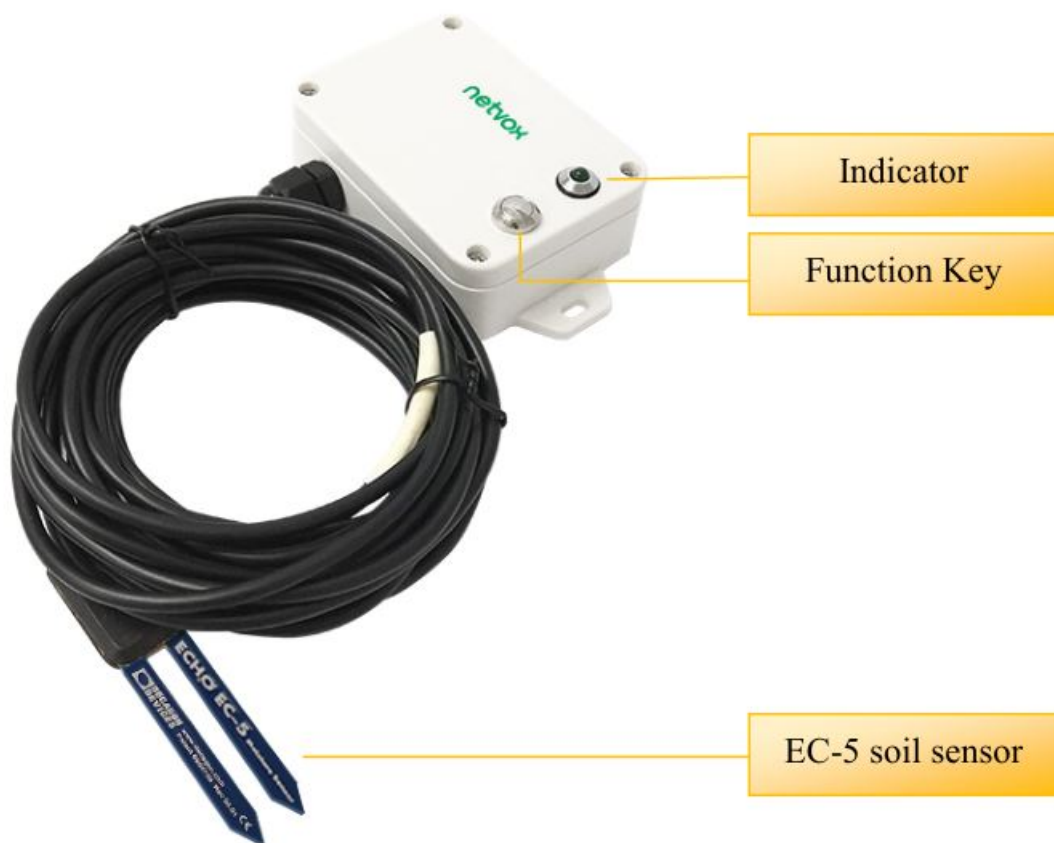
Main Characteristics

- Using SX1276 wireless communication module
- 2 ER14505 batteries AA size (3.6V / cell) power supply in parallel
- Host protection grade IP65
- VWC (volumetric water content) detection
- Compatible with LoRaWANTM 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

Operation

On/Off

Power on	Insert batteries. (users may need a 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. Need to be turned on to use. 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. 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. 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)	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 report change exceeds setting value or the state changes: send a data report according to Min Interval. |

Low Voltage Warning

| Low Voltage | 3.2V |

Data Report

The device will immediately send a version packet report along with an uplink packet including VWC value. The device sends data in the default configuration before any configuration is done.

Default setting:

MaxTime: Max Interval = 15 min (default)
MinTime: None
Soil Type: 0x00 (Mineral Soil)

Note:

1. The device report interval will be programmed based on the default firmware which may vary.
2. Mintime and ReportChange are not supported by R718PB13 (Invalid configuration)
3. Report cycle will be based on Report Max Time period when sending data packet.
4. Data packet: VWC value
5. It would take about 3 seconds for the soil sensor to sample and process the collected value if you were to manually trigger the device by pressing the button, please be patient.

The device reported data parsing please refer to Netvox LoRaWAN Application Command document and Netvox Lora Command Resolver **http://loraresolver.netvoxcloud.com:8888/page/index**

5-1 Data report configuration and sending period are as following

Description	Device	CmdID	Device Type	NetvoxPayLoadData		
Config ReportReq	R718PB13	0x01	0x58	MinTime (2bytes Unit:s)	MaxTime (2bytes Unit:s)	Reserved (5Bytes,Fixed 0x00)
Config ReportRsp		0x81		Status (0x00_success)		Reserved (8Bytes,Fixed 0x00)
ReadConfig ReportReq		0x02		Reserved (9Bytes,Fixed 0x00)		
ReadConfig ReportRsp		0x82		MinTime (2bytes Unit:s)	MaxTime (2bytes Unit:s)	Reserved (5Bytes,Fixed 0x00)

1. Configure device parameters MaxTime = 1min

   Downlink: 01580000003C0000000000

   The device returns:

   8158000000000000000000 (Configuration succeeded)

   0)

2. Read device configuration parameters

   Downlink: 0258000000000000000000

   The device returns:

   82580000003C0000000000 (device current configuration parameters)

5-2 Soil data collection calibration

The R718PB13 calibrates the acquired soil data by setting soil calibration values.
When the soil calibration value in the issued command is 0, the collected data is the data actually collected by the soil sensor.
If the soil calibration value in the command is not 0, the collected data is the original collected data plus the calibration value.

Soil acquisition data calibration configuration:

Description	Device	Cmd ID	Device Type	NetvoxPayLoadData	
SoilCalibrateReq	R718PB13	0x0C	0x58	VWCDelt (1byte SignedValue,Unit:1%)	Reserved (8Bytes,Fixed 0x00)
SoilCalibrateRsp		0x8C		Status (0x00_success)	Reserved (8Bytes,Fixed 0x00)

1. Configure the device VWC calibration value to be 10%.

   Downlink: 0C580A0000000000000000

   Device returns:

8C58000000000000000000 (configuration is successful)

8C58010000000000000000 (configuration is failed)

2. Read device parameters

Downlink: 0C58000000000000000000

Device returns:

8C580A0000000000000000 (device current configuration parameter)

5-3 Select soil type

R718PB13 selects soil types by instruction.
Soil types include mineral soil, potting soil, and rock wool. See the documentation for details.

Description	Device	CmdID	DeviceType	NetvoxPayLoadData	
SetSoilTypeReq	R718PB13	0x0A	0x58	Soil Type (1byte) 0x00_Mineral Soil 0x01_PottingSoil 0x02_Rockwool	Reserved (8Bytes,Fixed 0x00)
SetSoilTypeRsp		0x8A		Status (0x00_success)	Reserved (8Bytes,Fixed 0x00)
GetSoilTypeReq		0x0B		Reserved (9Bytes,Fixed 0x00)	
GetSoilTypeRsp		0x8B		Soil Type (1byte) 0x00_Mineral Soil 0x01_PottingSoil 0x02_Rockwool	Reserved (8Bytes,Fixed 0x00)

1. Configure the device soil type to Potting Soil

Downlink: 0A58010000000000000000

Device returns:

8A58000000000000000000 (configuration is successful)
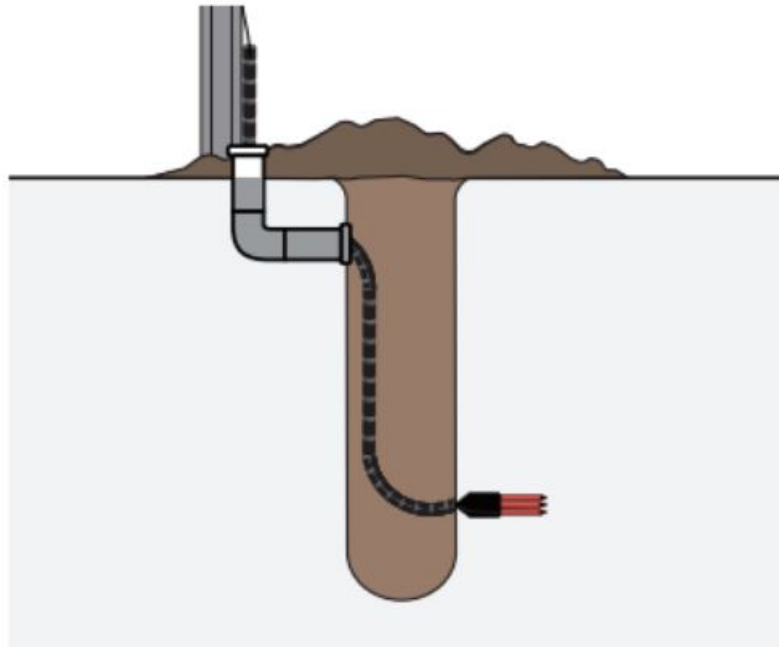
8A58010000000000000000 (configuration is failed)

2. Read device parameters

Downlink: 0B58000000000000000000

Device returns:

8B58010000000000000000 (device current configuration parameter)

Installation

Method1. 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 soil sensor.

Method2. 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 over molding of the sensor and the sensor cable in the process.

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.

Documents / Resources

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