netvox R718PA22 Wireless Bottom-Mounted Ultrasonic Liquid Level Sensor User Manual

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Introduction

The R718PA22 is a wireless communication device that measures the liquid level with an ultrasonic liquid level sensor. Ultrasonic liquid level sensor installed at the bottom of the container, it may measure water, gasoline, diesel and small, medium, large capacity storage tanks (metal, plastic, glass material). R718PA22 main unit and the ultrasonic liquid level sensor communicate via RS485 interface, and the detected data is sent to the other equipment shown which employs compliance LoraWANTM wireless communication protocol standards.

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

- Adopt SX1276 wireless communication module
- DC 12V adapter power supply
- IP Rating: Main body – IP65/IP67 (optional), ultrasonic probe – IP67
- RS485 communication
- The base is attached with a magnet that can be attached to a ferromagnetic material object
- Compatible with LoRaWANTM Class A
- Frequency hopping spread spectrum technology
- Configuration parameters can be configured through third-party software platforms
- Data can be read and alerts can be set via SMS text and email (optional)
- Applicable to third-party platforms: Actility / ThingPark / TTN / MyDevices / Cayenne

Operation

On/Off

On/Off	
Power on	External 12V power supply
Turn on	DC12V power supply, the green light flashes once indicating that it boots successfully.

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 power
Note:	1. At 1st -5th second after power on, the device will be in engineering test mode. 2. 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 (Or at factory setting)	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.

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 The device is not in the network: The green indicator remains off

Data Report

When the device is powered on, it will immediately send a version report and a report of the liquid level status, depth and temperature. Before any configuration, the device sends data according to the default configuration.
Default setting:

- **Max time:** Max Interval
- **Minimum time:** Min Interval (detect the current voltage value every Min Interval by default) Battery Voltage Change: 0x01 (0.1V) // R718PA22 is power by adapter, the value invalid Depth Change: 0x1E (30mm)
- **TemperatureChange:** 0x01 (1 ℃)

Note: The data transmission period of the device has been programmed. The interval between two reports must be the minimum time When Battery is 0x00, it represents powered by DC/AC power source

The data report can be decoded by the Netvox LoRaWAN Application Command document and
http://www.netvox.com.cn:8888/page/index

Data report configuration and sending period are as following:

Min. Interval (Unit:second)	Max. Interval (Unit:second)	Reportable Change	Current Change≥ Reportable Change	Current Change Reportable Change
Any number between 1~65535	Any number between 1~65535	Can not be 0.	Report per Min. Interval	Report per Max. Interval

Example of ConfigureCmd

Bytes	1	1	Var (Fix =9 Bytes)
	CmdID	DeviceType	NetvoxPayLoadData

- **CmdID:** 1 byte
- **DeviceType:** 1 byte – Device Type of Device
- **NetvoxPayLoadData:** var bytes (Max=9bytes)

Description	Device	Cmd ID	Device Type	NetvoxPayLoadData					
Config ReportReq		0x01		MinTime (2bytes Unit:s)	MaxTime (2bytes Unit:s)	BatteryChange (1byte Unit:0.1v)	DepthChange (2bytes,Unit: 1mm)	Temperature Change (1byte,Unit: 1℃)	Reserved (1Bytes,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)	BatteryChange (1byte Unit:0.1v)	DepthChange (2bytes,Unit: 1mm)	TemperatureCha nge (1byte,Unit: 1℃)	Reserved (1Bytes,Fixed 0x00)
SetMeasure TypeReq		0x03		Measure type 1byte 0x01_water, 0x 02_gasoline, 0x03_diesel oil			Reserved (8Bytes,Fixed 0x00)		

SetMeasure TypeRsp	R718 PA22	0x83	0x9B	Status (0x00_success)	Reserved (8Bytes,Fixed 0x00)
GetMeasure TypeReq		0x04		Reserved (9Bytes,Fixed 0x00)	
GetMeasure TypeRsp		0x84		Measure type 1byte 0x01_water, 0x02_gasoline, 0x03_diesel oil	Reserved (8Bytes,Fixed 0x00)

Configure device parameters MinTime = 1min, MaxTime = 1min, BatteryChange = 0.1v, Depth Change = 30mm, TemperatureChange = 1℃

Note: Since R718PA22 is a DC powered device, BatteryChange is invalid. But the configuration should be 0x01 because of the software limitation

The device returns: 819B0000000000000000000 (Configuration succeeded) and 819B0100000000000000000 (Configuration failed)

Read device configuration parameters
Downlink: 029B0000000000000000000
The device returns: 829B003C003C01001E0100 (current device configuration parameters)
Configure device measure type: 01 = Water, 02 = Gasoline, 03 = Diesel oil Downlink:
039B0200000000000000000 // Gasoline
**The device returns:** 839B0000000000000000000 (Configuration succeeded) 839B0100000000000000000 (Configuration failed) Read device configuration parameters
**Downlink:** 049B0000000000000000000
The device returns: 849B0200000000000000000 (current device configuration parameters) Example for MinTime/MaxTime logic

Example#1 based on MinTime = 1 Hour, MaxTime= 1 Hour
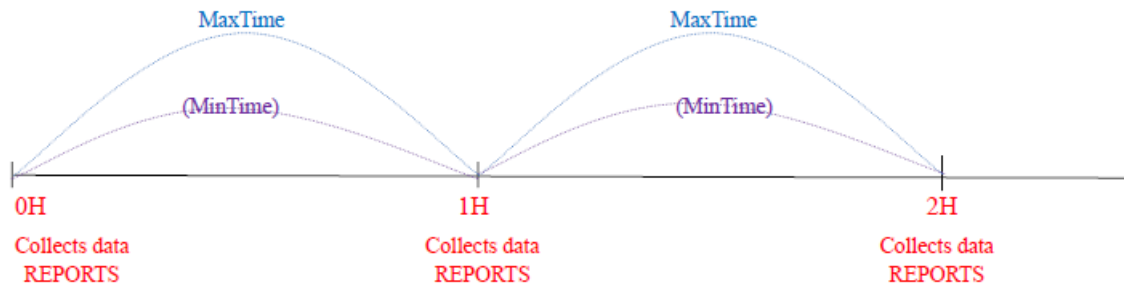
Note: MaxTime=MinTime. Data will only be report according to MaxTime (MinTime) duration regardless ON/OFF value.

Example#2 based on MinTime = 15 Minutes, MaxTime= 1 Hour
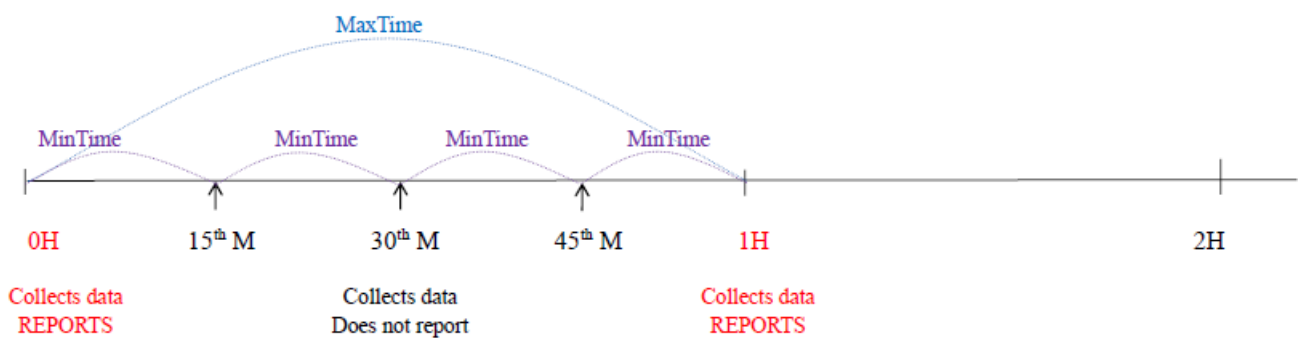
Example#3 based on MinTime = 15 Minutes, MaxTime= 1 Hour
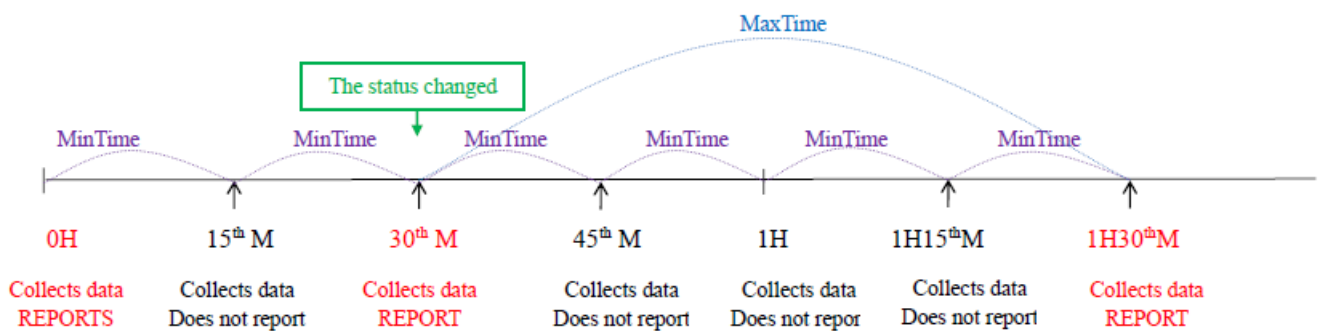
Installation

The data obtained by the ultrasonic level sensor is the actual liquid height + the thickness of the bottom of the container. The data is within the measuring range of 0.12-3m. The container material can be metal or plastic. During the installation test, different test liquids (water, diesel, gasoline) can be configured first.

Installation (Mounting)

Install the sensor at the bottom of the container / tank:

1. Power on first to see if the sensor is working normally. The red light flashing on the sensor indicates that the sensor can work normally, as shown in the figure.
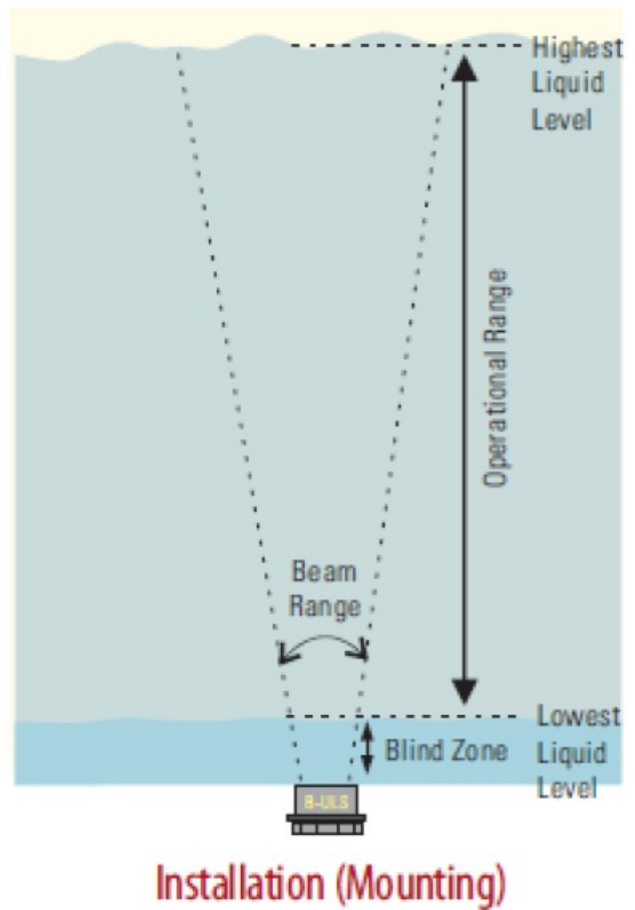

2. Place the container or tank in a horizontal position, preferably the angle between the container or tank and the horizontal plane is less than 2 degrees.
3. Make sure the container / tank is full or at least 2/3 of the liquid.
4. Find best check-point for installing the sensor (the bottom of the container should be kept clean).
   - Apply some coupling gel on the sensor surface.
   - Place the sensor on the bottom of the container / tank; gently move to find the correct test point and draw a circle around the test point.
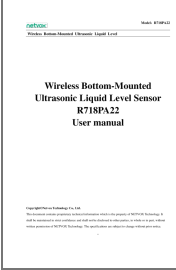
5. Clean the checkpoint and the sensor surface, and prepare to fix the sensor to the container / tank.

6. Apply AB glue to the surface of the sensor, stick the sensor to the inspection point of the container / tank, and keep it for a while until it is fixed.

7. If the installation is correct, the device reports the installation status in REPORT as 00, otherwise, it's 01.

8. When the thickness of the bottom of the steel container is more than 8mm, or the thickness of the bottom of the glass or plastic container is more than 10mm, the ultrasonic liquid level sensor can not measure the farthest distance (3m). The information is from the supplier. There is no relevant container, and no actual test has been made in the factory. The customer should refer to the actual test situation.

9. The ultrasonic level sensor has high ultrasonic energy; therefore, when the measured liquid is water, the water level must be higher than 50cm that can make the measured data reach 1% accuracy.

How to find the correct detection point

Check the reported installation information. "0" means that it can be installed at this detection point "1" means it cannot be installed at this detection point When selecting the correct detection point, pay attention to the following points:

1. Ensure that the working surface of the sensor is in a horizontal position, and the working surface is parallel to the liquid level in the tank; the radiation axis of the sensor is perpendicular to the horizontal direction. As the picture shows in below:

2. The 1, 2, and 4 points in below figure are not suitable for mounting sensors because they are too close to the tank wall or have obstacles.
   Point 5 is not suitable because it is not horizontal. Position 3 is suitable for mounting the sensor.

Important Maintenance Instruction

Kindly pay attention to the following in order to achieve the best maintenance of the product:

- Keep the device dry. Rain, moisture, or any liquid, might contain minerals and thus corrode electronic circuits. If the device gets wet, please dry it completely.
- Do not use or store the device in dusty or dirty environment. It might damage its detachable parts and electronic components.
- Do not store the device under excessive heat condition. High temperature can shorten the life of electronic devices, destroy batteries, and deform or melt some plastic parts.
- Do not store the device in places that are too cold. 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 clean the device with strong chemicals, detergents or strong detergents.
- Do not apply the device with paint. Smudges might block in the device and affect the operation.
- Do not throw the battery into the fire, or the battery will explode. Damaged batteries may also explode.

All of the above applies 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

| | **[netvox R718PA22 Wireless Bottom-Mounted Ultrasonic Liquid Level Sensor](#)** [pdf] User Manual
R718PA22, Wireless Bottom-Mounted Ultrasonic Liquid Level Sensor, R718PA22 Wireless Bottom-Mounted Ultrasonic Liquid Level Sensor |

References

- 🌐 **[Lora Command Resolver](#)**