

PRL-100 Portable Radar Level Sensor Operation Manual



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Limited Warranty

Pyxis Lab warrants its products for defects in materials and workmanship. Pyxis Lab will, at its option, repair or replace instrument components that prove to be defective with new or remanufactured components (i.e., equivalent to new). The warranty set forth is exclusive and no other warranty, whether written or oral, is expressed or implied.

Warranty Term

The Pyxis warranty term is thirteen (13) months ex-works. In no event shall the standard limited warranty coverage extend beyond thirteen (13) months from the original shipment date.

Warranty Service

Damaged or dysfunctional instruments may be returned to Pyxis for repair or replacement. In some instances, replacement instruments may be available for short duration loan or lease.

Pyxis warrants that any labor services provided shall conform to the reasonable standards of technical competency and performance effective at the time of delivery. All service interventions are to be reviewed and authorized as correct and complete at the completion of the service by a customer representative or personnel. Pyxis warrants these services for 30 days after the authorization and will correct any qualifying deficiency in labor provided that the labor service deficiency is exactly related to the originating event. No other remedy, other than the provision of labor services, may be applicable.

Repair components (parts and materials), but not consumables, provided during a repair, or purchased individually, are warranted for 90 days ex-works for materials and workmanship. In no event will the incorporation of a warranted repair component into an instrument extend the whole instrument's warranty beyond its original term.

Warranty Shipping

A Repair Material Authorization Number (RMA) must be obtained from Pyxis Technical Support before any product can be returned to the factory. Pyxis will pay freight charges to ship replacement or repaired products back to the customer. The customer shall pay freight charges for returning products to Pyxis. To receive an RMA you can generate a request on our website at <https://www.pyxis-lab.com/request-return-or-repair/>

Pyxis Technical Support

You can contact Pyxis Technical Support at 1-866-203-8397 or service@pyxis-lab.com

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1. Introduction

The Pyxis PRL-100 sensor is W-band FMCW continuous frequency modulation radar level transmitters. They provide continuous level measurement up to 591 inches (49.2 ft. or 15 m) with lora output and BlueTooth 5.0®. The PRL-100 Series has a 2.8" LCD display and 3 buttons for quick configuration and can be wirelessly configured via the Pyxis **uPyxis®** app for Mobile or Desktop devices enabling rapid integration and deployment in the field. The sensors are powered by a 3.7V rechargeable lithium battery. This non-contact liquid level sensor platform is well suited for corrosive liquids and can be used for industrial, municipal and process liquid storage as well as chemical feed applications.

2. Specifications

Specification	RPL-100
Part Number (P/N)	60388
Power Supply	3.7V 10200mAh Li-Ion Battery / Rechargeable
BlueTooth® Connectivity	BlueTooth 5.0® 4.1, 32 ft. (10 Meters) Line of Sight for use with uPyxis
Radio Output	Long Range Radio (LoRa)
Interface	Type-C for charging and data transfer
Range	3.94 – 591 inches (0.1 – 15 meters)
Resolution	0.02 inch (0.5 mm)
Accuracy	±2mm
Dead Zone	3.94 inch (10 cm)
Wireless Module Operating Frequency	BlueTooth: 2402MHZ-2480MHZ Radar: 75GHz - 85GHz LoRa: 915MHz
Installation	2-inch NPT
Weight	1.10 pound (500 g)
Dimension	Height: 7.09 inch (180 mm); Diameter: 2.64 inch (67 mm)
Enclosure Material	PBT
Ambient Temperature	5 - 122 oF (-15 - 50 °C)
Storage Temperature	-4 - 140 oF (-20 - 60 °C)
Pressure	-29 – 58 PSI (-0.2 – 0.4 MPa)
Enclosure Rating	IP66
Display	2.8" LCD display
Regulation	CE / RoHS / UKCA

**With Pyxis' continuous improvement policy, this specification is subject to change without notice.*



3. Unpacking Instrument

Remove the instrument and find the standard accessories from the shipping container as listed below. Inspect each item for any damage that may have occurred during shipping. Verify that all accessory items are included. If any item is missing or damaged, please contact Pyxis Lab Customer Service at service@pyxis-lab.com or by phone at 1-866-203-8397.

3.1 Standard Provided Accessories

The PRL-100 Series level sensors as delivered are provided with the items outlined below.

- **PRL-100** Radar Level Sensor (P/N 60388)
- Charging Plug
- Type-C Charging Cable
- NFC Tags
- User Manual Can Be Downloaded at [Support Documents - Pyxis Lab, Inc. \(pyxis-lab.com\)](http://Support Documents - Pyxis Lab, Inc. (pyxis-lab.com))

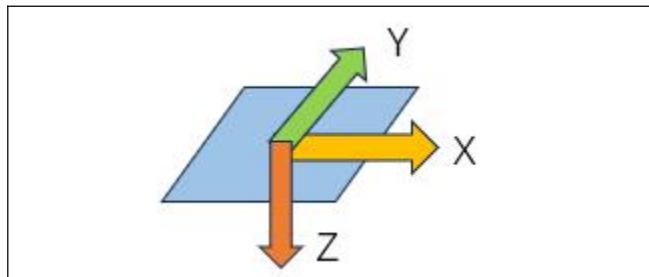


4 Installation

4.1 Tank Top Installation and Precautions

Should the sensor be installed in a 2-inch bulkhead fitting on the top of the tank, the following installation guideline should be maintained. The dimensions of the PRL-100 sensor is shown in Figure 3. If a flat horizontal surface is not available on the top of the tank, please use a self-aligning bulkhead fitting so that the sensor can be adjusted to be perpendicular (90°) to the liquid surface. The PRL-100 series sensors are also embedded with a 3-axis accelerometer which allows the user to use the Display Mode Switch Button to get the Z-axis angle (the angle at which the sensor deflects the line of gravity) measurement result, just as shown below. In other words, Z angle represents the inclination of the

horizontal plane of the sensor. In order for the sensor to work properly, the Z angle should be measured within 3 degrees of 0.00 horizontal baseline.



- Install and adjust the sensor to be perpendicular to liquid surface.
- Installation location should not be too close to container wall to avoid interference.
- The sensor has a 1.97 inch (5 cm) dead zone (DZ). Raise the probe to avoid the DZ as needed.
- Do not install in a location which will cause the microwave to be obstructed.

Top of Tank Installation Suggestions

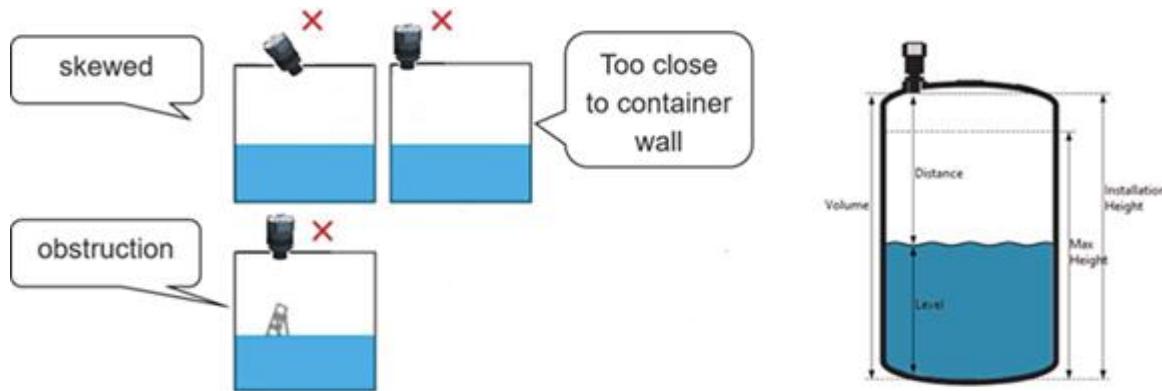


Figure 3. PRL-100 Series Installation Illustration



5 Instrument Overview

5.1 NFC function

NFC tag information reading and writing:

Edit the NFC tag using uPyxis 2.0 software to record the following information:

- Site Location
- Client name
- Measurement Reagent Information
- Reagent Drum Height
- Reagent bucket volume

Attach the edited NFC label to the reagent bucket.

Preparation before measurement:

Scan the NFC tag on the reagent pail with the PRL-100 device.

The PRL-100 reads the site information and reagent bucket parameters from the NFC tag.

Measurement and Data Logging:

Perform reagent bucket measurements.

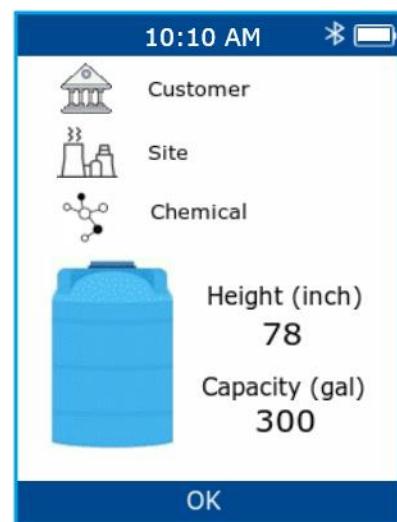
When the measurement is complete, the PRL-100 combines the test data with the field information in the NFC tag to generate a test record.

The test record is saved to the device log.

Consumption and Days Remaining Calculation:

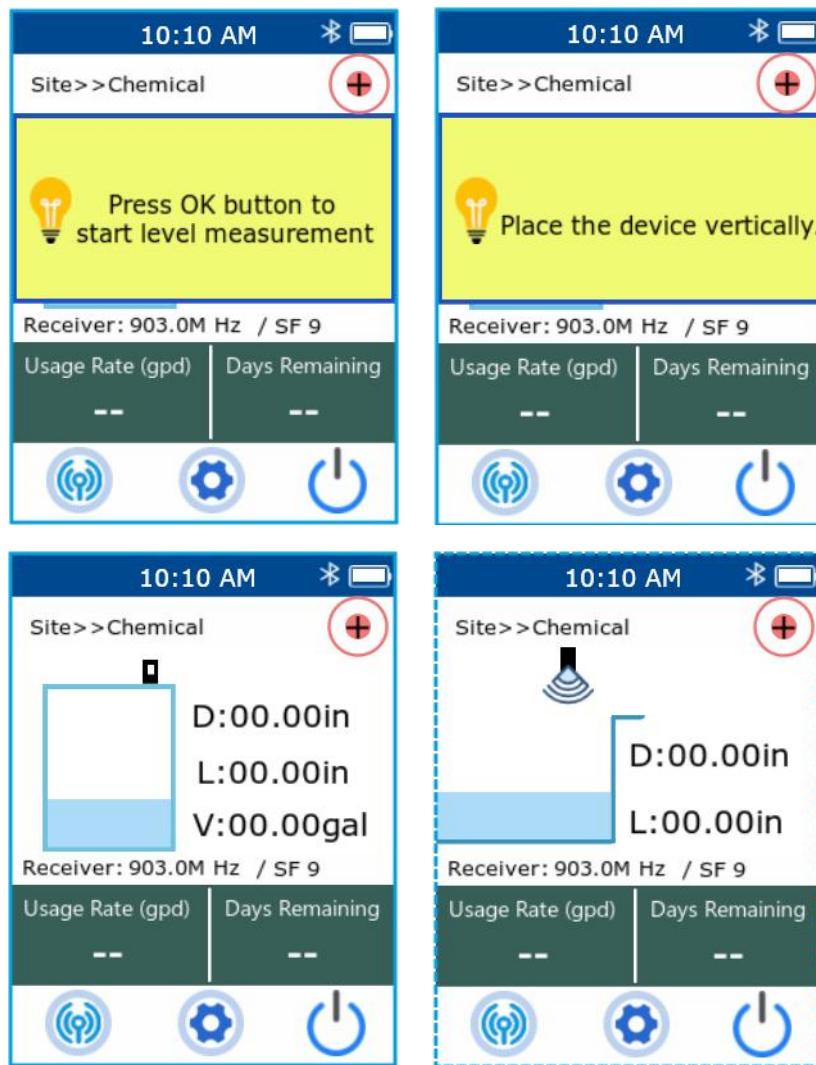
The device calculates the daily reagent volume consumption of the reagent drum based on the last test data.

The number of days remaining for the remaining reagent amount to be used is deduced.



5.2 Measurement

PRL-100 should keep the device vertically down when measuring, when the device is tilted at an angle greater than 30° the device will stop measuring, the screen will prompt please keep the device vertically down.



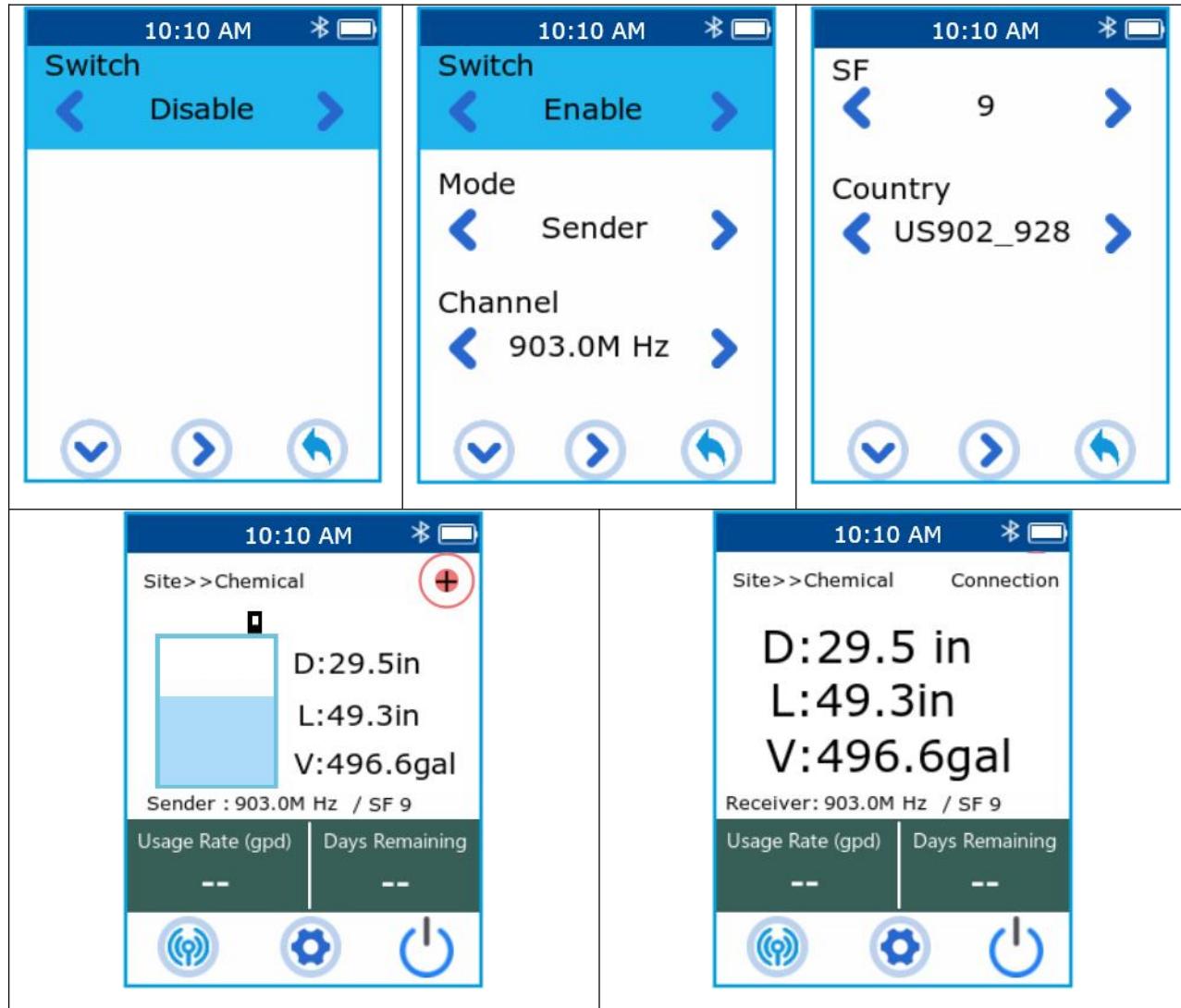
At the top of the interface is the location of the agent to measure the bucket and the bucket, and the indicating cross in the upper right corner of the interface is the reaction of the tilt Angle of the portable device. In the middle are the level and volume. Below the volume are the mode and communication parameters of the LORA data transmission. The dark green background below shows the rate of agent consumption and the remaining consumption time of the barrel.

5.2 LORA communication settings

PRL-100 supports LoRa function, there are two working modes of receiving end and transmitting end to choose, two sets of PRL-100 can be paired on site, one as transmitting end and one as receiving end, to realize remote monitoring of reagent drum measurement data.

PRL-100, as a LoRa receiver, can also receive data from other Pyxis radar level meters, such as LSR-801L, LSR-803L, etc., and can be used to remotely view the data or troubleshooting.

When pairing, you need to make sure that the parameters of a group of LORA devices are configured the same, or else they can't communicate with each other.



This interface is the LORA communication parameter setting interface, which is the switch LORA function, and select the LORA mode, and set the LORA frequency channel and SF amplification frequency factor function.

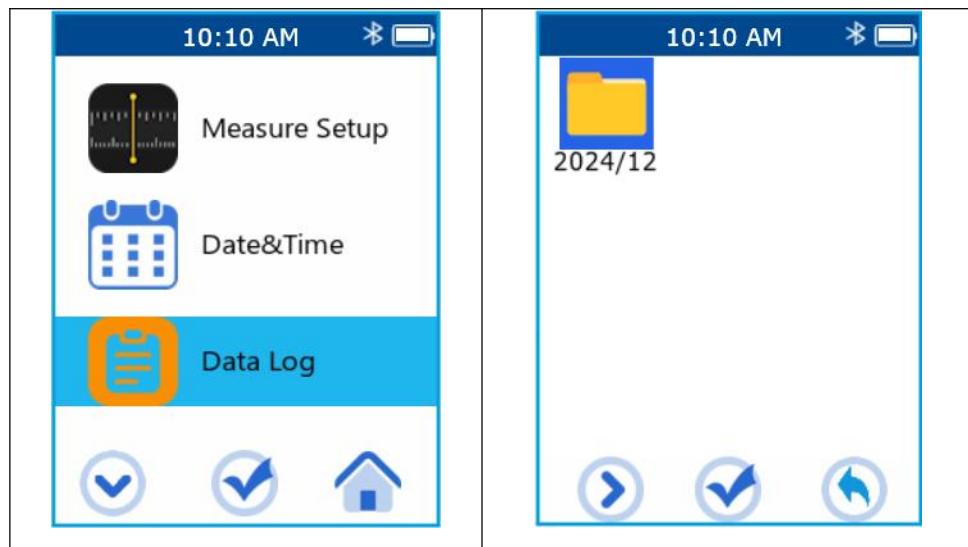
When the device is Receiver, it is the LORA wireless communication receiving end, and when the device is Sender, it is the LORA wireless signal transmitting end. When two devices are one as a receiver and the other as a sender, the LORA frequency channel and SF amplification factor is the same. Send the measurement data of the Sender end to the Receiver end, and the measurement data of the received Sender will be displayed on the measurement interface at the Receiver end.

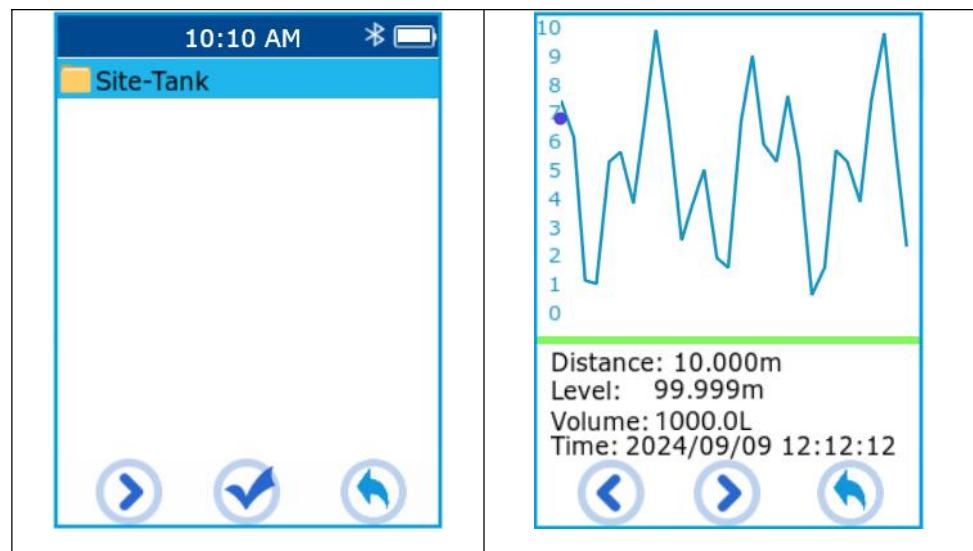
When the Receiver end is done, the measurement interface is displayed as follows:

At the Receiver end, the measurement interface displays the previous Site site and the Chemical agent as the PN # SN of the Sender-terminal device. And the position of the measurement interface on the Receiver end will display the received data.

5.3 Log function

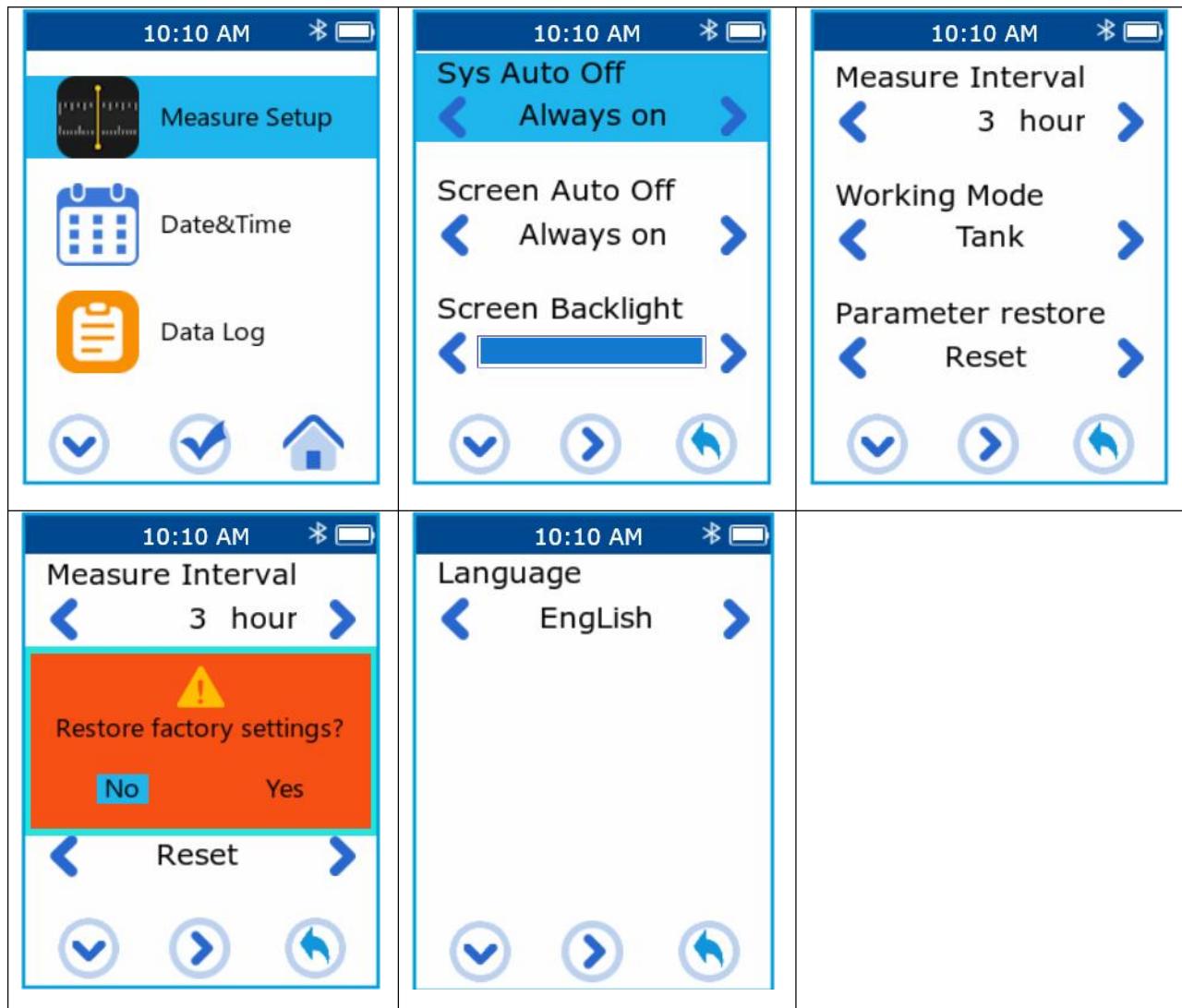
PRL-100 will automatically generate a test log for each measurement and save it





5.4 Configuration menu

5.4.1 Measurement and setting function



(1) Sys Auto Off

After setting, select the corresponding shutdown time. When the no-key operation time reaches the set time, it will be turned off.

(2) Screen Auto Off

After setting, select the corresponding break screen time. When the no-key operation time reaches the set time, the screen will be released. Press any button to wake up the screen.

(3) Screen Backlight setting

Select the corresponding backlight brightness, there are 10 gears to set, and when you select the corresponding backlight brightness, the screen will change with you.

(4) Measure Interval

The device defaults to continuous measurement mode, if you select interval measurement, such as 5 minutes to measure once, the device will be in accordance with the set time for a single measurement, after the completion of the measurement, the device enters the sleep state until the next measurement time, or there is a key to wake up, this mode can save battery power.

(5) Working mode

There are two options for working mode, Tank mode, Open flow Channel

(6) Parameter reset

After the selection, restore the parameters to the factory settings.

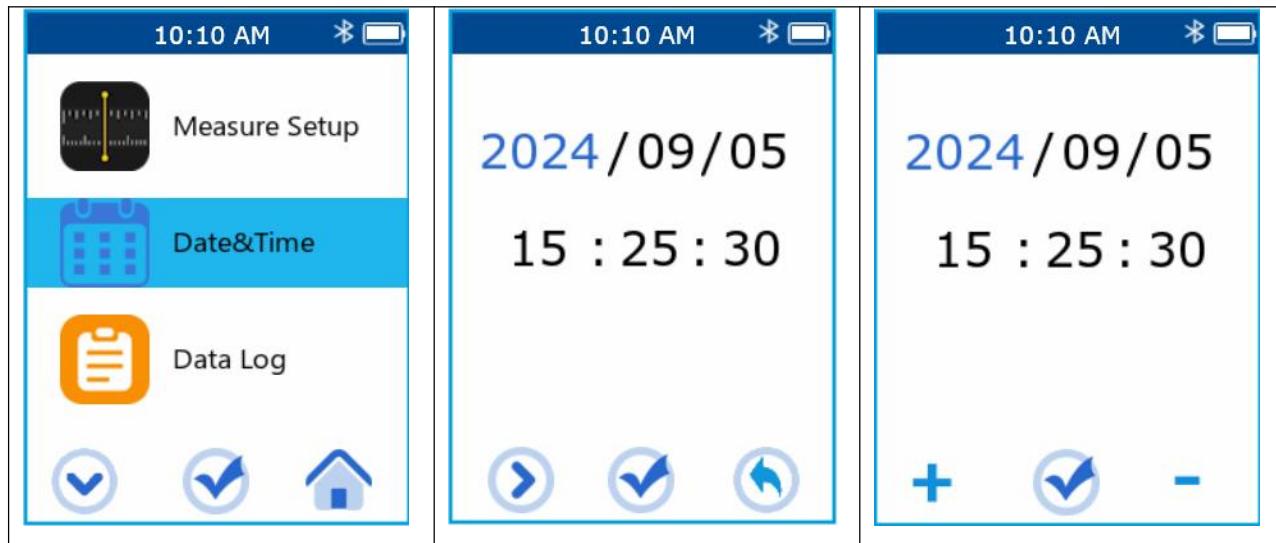
(7) Language Settings

The optional languages are: English, Chinese and Spanish

5.4.2 Time setting function

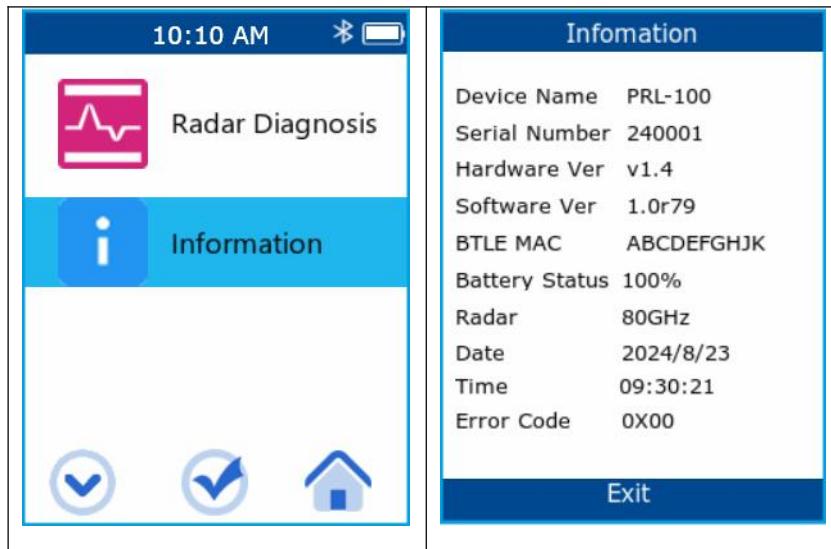
The system time is set by keys, or the time can be automatically synchronized by connecting to uPyxis.

The log records contain time information, so please set the correct time before using it for the first time.



5.4.3 Device Information

The device information screen displays the basic information of the device, PN, SN, software version, battery level, time, error code and other information.



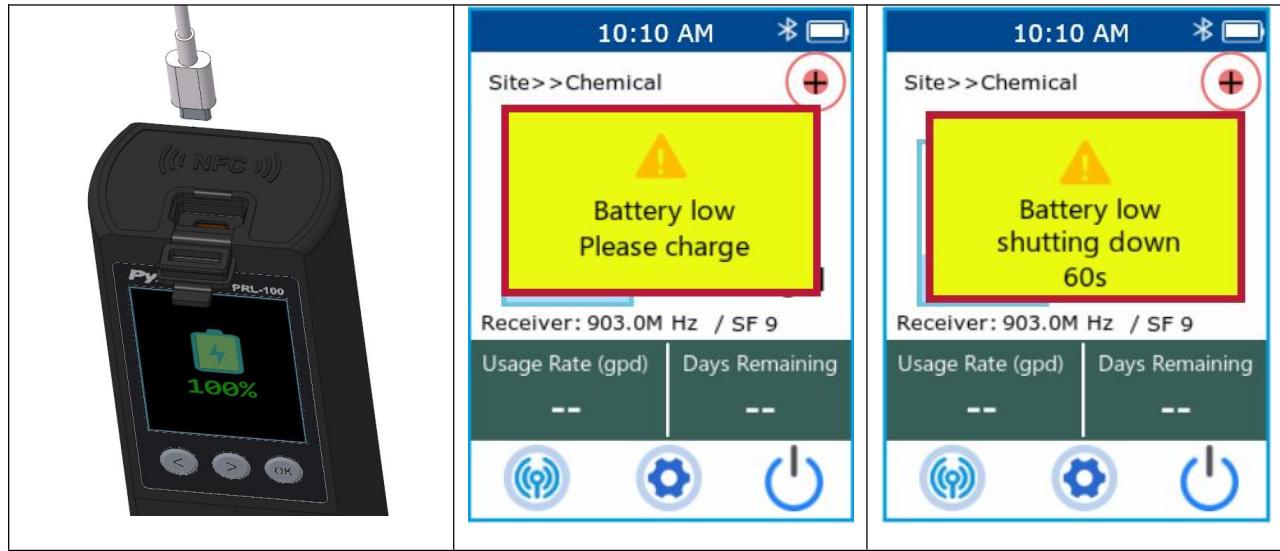
5.5 Charging function

PRL-100 are powered by a 3.7V rechargeable lithium battery. The battery can be charged via Type-C connector.

When the battery power is lower than 20%, the screen will indicate that the power is low, please charge, when the power is lower than 5%, the device will automatically shut down

When the device is charging in the off state, the screen will show the battery level, the

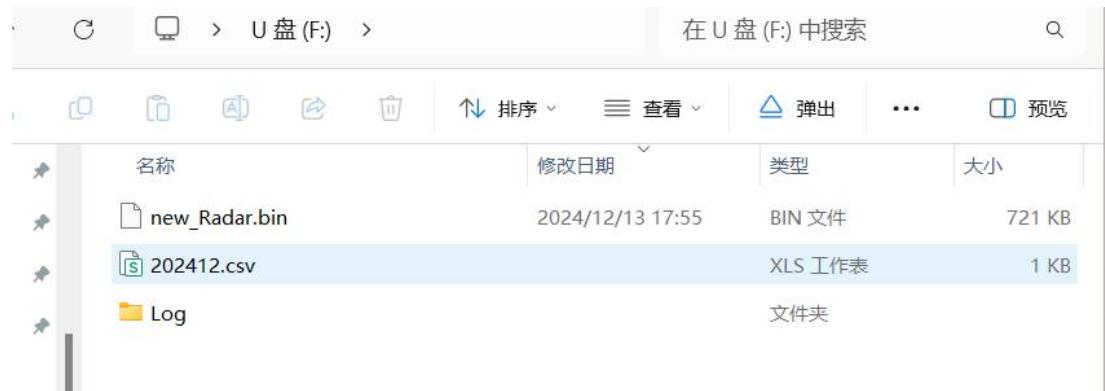
When the device is turned on the battery icon will show the charging status



5. 6 Firmware Update

Connect the device to the PC device via the Type C-USB data transmission line. The folder of the portable device pop up on the PC device.

Open the Log folder, you can view the log files stored by the device, and the user can move the required files out and conduct data analysis.



6 Setup with uPyxis 2.0 Mobile

6.1 Download the uPyxis 2.0 Mobile App

Download **uPyxis 2.0** Mobile APP from Apple [App Store](#) or [Google Play](#).



6.2 Connecting to uPyxis 2.0 Mobile App

Turn on the BlueTooth 5.0® on in your mobile device. ***NOTE*** Do not pair the phone's BlueTooth 5.0® to the PRL-100 sensor, the uPyxis 2.0 APP will do the pairing.

Open uPyxis 2.0 Mobile App. Click “Scan Bluetooth” button and the App will start to search for Pyxis sensors. Click on the [PRL-100 Sensor Picture](#) to connect to the Pyxis Radar sensor.

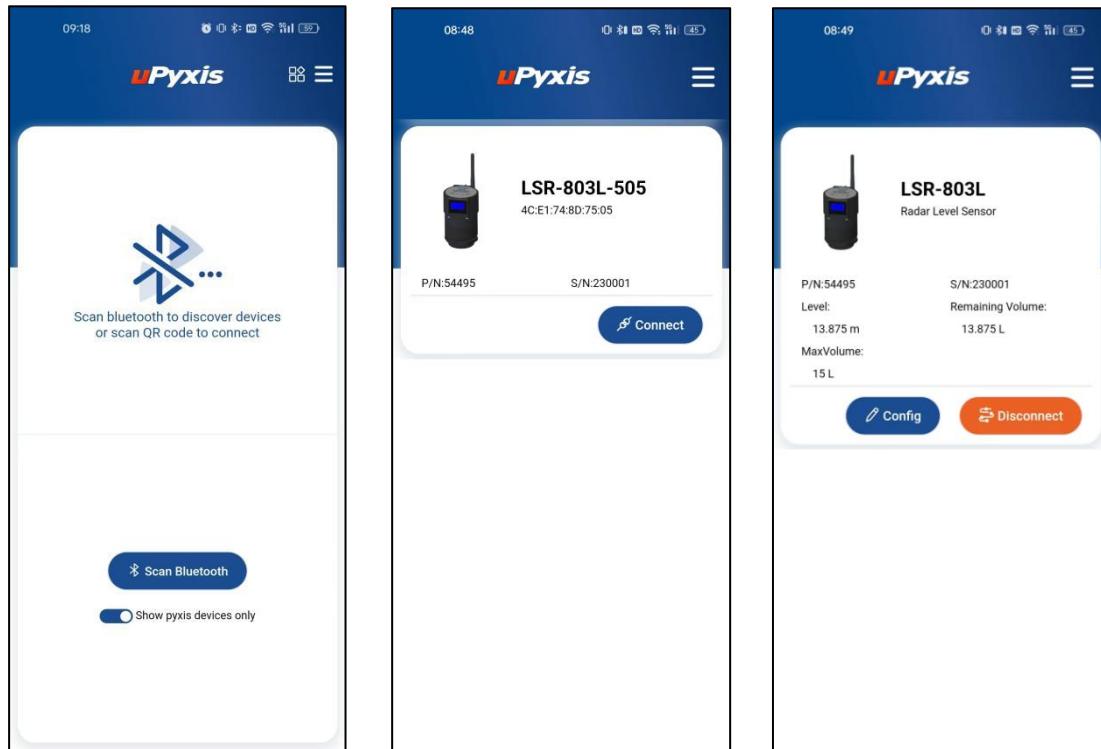


Figure 5. LSR-803 Series Radar Level Sensor Connection

6.3 Parameter Setting via uPyxis Mobile App

There are four-tab pages on the main screen as showed below. After connected, Mobile App will display the **Trend Chart** screen. User can click on **Overview** tab to check more measurement information. Configuration Tab is for user to change the settings of the sensor if needed. And Upgrade tab is for firmware upgrade

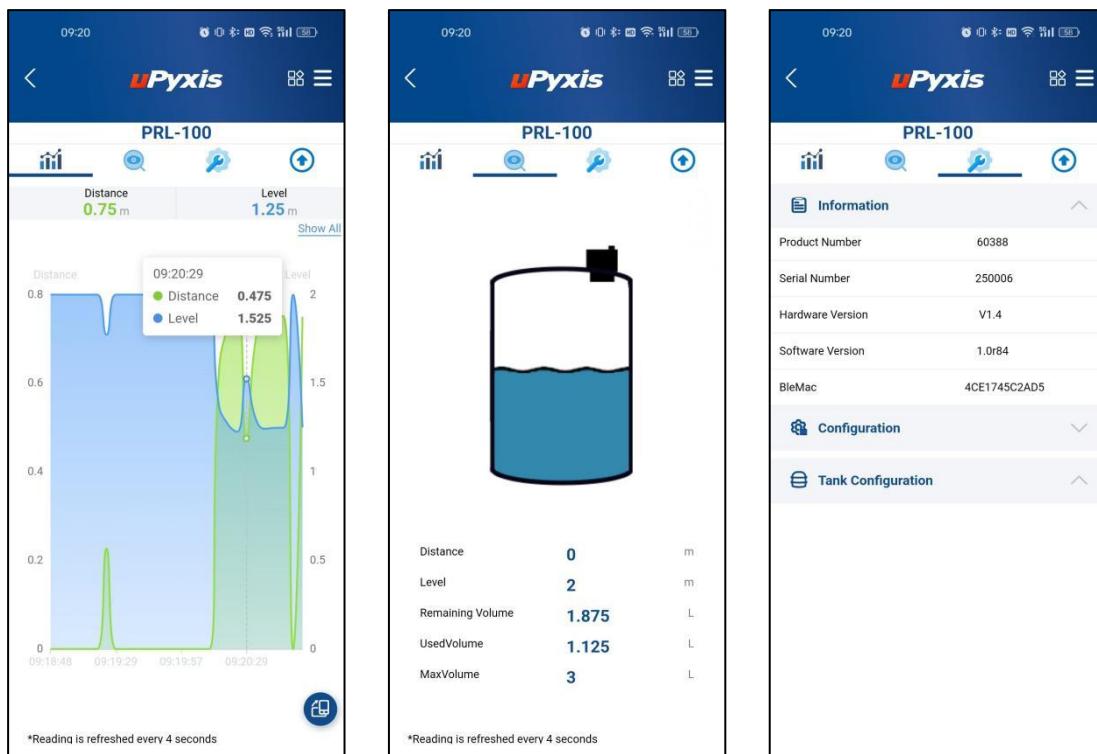


Figure 6. Sensor Tab Selection

In the **Configuration Tab** on the top of the page, the user can check the basic information of the sensor when clicking on **Information** sub menu.

If the user wants to rename the device name, change the communication parameters or display unit, please click on the **Configuration** sub menu.

To configure the tank, click on **Tank Configuration** sub menu and set **Tank Volume**, **Installation Height** and **Max Level Height** if needed. Please click on parameter data or the “PEN” image to the right of the related parameter to modify the parameter and then click on the “Apply” button to finish the setting.

NOTE Please make sure that the difference between the installation height and the maximum level height is greater than 1.97 inches, the sensor dead zone.



Figure 7. Sensor Configuration



7. Regulatory Approval

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RF Exposure Information

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

ISED Statement

English: This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

The digital apparatus complies with Canadian CAN ICES-3 (B)/NMB-3(B).

French: Cet appareil contient des émetteurs/récepteurs exempts de licence qui sont conformes aux RSS exemptés de licence d'Innovation, Sciences et Développement économique Canada.

L'exploitation est soumise aux deux conditions suivantes :

- (1) Cet appareil ne doit pas provoquer d'interférences.
- (2) Cet appareil doit accepter toute interférence, y compris les interférences susceptibles de provoquer un fonctionnement indésirable de l'appareil.

l'appareil numérique du ciem conforme canadien peut - 3 (b) / nmb - 3 (b).

This device meets the exemption from the routine evaluation limits in section 6.6 of RSS 102 and compliance with RSS 102 RF exposure, users can obtain Canadian information on RF exposure and compliance. cet appareil est conforme à l'exemption des limites d'évaluation courante dans la section 6.6 du cnr - 102 et conformité avec rss 102 de l'exposition aux rf, les utilisateurs peuvent obtenir des données canadiennes sur l'exposition aux champs rf et la conformité.

This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment.

Cet équipement est conforme aux limites d'exposition aux rayonnements du Canada établies pour un environnement non contrôlé.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Cet équipement doit être installé et utilisé à une distance minimale de 20 cm entre le radiateur et votre corps.

Contact Us

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