
LoRaWAN Analog Sensor User Manual

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1. Introduction

1.1 What is LoRaWAN Pressure Sensor

The Dragino PS-LB series sensors are **LoRaWAN Pressure Sensor** for Internet of Things solution. PS-LB can measure Air, Water pressure and liquid level and upload the sensor data via wireless to LoRaWAN IoT server.

The PS-LB series sensors include **Thread Installation Type** and **Immersion Type**, it supports different pressure range which can be used for different measurement requirement.

The LoRa wireless technology used in PS-LB allows device to send data and reach extremely long ranges at low data-rates. It provides ultra-long range spread spectrum communication and high interference immunity whilst minimizing current consumption.

PS-LB supports BLE configure and wireless OTA update which make user easy to use.

PS-LB is powered by **8500mAh Li-SOCI2 battery**, it is designed for long term use up to 5 years.

Each PS-LB is pre-load with a set of unique keys for LoRaWAN registrations, register these keys to local LoRaWAN server and it will auto connect after power on.

PS-LB in a LoRaWAN Network



1.2 Features

- LoRaWAN 1.0.3 Class A
- Ultra-low power consumption
- Measure air / gas or water pressure
- Different pressure range available
- Thread Installation Type or Immersion Type
- Monitor Battery Level
- Bands: CN470/EU433/KR920/US915/EU868/AS923/AU915/IN865
- Support Bluetooth v5.1 and LoRaWAN remote configure
- Support wireless OTA update firmware
- Uplink on periodically
- Downlink to change configure
- 850mAh Battery for long term use
- Controllable 3.3v, 5v and 12v output to power external sensor

1.3 Specification

Micro Controller:

- MCU: 48Mhz ARM
- Flash: 256KB
- RAM: 64KB

Common DC Characteristics:

- Supply Voltage: 2.5v ~ 3.6v
- Operating Temperature: -40 ~ 85 °C

LoRa Spec:

- Frequency Range, Band 1 (HF): 862 ~ 1020 Mhz, Band 2 (LF): 410 ~ 528 Mhz
- Max +22 dBm constant RF output vs.
- RX sensitivity: down to -139 dBm.
- Excellent blocking immunity

Current Input Measuring :

- Range: 0 ~ 20mA
- Accuracy: 0.02mA
- Resolution: 0.001mA

Voltage Input Measuring:

- Range: 0 ~ 30v
- Accuracy: 0.02v
- Resolution: 0.001v

Battery:

- Li/SOCI2 un-chargeable battery
- Capacity: 8500mAh
- Self-Discharge: <1% / Year @ 25 °C
- Max continuously current: 130mA
- Max boost current: 2A, 1 second

Power Consumption

- Sleep Mode: 5uA @ 3.3v
- LoRa Transmit Mode: 125mA @ 20dBm, 82mA @ 14dBm

1.4 Probe Types

1.4.1 Thread Installation Type



- Hersman Pressure Transmitter
- Measuring Range: -0.1 ~ 0 ~ 60MPa, see order info.
- Accuracy: 0.2% F.S
- Long-Term Stability: 0.2% F.S $\pm$ 0.05%
- Overload 200% F.S
- Zero Temperature Drift: 0.03% FS/ $^{\circ}$ C($\leq$ 100Kpa), 0.02%FS/ $^{\circ}$ C ($>$ 100Kpa)
- FS Temperature Drift: 0.003% FS/ $^{\circ}$ C($\leq$ 100Kpa), 0.002%FS/ $^{\circ}$ C ($>$ 100Kpa)
- Storage temperature: -30 $^{\circ}$ C~80 $^{\circ}$ C
- Operating temperature: -20 $^{\circ}$ C~60 $^{\circ}$ C
- Connector Type: Various Types, see order info

1.4.2 Immersion Type



- Immersion Type, Probe IP Level: IP68
- Measuring Range: Measure range can be customized, up to 100m.
- Accuracy: 0.2% F.S
- Long-Term Stability: $\pm$ 0.2% F.S / Year
- Storage temperature: -30 $^{\circ}$ C~80 $^{\circ}$ C
- Operating temperature: 0 $^{\circ}$ C~50 $^{\circ}$ C
- Material: 316 stainless steels

1.5 Probe Dimension

1.6 Application and Installation

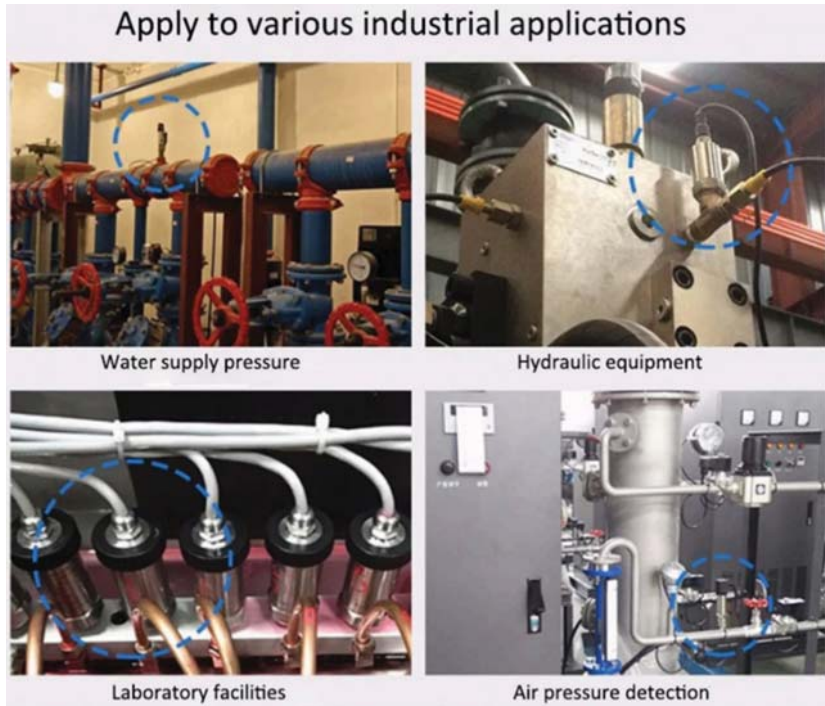
1.6.1 Thread Installation Type

Application:

- Hydraulic Pressure
- Petrochemical Industry
- Health and Medical
- Food & Beverage Processing

- Auto-controlling house
- Constant Pressure Water Supply
- Liquid Pressure measuring

Order the suitable thread size and install to measure the air / liquid pressure



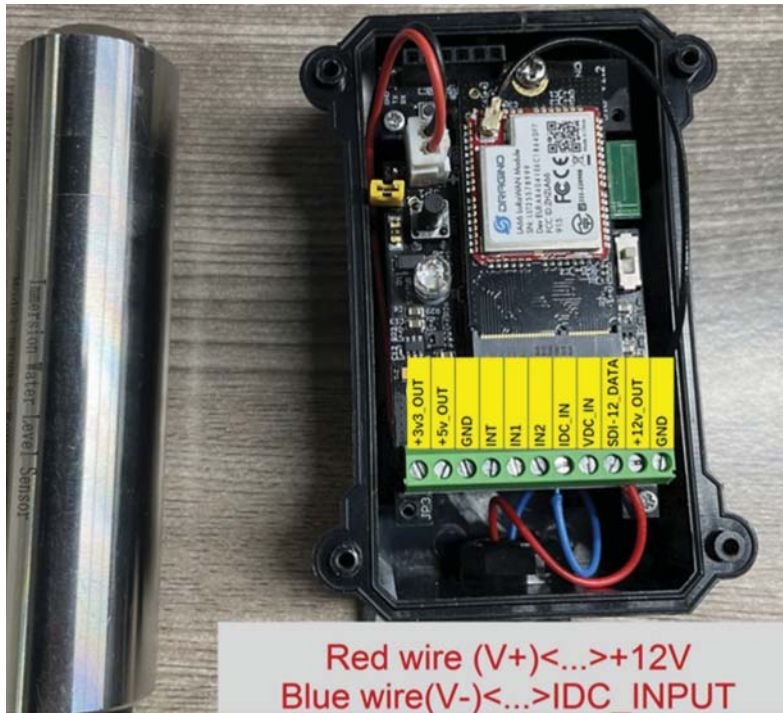
1.6.2 Immersion Type

Application:

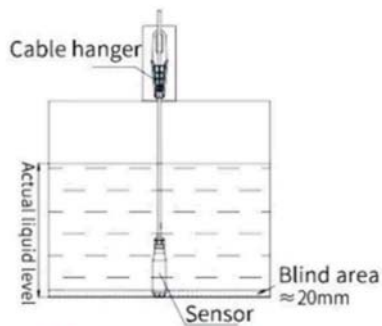
Liquid & Water Pressure / Level detect.



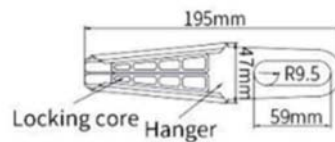
The Immersion Type pressure sensor is shipped with the probe and device separately. When user got the device, below is the wiring to for connect the probe to the device.



Installation Diagram

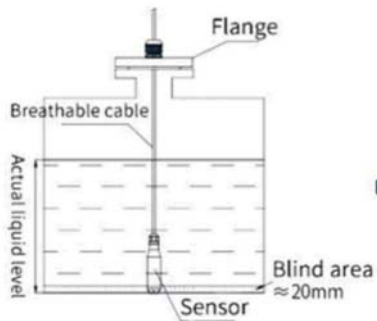


Cable Hanger Installation

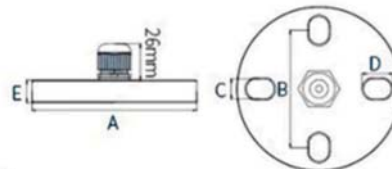


Locking core material: Engineering plastic
Hanger material: 304 stainless steel
Weight: 110g

Cable Hanger Size



Flange Fixed Installation



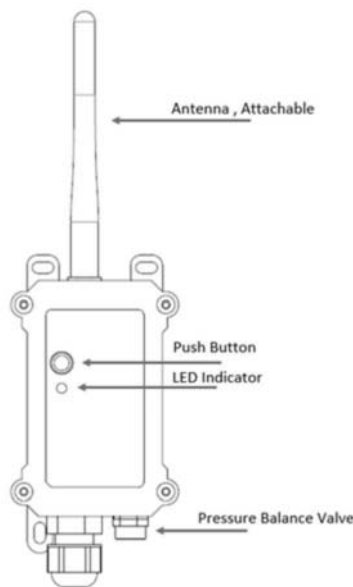
Flange Fixed Size

1.7 Sleep mode and working mode

Deep Sleep Mode: Sensor doesn't have any LoRaWAN activate. This mode is used for storage and shipping to save battery life.

Working Mode: In this mode, Sensor will work as LoRaWAN Sensor to Join LoRaWAN network and send out sensor data to server. Between each sampling/tx/rx periodically, sensor will be in IDLE mode), in IDLE mode, sensor has the same power consumption as Deep Sleep mode.

1.8 Button & LEDs



Behavior on ACT	Function	Action
Pressing ACT between 1s < time < 3s	Send an uplink	If sensor is already Joined to LoRaWAN network, sensor will send an uplink packet, blue led will blink once. Meanwhile, BLE module will be active and user can connect via BLE to configure device.
Pressing ACT for more than 3s	Active Device	Green led will fast blink 5 times, device will enter OTA mode for 3 seconds. And then start to JOIN LoRaWAN network. Green led will solidly turn on for 5 seconds after joined in network. Once sensor is active, BLE module will be active and user can connect via BLE to configure device, no matter if device join or not join LoRaWAN network.
Fast press ACT 5 times.	Deactivate Device	Red led will solid on for 5 seconds. Means PS-LB-NA is in Deep Sleep Mode.

1.9 Pin Mapping



1.10 BLE connection

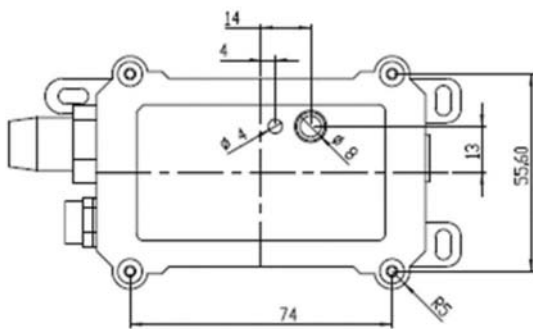
PS-LB support BLE remote configure.

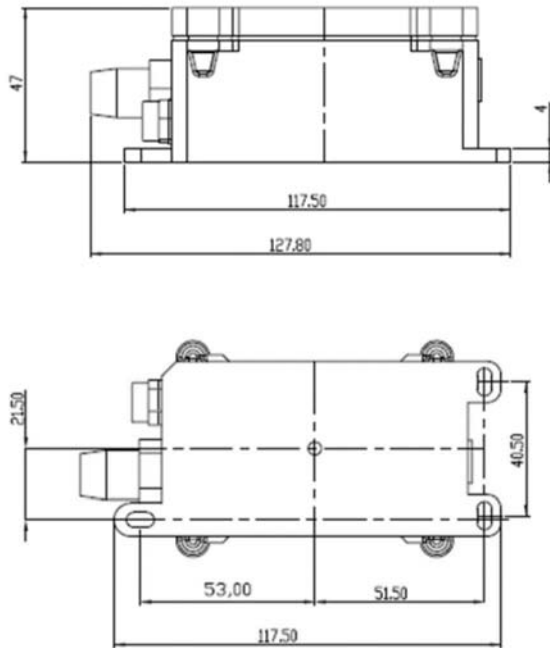
BLE can be used to configure the parameter of sensor or see the console output from sensor. BLE will be only activate on below case:

- Press button to send an uplink
- Press button to active device.
- Device Power on or reset.

If there is no activity connection on BLE in 60 seconds, sensor will shut down BLE module to enter low power mode.

1.11 Mechanical





2. Configure PS-LB to connect to LoRaWAN network

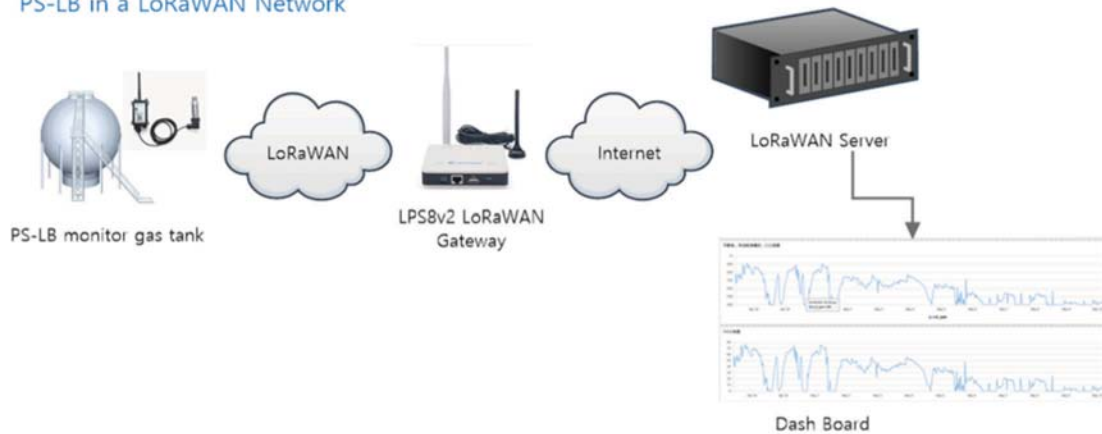
2.1 How it works

The PS-LB is configured as **LoRaWAN OTAA Class A** mode by default. It has OTAA keys to join LoRaWAN network. To connect a local LoRaWAN network, you need to input the OTAA keys in the LoRaWAN IoT server and activate the PS-LB. It will automatically join the network via OTAA and start to send the sensor value. The default uplink interval is 20 minutes.

2.2 Quick guide to connect to LoRaWAN server (OTAA)

Following is an example for how to join the [TTN v3 LoRaWAN Network](#). Below is the network structure; we use the [LPS8v2](#) as a LoRaWAN gateway in this example.

PS-LB in a LoRaWAN Network



The LPS8V2 is already set to connected to [TTN network](#), so what we need to now is configure the TTN server.

Step 1: Create a device in TTN with the OTAA keys from PS-LB.

Each PS-LB is shipped with a sticker with the default device EUI as below:



You can enter this key in the LoRaWAN Server portal. Below is TTN screen shot:

Register the device

Register end device

From The LoRaWAN Device Repository [Manually](#)

Preparation

Activation mode *

- ☒ Over the air activation (OTAA)
☐ Activation by personalization (ABP)
☐ Multicast
☐ Do not configure activation

LoRaWAN version ⓘ *

MAC V1.0.3

1

Network Server address

eu1.cloud.thethings.network

Application Server address

eu1.cloud.thethings.network

External Join Server ⓘ

☐ Enabled

Join Server address

eu1.cloud.thethings.network

Start

2

Add APP EUI and DEV EUI

Register end device

From The LoRaWAN Device Repository [Manually](#)

- 1 Basic settings
End device ID's, Name and Description
- 2 Network layer settings
Frequency plan, regional parameters, end device class and session keys.
- 3 Join settings
Root keys, NetID and kek labels.

End device ID ⓘ *

lsnpg01

AppEUI ⓘ *

.. .. . 00

DevEUI ⓘ *

.. .. .

End device name

LSNPG01

End device description

Description for my new end device

Optional end device description; can also be used to save notes about the end device

Network layer settings >

Add APP EUI in the application

Register end device

From The LoRaWAN Device Repository [Manually](#)

- ✓ **Basic settings**
End device ID's, Name and Description
- 2 Network layer settings**
Frequency plan, regional parameters, end device class and session keys.
- 3 **Join settings**
Root keys, NetID and kek labels.

Frequency plan ⓘ *

Europe 863-870 MHz (SF12 for RX2) ▼

LoRaWAN version ⓘ *

MAC V1.0.3 ▼

Regional Parameters version ⓘ *

PHY V1.0.3 REV A ▼

LoRaWAN class capabilities ⓘ

☐ Supports class B

☐ Supports class C

Advanced settings ▼

< Basic settings

Join settings >

Add APP KEY

Register end device

From The LoRaWAN Device Repository [Manually](#)

- ✓ **Basic settings**
End device ID's, Name and Description
- ✓ **Network layer settings**
Frequency plan, regional parameters, end device class and session keys.
- 3 **Join settings**
Root keys, NetID and kek labels.

Root keys

AppKey ⓘ *

BD 72 1D AC F3 CC AB 67 72 8D 7A F5 4D DF 30 8B ↻

Advanced settings ▼

< Network layer settings

Add end device

Step 2: Activate on PS-LB

Press the button for 5 seconds to activate the PS-LB.

Green led will fast blink 5 times, device will enter **OTA mode** for 3 seconds. And then start to JOIN LoRaWAN network. **Green led** will solidly turn on for 5 seconds after joined in network.

After join success, it will start to upload messages to TTN and you can see the messages in the panel.

2.3 Uplink Payload

2.3.1 Device Status, FPORT=5

Include device configure status. Once PS-LB Joined the network, it will uplink this message to the server.

Users can also use the downlink command(0x26 01) to ask PS-LB to resend this uplink.

Device Status (FPORT=5)					
Size (bytes)	1	2	1	1	2
Value	Sensor Model	Firmware Version	Frequency Band	Sub-band	BAT

Example parse in TTNv3



Sensor Model: For PS-LB, this value is 0x16

Firmware Version: 0x0100, Means: v1.0.0 version

Frequency Band:

- *0x01: EU868
- *0x02: US915
- *0x03: IN865
- *0x04: AU915
- *0x05: KZ865
- *0x06: RU864
- *0x07: AS923
- *0x08: AS923-1
- *0x09: AS923-2
- *0x0a: AS923-3
- *0x0b: CN470
- *0x0c: EU433

*0x0d: KR920

*0x0e: MA869

Sub-Band:

AU915 and US915:value 0x00 ~ 0x08

CN470: value 0x0B ~ 0x0C

Other Bands: Always 0x00

Battery Info:

Check the battery voltage.

Ex1: 0x0B45 = 2885mV

Ex2: 0x0B49 = 2889mV

2.3.2 Sensor value, FPORT=2

Uplink payload includes in total 9 bytes.

Size(bytes)	2	2	2	2	1
Value	BAT	Probe Model	0 ~ 20mA value	0 ~ 30v value	IN1 &IN2 Interrupt flag



2.3.3 Battery Info

Check the battery voltage for PS-LB.

Ex1: 0x0B45 = 2885mV

Ex2: 0x0B49 = 2889mV

2.3.4 Probe Model

PS-LB has different kind of probe, 4~20mA represent the full scale of the measuring range. So a 12mA output means different meaning for different probe.

For example.

Part Number	Probe Used	4~20mA scale	Example: 12mA meaning
PS-LB-I3	immersion type with 3 meters cable	0~3 meters	1.5 meters pure water
PS-LB-I5	immersion type with 5 meters cable	0~5 meters	2.5 meters pure water

PS-LB-T20-B	T20 threaded probe	0~1MPa	0.5MPa air / gas or water pressure
-------------	--------------------	--------	------------------------------------

The probe model field provides the convenient for server to identical how it should parse the 4~20mA sensor value and get the correct value.

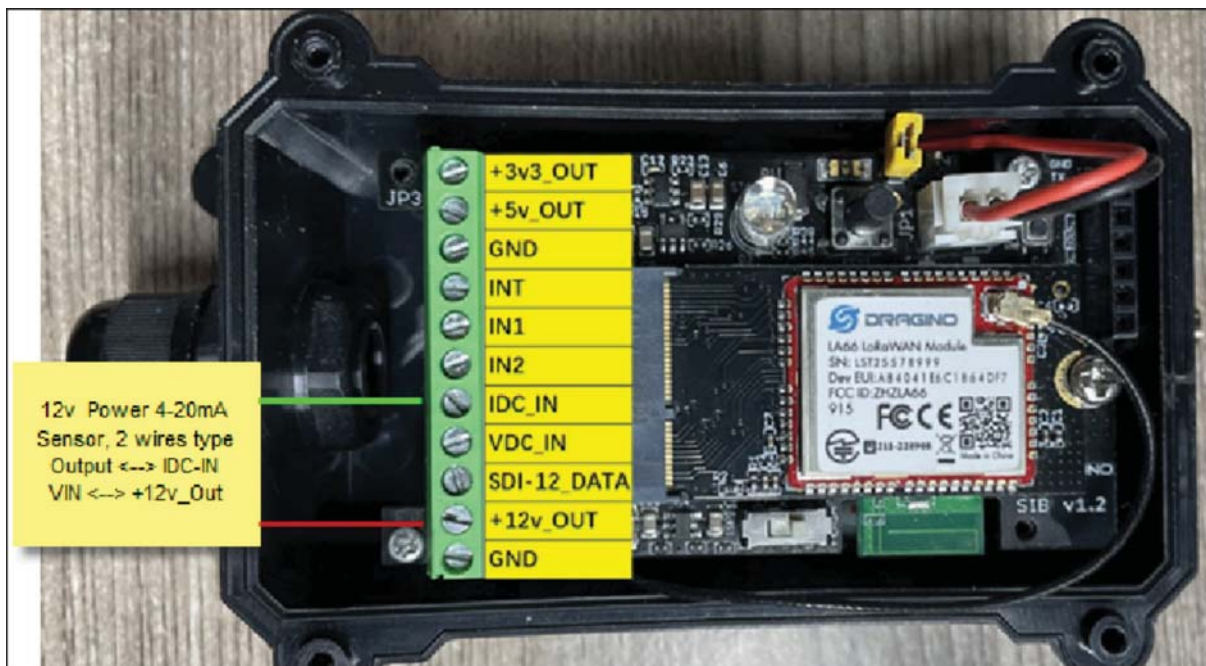
2.3.5 0~20mA value (IDC_IN)

The output value from **Pressure Probe**, use together with Probe Model to get the pressure value or water level.

Example:

$$27AE(H) = 10158 (D)/1000 = 10.158mA.$$

Instead of pressure probe, User can also connect a general 4~20mA in this port to support different types of 4~20mA sensors. below is the connection example:



2.3.6 0~30V value (pin VDC_IN)

Measure the voltage value. The range is 0 to 30V.

Example:

$$138E(H) = 5006(D)/1000 = 5.006V$$

2.3.7 IN1&IN2&INT pin

IN1 and IN2 are used as digital input pins.

Example:

09 (H): (0x09&0x04)>>2=0 IN2 pin is low level.

Example:

09 (H): 0x09&0x01=1 0x00: Normal uplink packet.

0x01: Interrupt Uplink Packet.

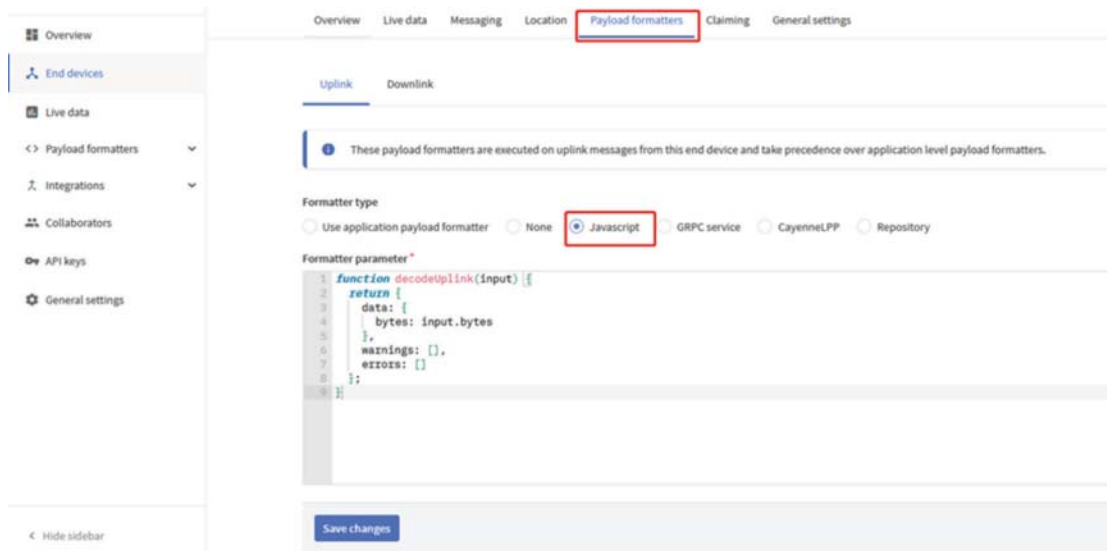
Size(bytes)	2	n
Value	BAT	Voltage value, each 2 bytes is a set of voltage values.



[voltage value1], [voltage value2], [voltage value3],...[voltage value n/2]

While using TTN network, you can add the payload format to decode the payload.

While using TTN network, you can add the payload format to decode the payload.



PS-LB TTN Payload Decoder: <https://github.com/dragino/dragino-end-node-decoder>

2.4 Uplink Interval

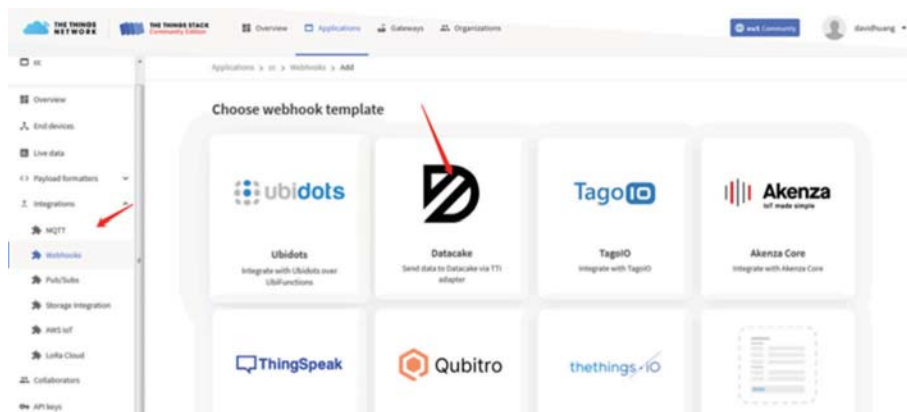
The PS-LB by default uplink the sensor data every 20 minutes. User can change this interval by AT Command or LoRaWAN Downlink Command. See this link: <http://wiki.dragino.com/xwiki/bin/view/Main/End%20Device%20AT%20Commands%20and%20Downlink%20Command/#H4.1ChangeUplinkInterval>

2.5 Show Data in DataCake IoT Server

[DATAKAKE](#) provides a human friendly interface to show the sensor data, once we have data in TTN, we can use [DATAKAKE](#) to connect to TTN and see the data in DATAKAKE. Below are the steps:

Step 1: Be sure that your device is programmed and properly connected to the network at this time.

Step 2: To configure the Application to forward data to DATAKAKE you will need to add integration. To add the DATAKAKE integration, perform the following steps:



Applications > lgt92test > Webhooks > Add > Datacake

Add custom webhook

Template information



Datacake

Send data to Datacake via TTI adapter

[About Datacake](#) | [Documentation](#)

Template settings

Webhook ID *

Token *

Datacake API Token

Create datacake webhook

Step 3: Create an account or log in Datacake.

Step 4: Create PS-LB product.

DEVICE

laq4

LAQ4-template

ldd75-test

lit65-one

lit65-test

lit65-two

lsn50

LSN50-template

LSPH01-template

LT22222

RS485-LN

ving 1 to 11 of 11 re

LoRaWAN

PARTICLE

API

D Zero

D Zero LTE

PINCODE

STEP 1

Product

STEP 2

Network Server

STEP 3

Devices

STEP 4

Plan

Datacake Product

You can add devices to an existing product on Datacake, create a new empty product or start with one of the templates. Products allow you to share the same configuration (fields, dashboard and more) between devices.

New Product from template
Create new product from a template

Existing Product
Add devices to an existing product

New Product
Create new empty product

New Product

If your device is not available as a template, you can start with an empty device. You will have to create the device definition (fields, dashboard) and provide the payload decoder in the device's configuration.

Product Name

LLDS12

Next

Add Device



LoRaWAN



PARTICLE



API



D Zero



D Zero LTE



PINCODE

STEP 1
Product

STEP 2
Network Server

STEP 3
Devices

STEP 4
Plan

Network Server

Please choose the LoRaWAN Network Server that your devices are connected to.

☒		The Things Stack V3 TTN V3 / Things Industries	Uplinks	Downlinks
☐		The Things Network V2 The old Things Network	Uplinks	Downlinks
☐		Helium	Uplinks	Downlinks
☐		LORIoT	Uplinks	Downlinks
☐		Kerlink Wanasy	Uplinks	
Showing 1 to 5 of 8 results			Previous	Next

[Back](#)

[Next](#)

Add Device

LoRaWAN PARTICLE API D Zero D Zero LTE PINCODE

STEP 1 Product **STEP 2** Network Server **STEP 3** Devices **STEP 4** Plan

Add Devices
Enter one or more LoRaWAN Device EUIs and the names they will have on Datacake.

DEVEUI	NAME
21 21 24 25 35 34 14 8 bytes	LLDS12

+ Add another device

Back Next

Step 5: add payload decode

Location: - Serial Number: A8404166A18219CF Last update: Mon May 31 2021 19:27:51 GMT+0800 Product Slug: dragino-ldds75-6

Dashboard Legacy Dashboard History Downlinks **Configuration** Debug Rules Permissions

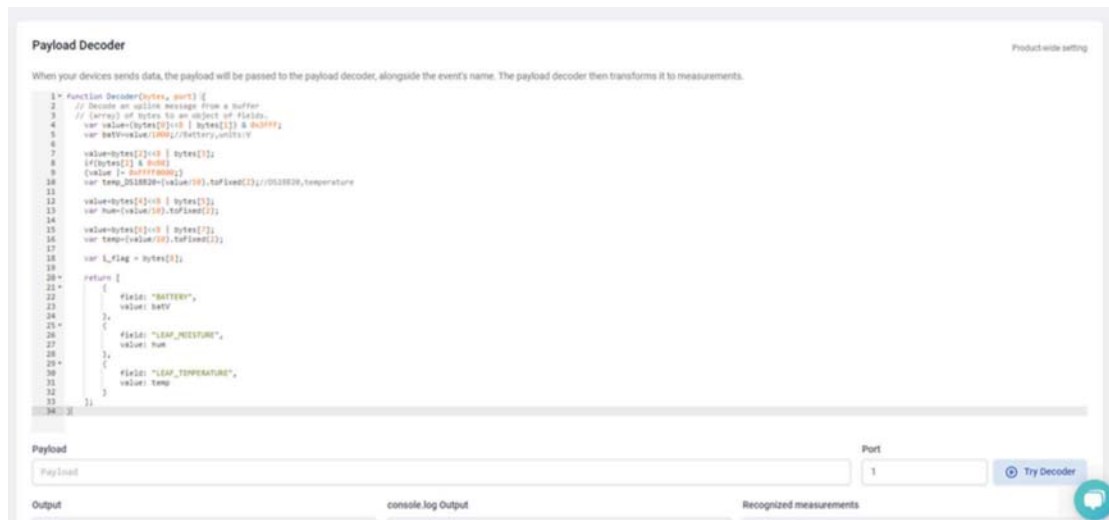
General Configuration

Name
ldd75-test

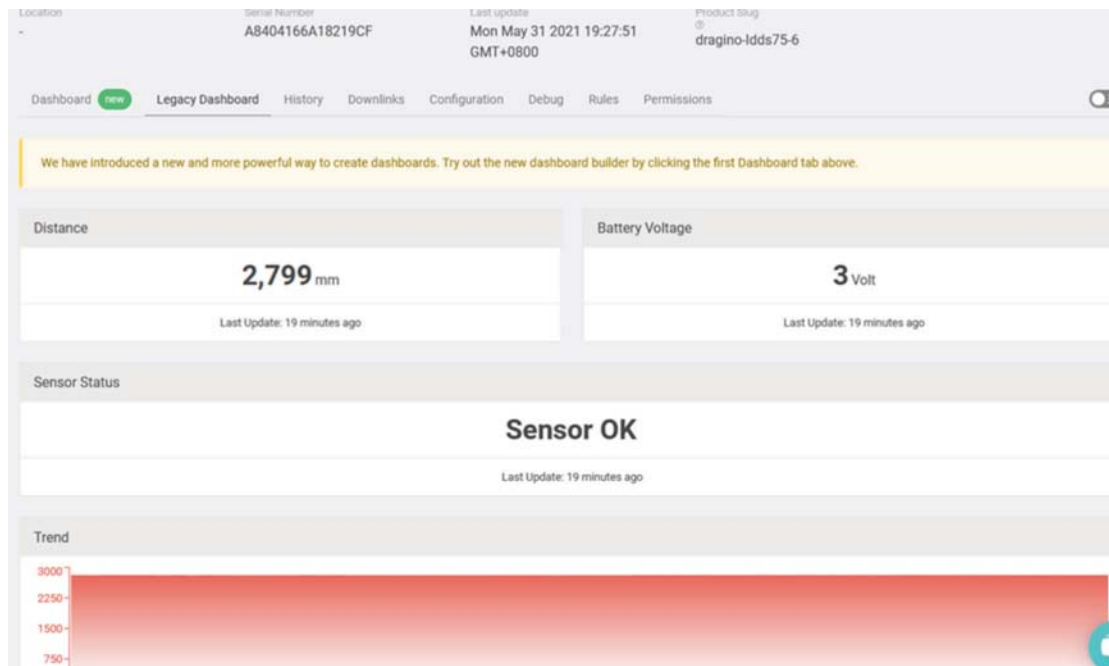
Location

Tags
You can use tags to organize your devices and create filters on the dashboard
Add tag

Metadata
Metadata is displayed on the device overview and can be used in dashboards



After added, the sensor data arrive TTN, it will also arrive and show in Datacake.



2.6 Frequency Plans

The PS-LB uses OTAA mode and below frequency plans by default. If user want to use it with different frequency plan, please refer the AT command sets.

<http://wiki.dragino.com/xwiki/bin/view/Main/End%20Device%20Frequency%20Band/>

2.7 Firmware Change Log

Firmware download link:

<https://www.dropbox.com/sh/gf1glloczbzz19h/AABbuYI4WY6VdAmpXo6o1V2Ka?dl=0>

3. Configure PS-LB

3.1 Configure Methods

PS-LB-NA supports below configure method:

- AT Command via Bluetooth Connection (**Recommend Way**): [BLE Configure Instruction](#).
- AT Command via UART Connection : See [FAQ](#).
- LoRaWAN Downlink. Instruction for different platforms: See [IoT LoRaWAN Server](#) section.

3.2 General Commands

These commands are to configure:

- General system settings like: uplink interval.
- LoRaWAN protocol & radio related command.

They are same for all Dragino Devices which support DLWS-005 LoRaWAN Stack. These commands can be found on the wiki:

<http://wiki.dragino.com/xwiki/bin/view/Main/End%20Device%20AT%20Commands%20and%20Downlink%20Command/>

3.3 Commands special design for PS-LB

These commands only valid for PS-LB, as below:

3.3.1 Set Transmit Interval Time

Feature: Change LoRaWAN End Node Transmit Interval.

AT Command: AT+TDC

Command Example	Function	Response
AT+TDC=?	Show current transmit Interval	30000 OK the interval is 30000ms = 30s
AT+TDC=60000	Set Transmit Interval	OK Set transmit interval to 60000ms = 60 seconds

Downlink Command: 0x01

Format: Command Code (0x01) followed by 3 bytes time value.

If the downlink payload=0100003C, it means set the END Node's Transmit Interval to 0x00003C=60(S), while type code is 01.

- Example 1: Downlink Payload: 0100001E // Set Transmit Interval (TDC) = 30 seconds
- Example 2: Downlink Payload: 0100003C // Set Transmit Interval (TDC) = 60 seconds

3.3.2 Set Interrupt Mode

Feature, Set Interrupt mode for GPIO_EXIT.

AT Command: AT+INTMOD

Command Example	Function	Response
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AT+INTMOD=?	Show current interrupt mode	0 OK the mode is 0 =Disable Interrupt
AT+INTMOD=2	Set Transmit Interval 0. (Disable Interrupt), 1. (Trigger by rising and falling edge) 2. (Trigger by falling edge) 3. (Trigger by rising edge)	OK

Downlink Command: 0x06

Format: Command Code (0x06) followed by 3 bytes.

This means that the interrupt mode of the end node is set to 0x000003=3 (rising edge trigger), and the type code is 06.

- Example 1: Downlink Payload: 06000000 // Turn off interrupt mode
- Example 2: Downlink Payload: 06000003 // Set the interrupt mode to rising edge trigger

3.3.3 Set the output time

Feature, Control the output 3V3 , 5V or 12V.

AT Command: AT+3V3T

Command Example	Function	Response
AT+3V3T=?	Show 3V3 open time.	0 OK
AT+3V3T=0	Normally open 3V3 power supply.	OK default setting
AT+3V3T=1000	Close after a delay of 1000 milliseconds.	OK
AT+3V3T=65535	Normally closed 3V3 power supply.	OK

AT Command: AT+5VT

Command Example	Function	Response
AT+5VT=?	Show 5V open time.	0 OK
AT+5VT=0	Normally closed 5V power supply.	OK default setting
AT+5VT=1000	Close after a delay of 1000 milliseconds.	OK
AT+5VT=65535	Normally open 5V power supply.	OK

AT Command: AT+12VT

Command Example	Function	Response
AT+12VT=?	Show 12V open time.	0 OK
AT+12VT=0	Normally closed 12V power supply.	OK
AT+12VT=500	Close after a delay of 500 milliseconds.	OK

Downlink Command: 0x07

Format: Command Code (0x07) followed by 3 bytes.

The first byte is which power, the second and third bytes are the time to turn on.

- Example 1: Downlink Payload: 070101F4 --> AT+3V3T=500

- Example 2: Downlink Payload: 0701FFFF ---> AT+3V3T=65535
- Example 3: Downlink Payload: 070203E8 ---> AT+5VT=1000
- Example 4: Downlink Payload: 07020000 ---> AT+5VT=0
- Example 5: Downlink Payload: 070301F4 ---> AT+12VT=500
- Example 6: Downlink Payload: 07030000 ---> AT+12VT=0

3.3.4 Set the Probe Model

Users need to configure this parameter according to the type of external probe. In this way, the server can decode according to this value, and convert the current value output by the sensor into water depth or pressure value.

AT Command: AT +PROBE

AT+PROBE=aabb

When aa=00, it is the water depth mode, and the current is converted into the water depth value; bb is the probe at a depth of several meters.

When aa=01, it is the pressure mode, which converts the current into a pressure value;

bb represents which type of pressure sensor it is.

(A->01,B->02,C->03,D->04,E->05,F->06,G->07,H->08,I->09,J->0A,K->0B,L->0C)

Command Example	Function	Response
AT +PROBE = ?	Get or Set the probe model.	0 OK
AT +PROBE =0003	Set water depth sensor mode, 3m type.	OK
AT +PROBE =000A	Set water depth sensor mode, 10m type.	OK
AT +PROBE =0101	Set pressure transmitters mode, first type(A).	OK
AT +PROBE =0000	Initial state, no settings.	OK

Downlink Command: 0x08

Format: Command Code (0x08) followed by 2 bytes.

- Example 1: Downlink Payload: 080003 ---> AT+PROBE=0003
- Example 2: Downlink Payload: 080101 ---> AT+PROBE=0101

3.3.5 Multiple collections are one uplink (Since firmware V1.1)

Added AT+STDC command to collect the voltage of VDC_INPUT multiple times and upload it at one time.

AT Command: AT +STDC

AT+STDC=aa,bb,bb

aa:

0: means disable this function and use TDC to send packets.

1: means enable this function, use the method of multiple acquisitions to send packets.

bb: Each collection interval (s), the value is 1~65535

cc: the number of collection times, the value is 1~120

Command Example	Function	Response
AT+STDC=?	Get the mode of multiple acquisitions and one uplink.	1,10,18 OK
AT+STDC=1,10,18	Set the mode of multiple acquisitions and one uplink, collect once every 10 seconds, and report after 18 times.	Attention:Take effect after ATZ OK

AT+STDC=0, 0,0

Use the TDC interval to send packets.(default)

Attention:Take effect after ATZ

OK

Downlink Command: 0xAE

Format: Command Code (0x08) followed by 5 bytes.

- Example 1: Downlink Payload: AE 01 02 58 12 ---> AT+STDC=1,600,18

4. Battery & Power Consumption

PS-LB-NA uses ER26500 + SPC1520 battery pack. See below link for detail information about the battery info and how to replace.

[Battery Info & Power Consumption Analyze](#) .

5. OTA firmware update

Please see this link for how to do OTA firmware update: <http://wiki.dragino.com/xwiki/bin/view/Main/Firmware%20OTA%20Update%20for%20Sensors/>

6. FAQ

6.1 How to use AT Command via UART to access device?

See: <http://wiki.dragino.com/xwiki/bin/view/Main/UART%20Access%20for%20LoRa%20ST%20v4%20base%20model/#H1.LoRaSTv4baseHardware>

6.2 How to update firmware via UART port?

See: <http://wiki.dragino.com/xwiki/bin/view/Main/UART%20Access%20for%20LoRa%20ST%20v4%20base%20model/#H1.LoRaSTv4baseHardware>

6.3 How to change the LoRa Frequency Bands/Region?

You can follow the instructions for [how to upgrade image](#).
When downloading the images, choose the required image file for download.

7. Order Info

PS : Pressure Sensor Series Prefix					
Wireless Tech: L: LoRaWAN , N : NB-IoT					
Battery Type: B: 8500mAh LI-SOIC2 Battery ; S: Solar Panel + Li-on Battery					
					Probe Type: T20 Thread Type - M20 x 1.5
					T14 Thread Type - M14 x 1.5
					T27 Thread Type - M27 x 2
					TG2 Thread Type - G1/2
					TG4 Thread Type - G1/4
					TN4 Thread Type - NPT1/4
					TP4 Thread Type - PT1/4
					I1 Immersion Version - 1 meter cable
					I2 Immersion Version - 2 meter cable
					I3 Immersion Version - 3 meter cable
					I4 Immersion Version - 4 meter cable
					Ixx Immersion Version - xx meter cable
					I100 Immersion Version - 100 meter cable
					PRESSURE -- Only for Thread Type A 0-0.6MPa B 0-1MPa C 0-1.6MPa D 0-2.5MPa E 0-10MPa F 0-40MPa G 0-60MPa H -0.1-0MPa I -0.1-0.1MPa J 0-5KPa K 0-50KPa L 0-100KPa
					Frequency: CN470/EU433/KR920/US915/ EU868/AS923/AU915/IN865
PS	-	L	B	-	T20 - B EU868 Example: PS-LB-T20-B-EU868
PS	-	L	B	-	I5 - US915 Example: PS-LB-I5-US915

8. Troubleshooting

8.1 Water Depth Always shows 0 in payload

If your device's IDC_input_mA is normal, but your reading always shows 0, please refer to the following points:

1. Please set it to mod1
2. Please set the command [AT+PROBE](#) according to the model of your sensor
3. Check the connection status of the sensor

9. Packing Info

Package Includes:

- PS-LB LoRaWAN Pressure Sensor

Dimension and weight:

- Device Size: cm
- Device Weight: g
- Package Size / pcs : cm
- Weight / pcs : g

10. Support

- Support is provided Monday to Friday, from 09:00 to 18:00 GMT+8. Due to different timezones we cannot offer live support. However, your questions will be answered as soon as possible in the before-mentioned schedule.
- Provide as much information as possible regarding your enquiry (product models, accurately describe your problem and steps to replicate it etc) and send a mail to Support@dragino.cc.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the 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.

Note: 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.

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& your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.