
PB05-L -- LoRaWAN Button User Manual

Version 410.1 authored by  [Mengting Qiu](#) on 2026/05/23 15:02

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Note: Images may differ from your actual product.

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1. Introduction

1.1 What is the PB05-L LoRaWAN Push Button?

The **PB05-L LoRaWAN Button** is a wireless device with **5 push buttons**. When a button is pressed, the device sends a signal to the IoT server using the LoRaWAN protocol.

It runs on **2 x AA batteries**, lasting for approximately **30k presses** across all five buttons. When the batteries run out, they can be easily replaced.

The PB05-L also has a **built-in speaker** that plays different sounds when a button is pressed or when a response is received from the server. If needed, the speaker can be turned off.

This device is **fully compatible with LoRaWAN v1.0.3** and works with any standard LoRaWAN gateway.

Note: Battery life depends on how often the device sends data. Check the [battery analyzer](#) for details.

1.2 Features

- Wall-mountable
- LoRaWAN v1.0.3 Class A protocol
- 5 push buttons
- Built-in speaker
- Frequency bands: CN470, EU433, KR920, US915, EU868, AS923, AU915
- AT commands for parameter configuration
- Remote parameter configuration via LoRaWAN downlink
- Firmware upgradeable via programming port
- Supports 2 × AA LR6 batteries
- IP20-rated for dust and water resistance

1.3 Power Consumption

- **Idle:** 5 µA
- **Transmit:** Max 110 mA

1.4 Storage & Operation Temperature

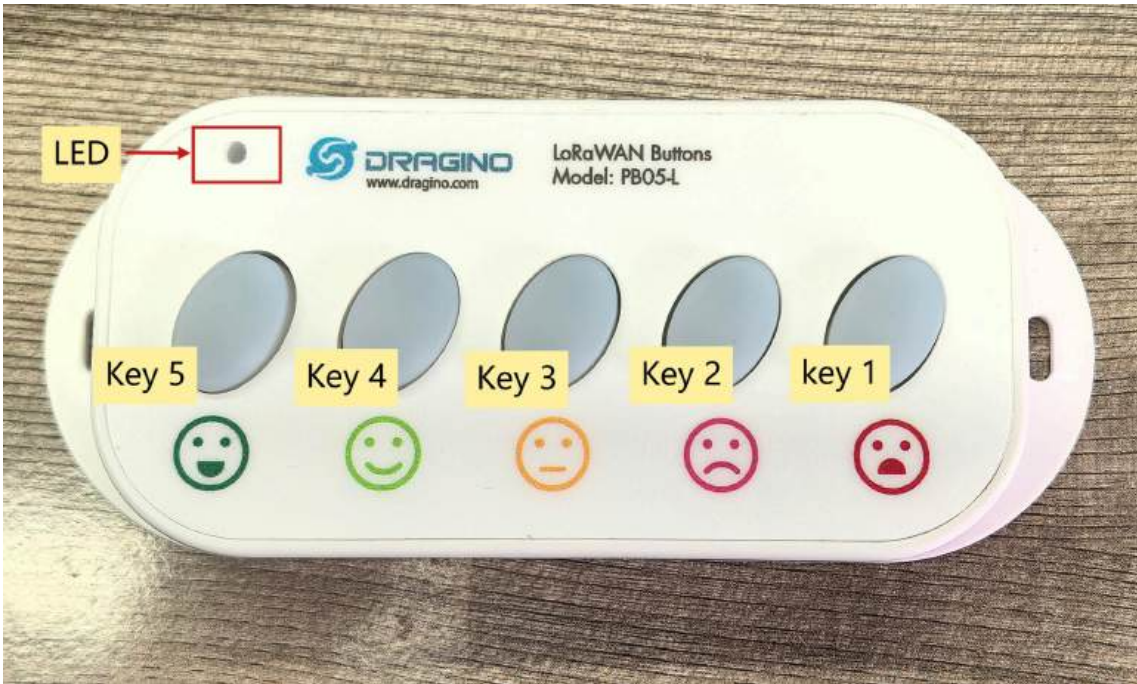
-10 ~ 50 °C or -40 ~ 60 °C (depends on the battery type, see [FAQ](#))

1.5 Applications

- Smart Buildings & Home Automation
- Logistics and Supply Chain Management
- Smart Metering
- Smart Agriculture
- Smart Cities
- Smart Factory

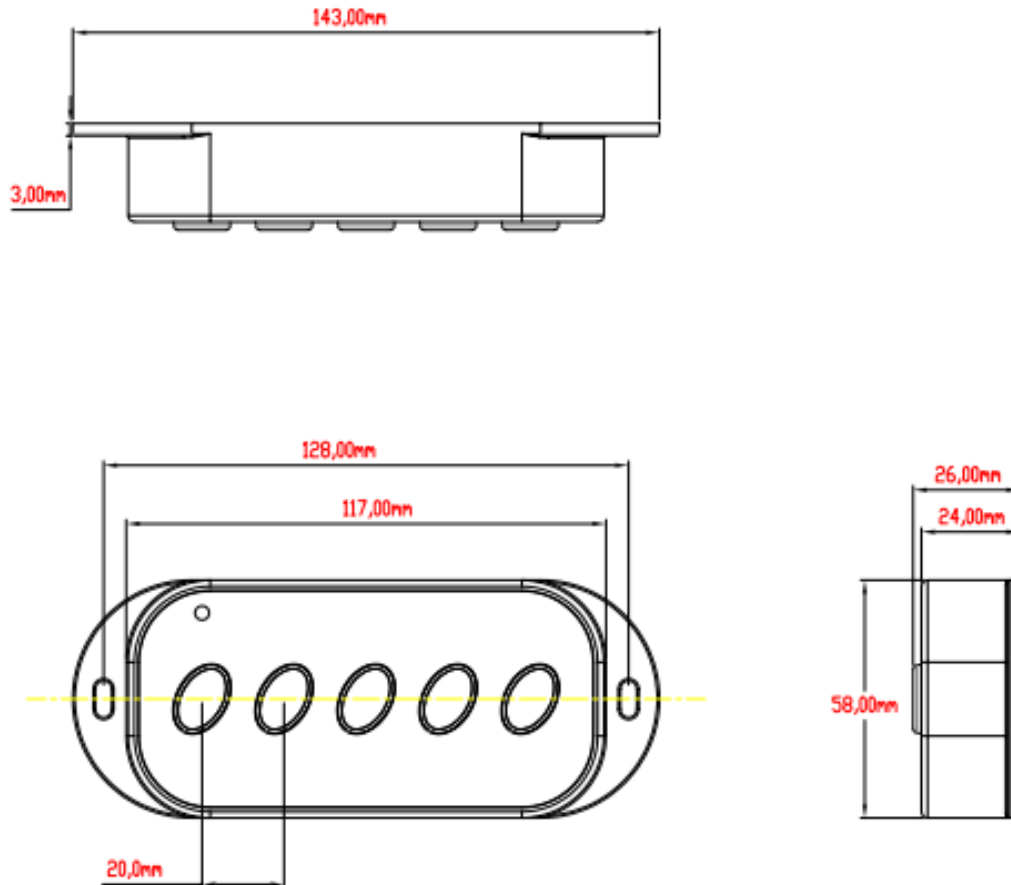
See **Use Cases** (Section 7) for more information.

1.6 Device appearance



Note: For customization purposes, the PVC sticker is not attached by default.

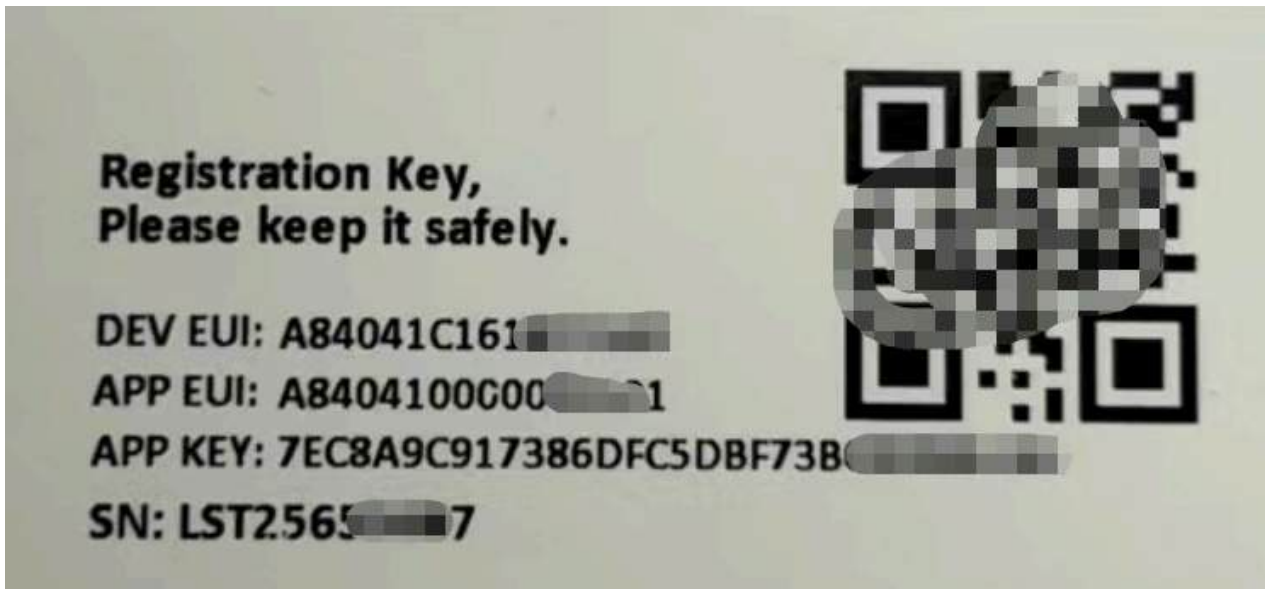
1.7 Mechanical Drawings



2. Operation Mode

2.1 How does it work?

Each PB05-L is shipped with a **unique set of LoRaWAN registration information**, including **DevEUI**, **AppEUI**, and **AppKey**. To use the PB05-L in a LoRaWAN network, the user must register these EUIs and keys **in advance** to enable OTAA activation of the device in the LoRaWAN network server.



Once the device is powered on and within the network's coverage, it will automatically join and start transmitting sensor data. By default, it sends an uplink every **20 minutes**.

2.2 How to Activate PB05-L?

1. **Open the enclosure from the bottom as shown in the image below.**



2. Insert 2 x AA LR6 batteries. Make sure to insert them in the correct direction.



3. Activate the device by pressing and holding (long press) the ACT button.



You can check [LED Status](#) to determine the working state of the PB05-L.

2.3 Joining with a LoRaWAN network server

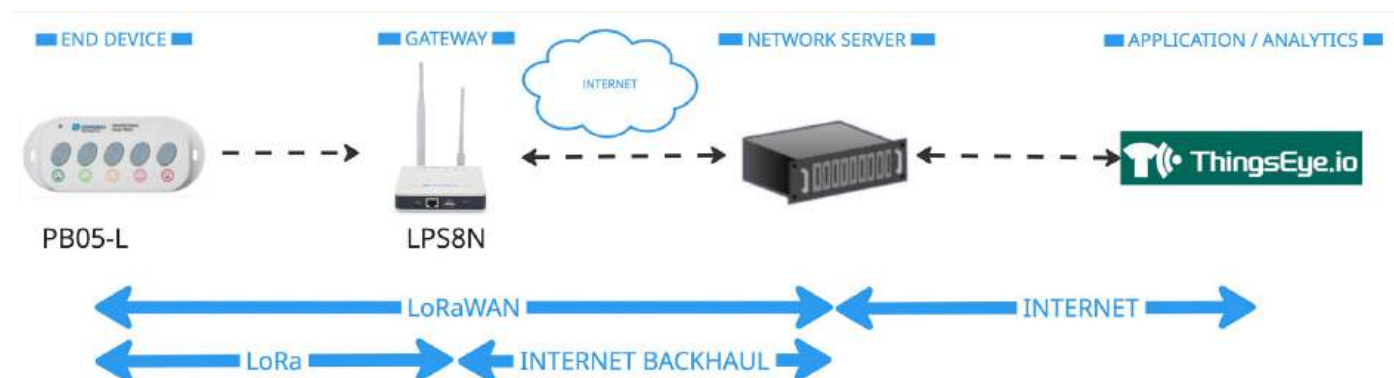
This section shows an example of how to join The Things Stack LoRaWAN network server. Registering with other LoRaWAN network servers may also follow a similar procedure.

The following network diagram shows that the PB05-L is connected to a LoRaWAN Network Server. The network server supports end-to-end data communication between the PB05-L and the application server. You can use any public LoRaWAN Network Server to register your device, or you can set up your own private LoRaWAN Network Server. The Things Stack (both free and paid) and ChirpStack are some of the popular LoRaWAN Network Servers available for use.

The following network diagram illustrates how the PB05-L connects to a LoRaWAN network server and how end-to-end communication occurs between the PB05-L and the application server.

The PB01-L sends LoRa-modulated uplink packet when a specific button (Button 1 to 5) is pressed by the user. The uplink packet is received by the LoRaWAN gateway and forwarded to the LoRaWAN Network Server via its internet connection. The Network Server then forwards the application payload of the uplink

packet to the Application Server for further processing, enabling data analysis and valuable insights. Both the Application Server and the Network Server can send downlink messages to the PB05-L through the LoRaWAN gateway.

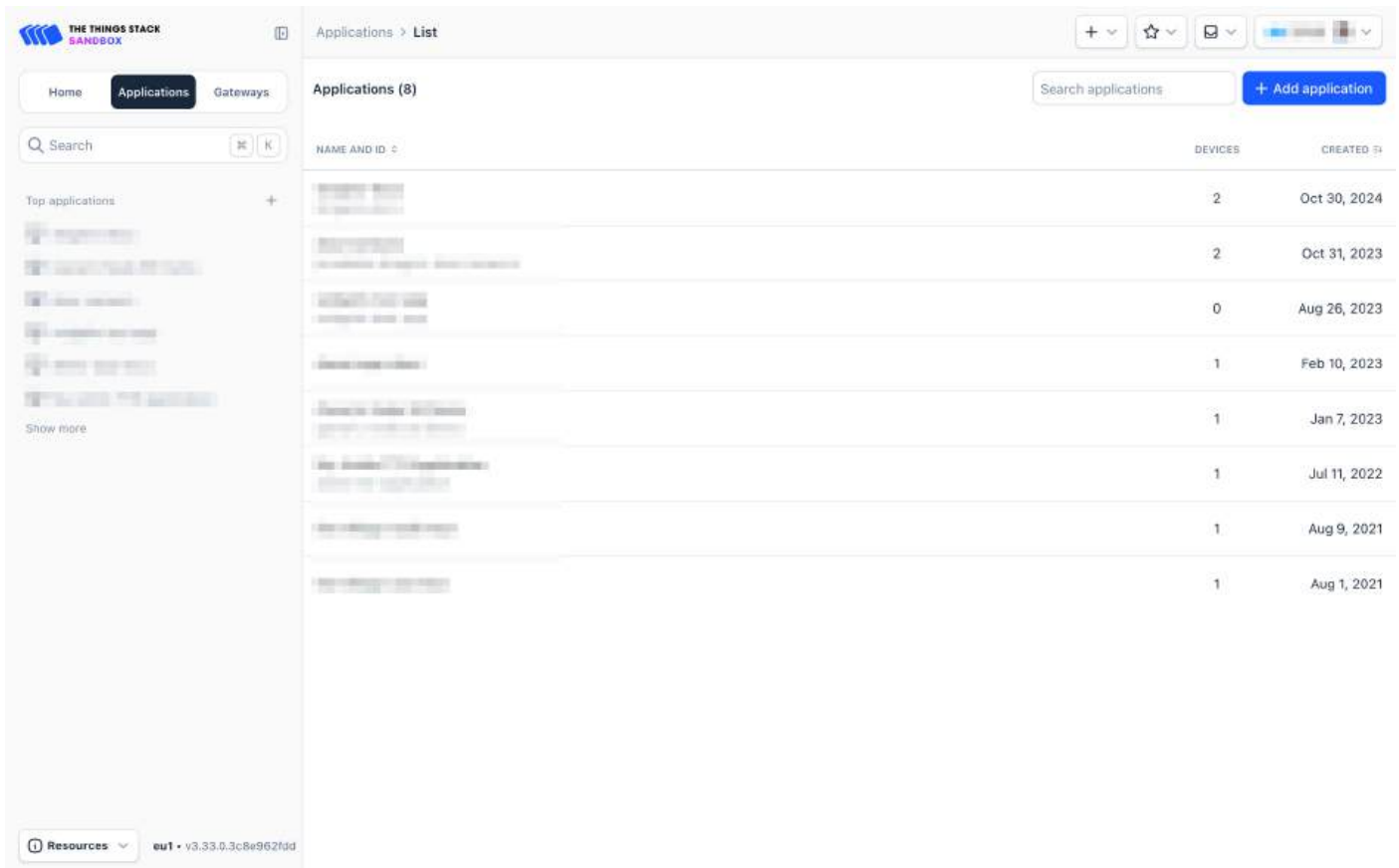


2.3.1 Registering with The Things Stack

The following steps guide you through the process of registering the PB05-L with The Things Stack LoRaWAN network server.

2.3.1.1 Setting up

- Sign up for a free account with [The Things Stack Sandbox](#) if you do not have one yet.
- Log in to your **The Things Stack** account.
- Create an **application** with The Things Stack if you do not have one yet.
 - On the left navigation, click **Applications**.
 - Then click + **Add Application** button.



- On the **Create Application** page, configure the following:
 - **Application ID:** Provide a unique identification for your application within The Things Stack.
 - **Application name:** (optional) Provide a descriptive name.
 - **Description:** (optional) Provide a description.
- Click on **Create application** button.

Applications > Create application

Create application

Within applications, you can register and manage end devices and their network data. After setting up your device fleet, use one of our many integration options to pass relevant data to your external services.
Learn more in our guide on [Adding Applications](#).

Application ID *
my-new-application

Application name
My new application

Description
Description for my new application

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

[Create application](#)

Resources eu1 • v3.33.0.3c8e962fdd

- Go to your application's page and click on the **End devices** in the left menu.
- On the End devices page, click on **+ Register end device**.

Applications > dragino-docs > End devices

dragino-docs
ID: dragino-docs

Last activity Dec 8, 2024 • 1 End devices

End devices (2)

Search [Import end devices](#) [+ Register end device](#)

NAME AND ID	DEVEUI	JOINEUI	LAST ACTIVITY
[REDACTED]	[REDACTED]	[REDACTED]	Never
[REDACTED]	[REDACTED]	[REDACTED]	Dec 8, 2024

Resources eu1 • v3.33.0.3c8e962fdd

- Two registration options are available:
 - Using the LoRaWAN Device Repository
 - Manual registration

2.3.1.2 Manual registration

Currently, the PB05-L supports only manual registration.

- On the **Register end device** page:
 - Select the option **Enter end device specifics manually** under **Input method**.
 - Select the **Frequency plan** that matches your device from the **Frequency plan** dropdown list.
 - Select the **LoRaWAN version** as **LoRaWAN Specification 1.0.3**
 - Select the **Regional Parameters version** as **RP001 Regional Parameters 1.0.3 revision A**
 - Enter **AppEUI** in the **JoinEUI** field. Then click **Confirm** button.

Applications > zero > End devices > **Register end device**

Register end device

Does your end device have a LoRaWAN® Device Identification QR Code? Scan it to speed up onboarding.

 Scan end device QR code

 [Device registration help](#)

End device type

Input method ⓘ

- ☐ Select the end device in the LoRaWAN Device Repository
- ☒ Enter end device specifics manually

Frequency plan ⓘ *

Europe 863-870 MHz (SF12 for RX2)

Select the frequency corresponding to the node

LoRaWAN version ⓘ *

LoRaWAN Specification 1.0.3

Regional Parameters version ⓘ *

RP001 Regional Parameters 1.0.3 revision A

[Show advanced activation, LoRaWAN class and cluster settings](#)

Provisioning information

JoinEUI ⓘ *

00 00 00 00 00 00 00 00

Confirm

AppEUI

To continue, please enter the JoinEUI of the end device so we can determine onboarding options

- In the **DevEUI** field, enter the **DevEUI**.
- In the **AppKey** field, enter the **AppKey**.
- In the **End device ID** field, enter a unique name for your PB05 within this application.
- Under **After registration**, select the **View registered end device** option.
- Click the **Register end device** button.

Provisioning information

JoinEUI ⓘ *

00 00 00 00 00 00 00 00

Reset

This end device can be registered on the network

DevEUI ⓘ *

.. .. .

Generate

10/50 used

AppKey ⓘ *

.. .. .

Generate

End device ID ⓘ *

my-new-device

After registration

☒ View registered end device

☐ Register another end device of this type

Register end device

You will be navigated to the **Device overview** page.

2.3.1.3 Uplink Payload Formatter (Decoder)

To add the uplink formatter code, select **Applications** > [your application] > **End devices** > [your end device] > **Payload formatters** > **Uplink**. Then select **Use Device repository formatters** for the **Formatter type** dropdown. Click the **Save changes** button to apply the changes.

The uplink payload formatter for PB05-L can be downloaded from here: [PB05-L decoder](#).

pb05
ID: 0005

Last activity 2 minutes ago • T4 5 up / 1 (App), 4 (Nwk) down

Device overview Live data Messaging Location **Payload formatters** Settings

Uplink Downlink

Setup

Formatter type*
Custom Javascript formatter

Formatter code*

```

1 function dataLog(i,bytes){
2   var a1=((bytes[4+i]>>4) & 0x01)? "Yes":"No";
3   var a2=((bytes[4+i]>>3) & 0x01)? "Yes":"No";
4   var a3=((bytes[4+i]>>2) & 0x01)? "Yes":"No";
5   var a4=((bytes[4+i]>>1) & 0x01)? "Yes":"No";
6   var a5=(bytes[4+i] & 0x01)? "Yes":"No";
7   var dd=(bytes[6+i]&0x01)? "True":"False";
8   var cDate=getMyDate((bytes[7+i]<<24 | bytes[8+i]<<16 | bytes[9+i]<<8 | bytes[10+i]).toString(16));
9   var string='['+a1+', '+a2+', '+a3+', '+a4+', '+a5+', '+dd+', '+cDate+']';
10
11   return string;
12 }
13
14 function getc(c_num){
15   if(parseInt(c_num) < 10)
16     c_num = '0' + c_num;
17
18   return c_num;
19 }
20
21 function getMyDate(str){
22   var cDate;
23   if(str > 9999999999)
24     cDate = new Date(parseInt(str));
25   else

```

Replace the TTN original decoding with our decoding

Test

Byte payload

FPort 1

Test decoder

Press the ACT button to activate the PB05-L. It will then join The Things Stack. Once successfully joined, it will start uploading sensor data to The Things Stack, which you can view on the Live Data panel.

pb05
ID: 0005

Last activity 1 minute ago • T4 5 up / 1 (App), 4 (Nwk) down

Device overview **Live data** Messaging Location Payload formatters Settings

Time Type Data Preview

17:00:14 Schedule data download for transmissi... DevAddr: 26 00 00 20 Rx1 Delay: 0

17:00:14 Forward uplink data message DevAddr: 26 00 00 20 Payload: { Alarm: "FALSE", BatV: 3.10, Sound_ACK: "OPEN", Sound_key: "OPEN", key1: "No", key2: "No", key3: "No", key4: "No", key5: "No" } FPort: 2 Data rate: SF12BW125 300k 9.5 8000

17:00:16 Successfully processed data message DevAddr: 26 00 00 20

17:00:16 Forward join-accept message DevAddr: 26 00 00 20 JoinEUI: FF FF FF FF FF FF FF FF DevEUI: 02 FF FF FF FF FF FF FF FF

17:00:00 Successfully processed join-request DevAddr: 26 00 F9 01 JoinEUI: FF FF FF FF FF FF FF FF DevEUI: 01 FF FF FF FF FF FF FF FF

17:00:00 Accept join-request DevAddr: 26 00 00 20 JoinEUI: FF FF FF FF FF FF FF FF DevEUI: 02 FF FF FF FF FF FF FF FF

17:00:40 Schedule data download for transmissi... DevAddr: 26 00 F9 01 Rx1 Delay: 0

17:29:47 Console: Stream disconnected The stream connection has been re-established

2.4 Uplink Payload

Uplink payloads include two types: **Valid Sensor Value** and **Other Status / Control Commands**.

- **Valid Sensor Value:** Use FPort=2
- **Other Status / Control Commands:** Use an FPort other than 2.

2.4.1 Uplink FPort=5, Device Status

You can get the **Device Status** uplink through the downlink command:

Downlink: 0x2601

The device uplinks the status using FPort=5.

Size (bytes)	1	2	1	1	2
Value	Sensor Model	Firmware Version	Frequency Band	Sub-band	BAT

Example from The Things Stack:

Example payload (FPort=5): **3B 01 00 01 FF 0C 48**

Sensor Model: For PB05-L, this value is 0x3B.

Firmware Version: 0x0100 means the version is v1.0.0.

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

Sub-Band: Value 0x00 to 0x08 (only for CN470, AU915, and US915. For other regions, use 0x00.)

BAT: Shows the battery voltage of PB05-L.

Example: 0x0C48 = 3144mV

2.4.2 Uplink FPort=2, Real-time sensor value

The PB05-L will send this uplink after the Device Status uplink once it has successfully joined the LoRaWAN network. It will then continue to send this uplink periodically. The default interval is **20 minutes**, but it [can be changed](#).

This uplink uses FPort=2 and, by default, is sent once every 20 minutes.

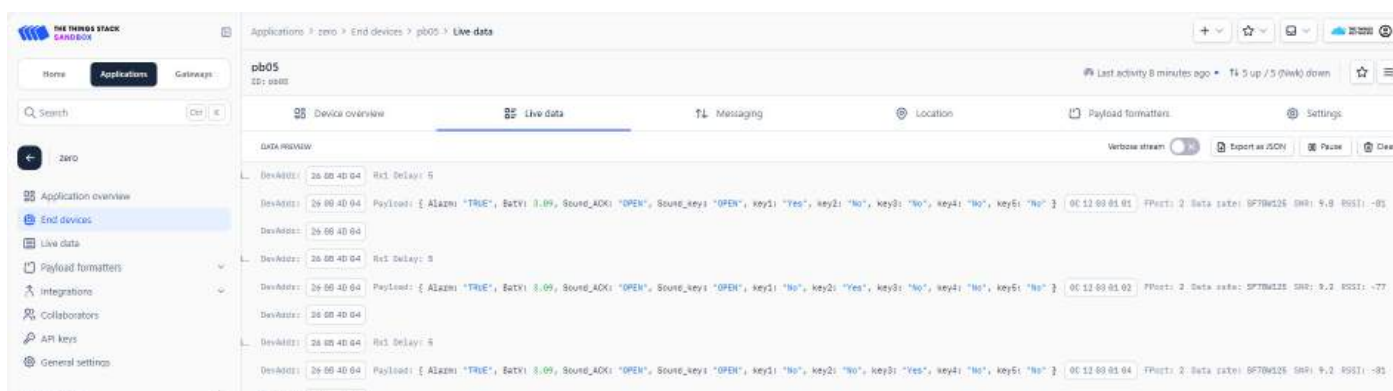
Size(bytes)	2	1	1	1
-------------	---	---	---	---

Value	Battery	Sound_key & Sound_ACK	Alarm	key1 & key2 & key3 & key4 & key5
-------	---------	-----------------------	-------	----------------------------------

key1 & key2 & key3 & key4 & key5:

Size(bit)	bit[1:7]	bit0
Value	Reserve	key1 & key2 & key3 & key4 & key5

Example from The Things Stack.



- Battery:**

To get the battery voltage.

Example 1: 0x0CEA = 3306mV

Example 2: 0x0D08 = 3336mV

- Sound_key & Sound_ACK:**

Key sound and ACK sound are enabled by default.

Example 1: 0x03

Sound_ACK: (03>>1) & 0x01=1, OPEN.

Sound_key: 03 & 0x01=1, OPEN.

Example 2: 0x01

Sound_ACK: (01>>1) & 0x01=0, CLOSE.

Sound_key: 01 & 0x01=1, OPEN.

- Alarm:**

Key alarm.

Example 1: 0x01 & 0x01=1, "TRUE", key alarm packet.

Example 2: 0x00 & 0x01=0, "FALSE", normal uplink data.

- **key1**

Displays whether the uplink data was triggered by key 1.

01 (H): (0x01&0x01)=01(H) =0000 000**1**(B) bit0=1, "Yes"

02 (H): (0x02&0x01)=0 bit0=0, "No"

- **key2**

Displays whether the uplink data was triggered by key 2.

02 (H): (0x02>>1)&0x01 =01(H) =0000 000**1**(B) bit0=1, "Yes"

04 (H): (0x04>>1)&0x01 =0 bit0=0, "No"

- **key3**

Displays whether the uplink data was triggered by key 3.

04 (H): (0x04>>2)&0x01 =01(H) =0000 000**1**(B) bit0=1, "Yes"

08 (H): (0x08>>2)&0x01 =0 bit0=0, "No"

- **key4**

Displays whether the uplink data was triggered by key 4.

08 (H): (0x08>>3)&0x01 =01(H) =0000 000**1**(B) bit0=1, "Yes"

10 (H): (0x10>>3)&0x01 =0 bit0=0, "No"

- **key5**

Displays whether the uplink data was triggered by key 5.

10 (H): (0x10>>4)&0x01 =01(H) =0000 000**1**(B) bit0=1, "Yes"

01 (H): (0x01>>4)&0x01 =0 bit0=0, "No"

2.4.3 Uplink FPort=3, Datalog sensor value

PB05-L stores sensor values, and the user can retrieve this historical data via a downlink command. The datalogged sensor values are sent via FPort=3.

The historical payload includes one or multiple entries.

Size(bytes)	4	1	1	1	4
Value	Reserve	key5 & key4 & key3 & key2 & key1	Reserve	Poll message flag & alarm	Unix Time Stamp

key5 & key4 & key3 & key2 & key1:

Size(bit)	bit[1:7]	bit0
Value	Reserve	key5 & key4 & key3 & key2 & key1

Poll message flag & Alarm:

Size(bit)	bit7	bit6	bit5	bit4	bit[3:1]	bit0
Status&Ext	No ACK Message	Poll Message Flag	Sync time OK	Unix Time Request	Reserve	Alarm:1

No ACK Message: 1: This indicates that the payload is from an uplink message that did not receive an ACK from the server (related to the [PNACKMD=1](#) feature)

Poll Message Flag: 1: This indicates that the message is a reply to a poll message.

- Each data entry is 11 bytes long to save airtime and battery. PB05-L will send the maximum number of bytes allowed based on the current data rate (DR) and frequency band.

For example, in the US915 band, the maximum payload size for different DRs is:

- DR0:** Maximum is 11 bytes - the device sends one data entry.
- DR1:** Maximum is 53 bytes - the device sends 4 data entries (44 bytes total).
- DR2:** Payload includes 11 data entries.
- DR3:** Payload includes 22 data entries.

If you send the downlink command: **31 6722DD98 672300C0 05**

Where:

Start time: 6722DD98 = 2024/10/31 (Thursday) 01:30:00

Stop time: 672300C0 = 2024/10/31 (Thursday) 04:00:00

PB05-L will uplink the following payload:

TIME	TYPE	DATA/REVIEW
10:09:27	Schedule data downlink for transmission	DevAddr: 28 08 4D 04 RxD Delay: 5
10:09:27	Forward uplink data message	DevAddr: 28 08 4D 04 Payload: [DATA00: [Yes.No.No.No.No.True,2024-10-31 00:00:00],[No.No.No.No.No.No,2024-10-31 00:00:00],[No.No.No.No.No.No,2024-10-31 00:00:00],[No.No.No.No.No.No,2024-10-31 00:00:00],[No.No.No.No.No.No,2024-10-31 00:00:00],[No.No.No.No.No.No,2024-10-31 00:00:00],[No.No.No.No.No.No,2024-10-31 00:00:00],[No.No.No.No.No.No,2024-10-31 00:00:00],[No.No.No.No.No.No,2024-10-31 00:00:00],[No.No.No.No.No.No,2024-10-31 00:00:00],[No.No.No.No.No.No,2024-10-31 00:00:00]]
10:09:27	Successfully processed data message	DevAddr: 28 08 4D 04
10:09:28	Schedule data downlink for transmission	DevAddr: 28 08 4D 04 PPort: 1 PFC payload: 02 09 40 14 30 00 74 03 FC AL RxD Delay: 0
10:09:28	Forward uplink data message	DevAddr: 28 08 4D 04 Payload: [Alarm: "TRUE", Batt: 3.00, Sound_ACK: "OPEN", Sound_key: "OPEN", key1: "No", key2: "No", key3: "No", key4: "No", key5: "True"] 0C 12 03 00 10 PPort: 3 Data rate: SF7BW125 RSK: -47
10:09:28	Successfully processed data message	DevAddr: 28 08 4D 04
10:09:30	Receive downlink data message	31 67 22 DD 98 67 23 00 C0 05 PPort: 1
10:09:43	Forward uplink data message	DevAddr: 28 08 4D 04 Payload: [Alarm: "FALSE", Batt: 3.00, Sound_ACK: "OPEN", Sound_key: "OPEN", key1: "No", key2: "No", key3: "No", key4: "No", key5: "No"] 0C 12 03 00 00 PPort: 3 Data rate: SF7BW125 RSK: -47
10:09:43	Successfully processed data message	DevAddr: 28 08 4D 04

000000001000416722E531

000000000800416722E5380000000000400416722E540000000000200416722E54A000000000100416722E55200

Where the first 11 bytes are for the first entry:

00000000 10 00 41 6722E531

The first four bytes are reserved - (do not indicate anything)

key5 & key4 & key3 & key2 & key1: 10(H).

- key5: $((0x10 \gg 4) \& 0x01) = 1$, "Yes".
- key4: $((0x10 \gg 3) \& 0x01) = 0$, "No".
- key3: $((0x10 \gg 2) \& 0x01) = 0$, "No".
- key2: $((0x10 \gg 1) \& 0x01) = 0$, "No".
- key1: $(0x10 \& 0x01) = 0$, "No".

The sixth byte is reserved - (does not indicate anything)

Poll Message Flag & Alarm: 0x41 (Hex) indicates a reply message. For the alarm, $0x41 \& 0x01 = 1$, which means "True".

Unix time is $0x6722E531 = 1730340145s = 24/10/31\ 02:02:25$

If the PB05-L has no data at the polling time, it will transmit an uplink containing 11 bytes of zeros.

See [Datalog feature](#) for more informaton.

2.5 Show data on Datalog

The Datalog IoT platform provides a user-friendly interface to display sensor data in charts. Once your sensor data is available in The Things Stack, you can connect Datalog to The Things Stack and view the data in Datalog. Follow the steps below:

2.5.1 Prerequisites

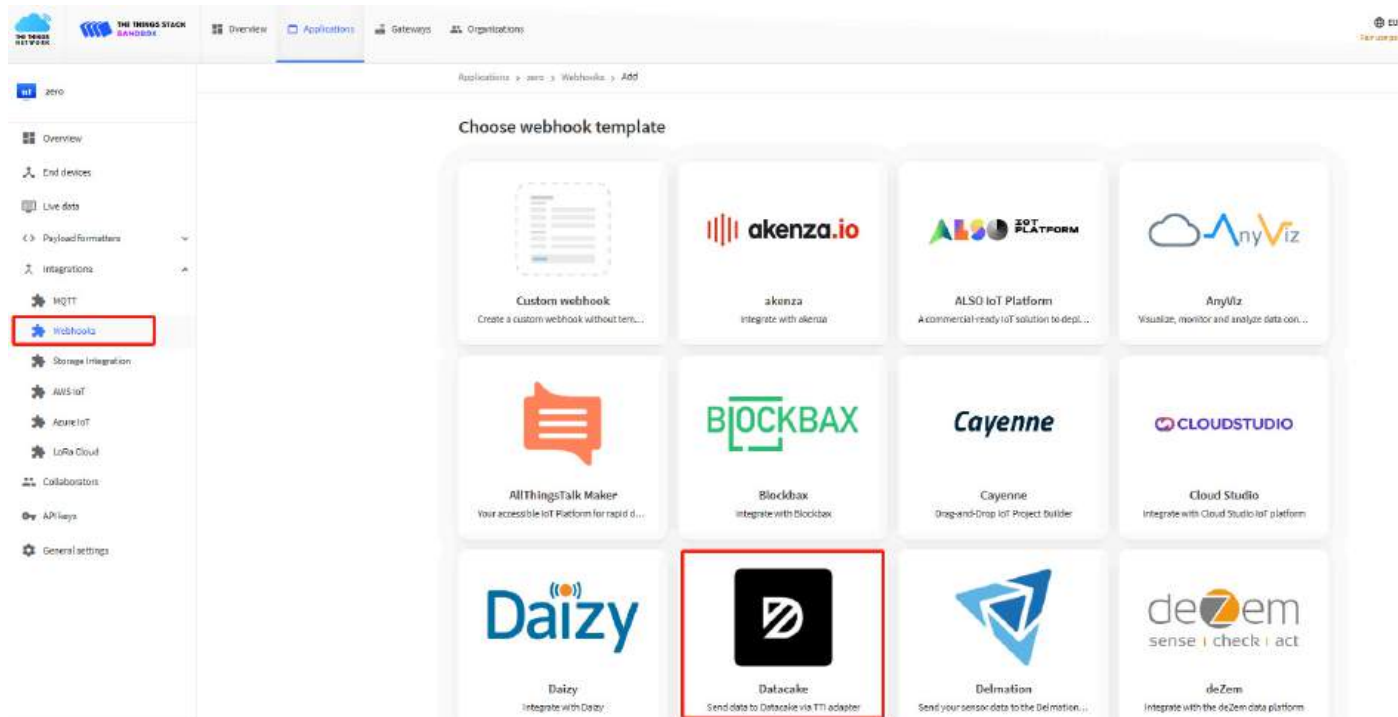
- The Things Stack account
- Ensure that your PB05 is programmed and properly connected to the LoRaWAN network.

2.5.2 Procedure

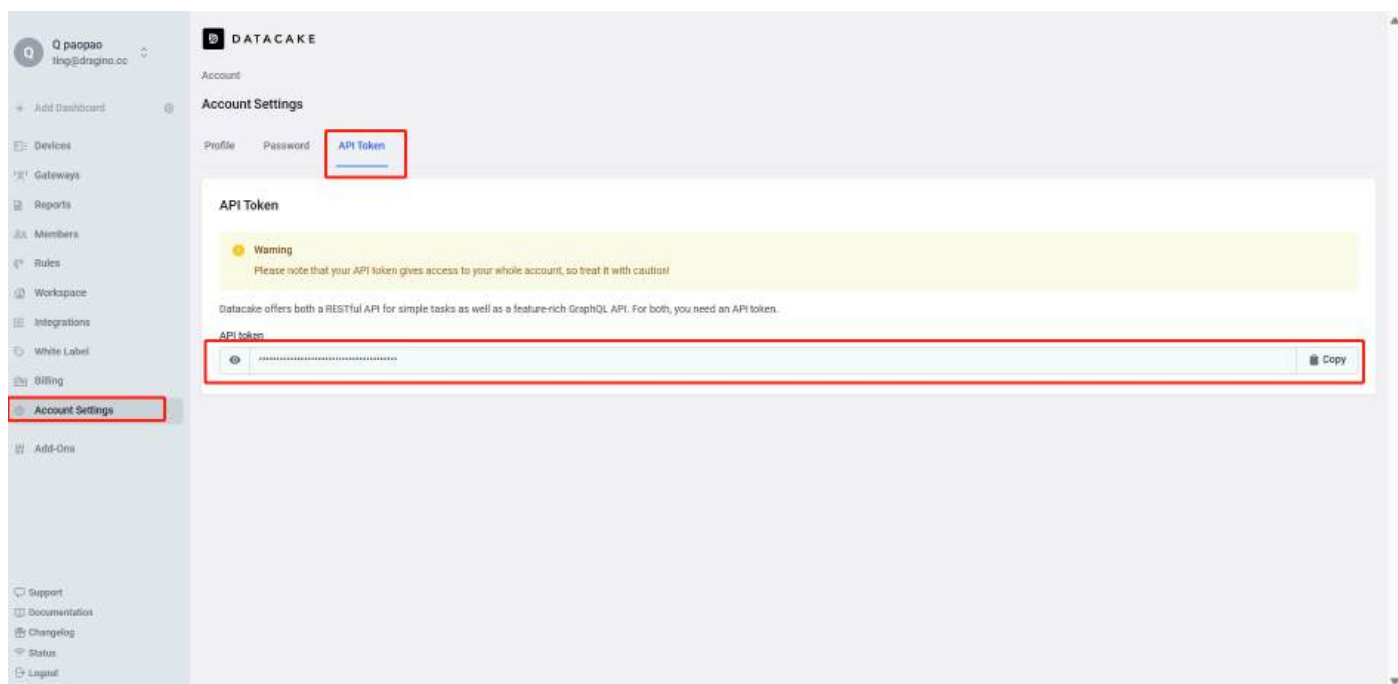
First, configure your application to forward data to Datalog by adding an integration:

1. Go to The **Things Stack Console --> Applications --> Integrations --> Add Integrations.**
2. On the **Choose webhook template** page, click on the **Datacake.**

Please refer to the figure below:



Log in to **Datacake** and copy the **API token** from your account. You can find it under **Account Settings -> API Token**.



In the **Setup webhook for Datacake** page, enter the following:

- Enter the **Webhook ID**

- Paste the **API token** you copied from The Things Stack in the **Token** text box.

Click on the **Create Datacake webhook** button.

The screenshot shows the 'Setup webhook for Datacake' page in The Things Stack. The left sidebar contains navigation links: Overview, End devices, Live data, Payload formatters, Integrations, MQTT, Webhooks (highlighted), Storage Integration, AWS IoT, Azure IoT, LoRa Cloud, Collaborators, API keys, and General settings. The main content area has a breadcrumb trail: Applications > zero > Webhooks > Add > Datacake. The form includes a 'Webhook ID' field with the value 'pb05-l', a 'Token' field with a redacted value, and a 'Create Datacake webhook' button. Red arrows point to the 'Token' field with the text 'Paste the API here' and to the 'Create Datacake webhook' button.

Setup webhook for Datacake
Send data to Datacake via TTI adapter
[About Datacake](#) | [Help](#)

Webhook ID *
pb05-l

Token *
[Redacted Token]

Datacake API Token

Create Datacake webhook

In the Datacake, click **Devices** and then click on the **+Add Device** button.

The screenshot shows the 'Fleet > Devices' page in Datacake. The 'Devices' tab is selected in the left sidebar. The top right corner has a search bar, a 'Columns' dropdown, and a '+ Add Device' button. Below this is a table with columns: DEVICE, PRIMARY, SECONDARY, DEVICE SIGNAL, and DEVICE BATTERY. The table contains two rows of device data. A red arrow points to the '+ Add Device' button.

DATA CAKE

Fleet > Devices

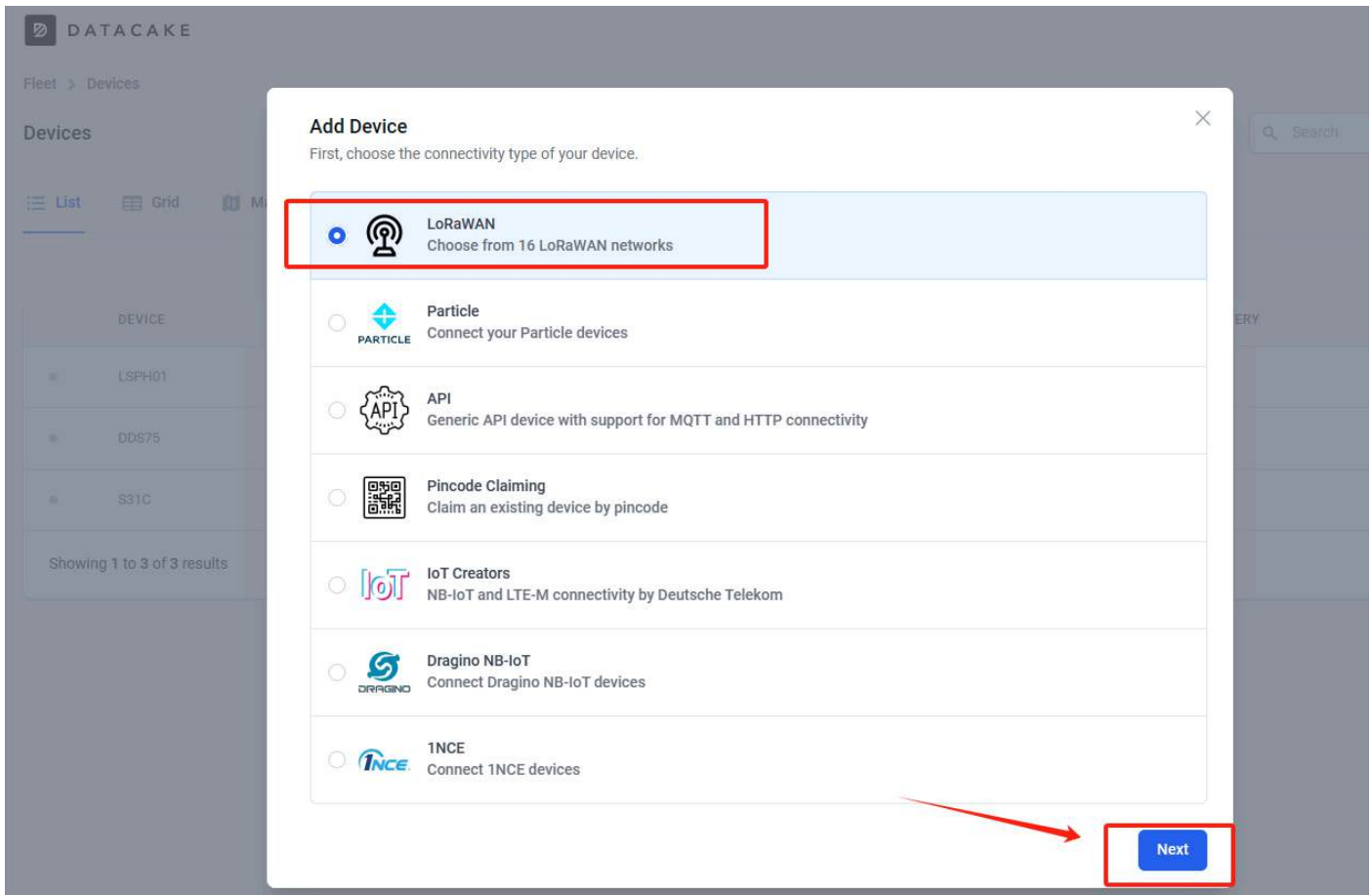
Devices

Search Columns + Add Device

DEVICE	PRIMARY	SECONDARY	DEVICE SIGNAL	DEVICE BATTERY	Actions
LSPH01	N/A	N/A	N/A	N/A	[Icons]
DC675	N/A	N/A	N/A	N/A	[Icons]

In the **Add Device** dialogue box, choose **LoRaWAN**.

Then click on the **Next** button.



In the **Add LoRaWAN Device** dialogue box, configure the following:

STEP 1:

- Choose **New Product**.
- Enter the **product name** in the **Product Name** text box. pb05-l, for example.

Click on the **Next** button.

Add LoRaWAN Device

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
pb05-l

BackNext

STEP 2:

- Choose **The Things Stack V3**.

Click on the **Next** button.

Add LoRaWAN Device

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.

☐



Datacake LNS

AUTOMATIC SETUP

Start and scale easily with a managed LNS

Uplinks

Downlinks

☒



The Things Stack V3

TTN V3 / Things Industries

Uplinks

Downlinks

☐



Helium

Use your own console

Uplinks

Downlinks

☐



LORIoT

Uplinks

Downlinks

☐



ChirpStack

Uplinks

Downlinks

☐



Actility

Uplinks

Downlinks

Showing 1 to 5 of 15 results

Previous

Next

Back

Next

STEP 3:

- Enter the **DevEUI** of the PB05 in the **DEVEUI** box.
- Type **PB05** in the **NAME** text box.

Click the **Next** button.

Add LoRaWAN Device

STEP 1
Product

STEP 2
Network Server

STEP 3
Devices

STEP 4
Plan

Add Devices

ManualImport from The Things Stack

Please provide one or multiple LoRaWAN device EUIs along with the corresponding names they should have on Datacake.

Alternatively, you can choose to upload a CSV file that contains the DevEUI, device Name, location, and a set of tags. For more information on how to format the file, please refer to [our documentation](#).

📁 Drag and drop a .csv file here or click to choose one

DEVEUI	NAME	LOCATION	TAGS
 FA 23 45 55 55 55 51 8 bytes	 PB05	Location	Add tag

+ Add another device

Back

Next

Go to the PB05's configuration page.

 DATACAKE

Fleet > PB01

PB05

Serial Number
FA2345555555551

Last update
Never

Dashboard

History

Downlinks

Configuration

Debug

Rules

Permissions

General Configuration

Device name

Icon

No icon selected

You can override the default product icon for this device

Location description

Copy and paste the [TTN decoder](#) in the Payload Decoder box and click the **Save** button.



To learn about how to add visual widgets in the Datacake to visualise the data, please read the [Datacake documentation](#).

2.6 Datalog Feature

Datalog Feature is to ensure IoT Server can get all sampling data from Sensor even if the LoRaWAN network is down. For each sampling, PB05 will store the reading for future retrieving purposes.

2.5.1 How datalog works

PB05 will wait for ACK for every uplink, when there is no LoRaWAN network, PB05 will mark these records with non-ack messages and store the sensor data, and it will send all messages (10s interval) after the network recovery.

- a) PB05 will do an ACK check for data records sending to make sure every data arrive server.
- b) PB05 will send data in **CONFIRMED Mode**, but PB05 won't re-transmit the packet if it doesn't get ACK, it will just mark it as a NONE-ACK message. In a future uplink if PB05 gets a ACK, PB05 will consider there is a network connection and resend all NONE-ACK messages.

2.5.2 Enable Datalog

User need to make sure below two settings are enable to use datalog;

- SYNCMOD=1(Default)** to enable sync time via LoRaWAN MAC command, click here ([AT+SYNCMOD](#)) for detailed instructions.
- PNACKMD=1** to enable datalog feature, click here ([AT+PNACKMD](#)) for detailed instructions.

Once PB05 Joined LoRaWAN network, it will send the MAC command (DeviceTimeReq) and the server will reply with (DeviceTimeAns) to send the current time to PB05 . If PB05 fails to get the time from the server, PB05 will use the internal time and wait for next time request (AT+SYNCTDC to set the time request period, default is 10 days).

Note: LoRaWAN Server need to support LoRaWAN v1.0.3(MAC v1.0.3) or higher to support this MAC command feature, Chirpstack,TTN V3 v3 and loriot support but TTN V3 v2 doesn't support. If server doesn't support this command, it will through away uplink packet with this command, so user will lose the packet with time request for TTN V3 v2 if SYNCMOD=1.

2.6.1 Unix TimeStamp

The Unix timestamp shows the sampling time of the uplink payload. The following figure shows the **DeviceTimeAns** payload format.

Size (bytes)	4	1
DeviceTimeAns Payload	32-bit unsigned integer : Seconds since epoch*	8bits unsigned integer: fractional-second in $\frac{1}{2}^8$ second steps

Figure 10 : DeviceTimeAns payload format

To get the current Unix epoch time, visit the website <https://www.epochconverter.com/>:

For example, if the Unix epoch time is 1611889090, you can convert it to hex using a Decimal to Hex Converter available online, such as Code Beautify. For this example, the equivalent hex value is 0x60137afd.

The screenshot illustrates the process of converting a Unix epoch time to a hexadecimal value. It shows three main components:

- EpochConverter**: Displays the current Unix epoch time as 1611889418.
- Code Beautify**: The 'Decimal to Hex Converter' is selected from the menu.
- Decimal to Hex**: The decimal value 1611889405 is entered, and the resulting hex value 60137afd is shown.

 Red arrows indicate the flow of data from the epoch time to the converter and then to the final hex result.

2.6.2 Set Device Time

There are two ways to set the device's time:

1. Through LoRaWAN MAC Command (Default settings)

You need to set **AT+SYNCMOD=1** to enable time synchronisation via the MAC command.

Once the PB05-L joins a LoRaWAN network, it sends a MAC command (DeviceTimeReq). The server responds with a DeviceTimeAns to provide the current time to the PB05-L. If the PB05-L fails to get the time from the server, it will use its internal clock and wait for the next time request.

You can use **AT+SYNCTDC** to set the time request period (default is 10 days).

Note: The LoRaWAN server needs to support **LoRaWAN v1.0.3 (MAC v1.0.3)** or higher to enable this MAC command feature.
ChirpStack, **TTS V3 (v3)**, and **Loriot** support it, but **TTS V3 (v2)** does not.
 If the server does not support this command, it will **discard** the uplink packet containing the time request. As a result, the user will lose the time request packet when using **TTS V3 (v2)** with **SYNCMOD=1**.

2. Manually Set Time

You need to set **AT+SYNCMOD=0** to enable manual time configuration. Otherwise, the time you set will be overwritten by the time provided by the server.

2.6.3 Poll sensor value

You can poll sensor values based on timestamps from the server.

Below is the downlink command.

1byte	4bytes	4bytes	1byte
31	Timestamp start	Timestamp end	Uplink Interval

Timestamp start and Timestamp end use Unix Timestamp format as mentioned above. Devices will reply with all data logs during this time period, using the uplink interval.

For example, downlink command **31 6722DD98 672300C0 05**

Is to check 2024/10/31 01:30:00 to 2020/12/1 04:00:00's data

Uplink Internal =5s, means PB05-L will send one packet every 5s, range 5~255s.

2.6.4 Datalog Uplink payload

See, [Uplink FPort=3, Datalog sensor value](#)

2.7 Buttons

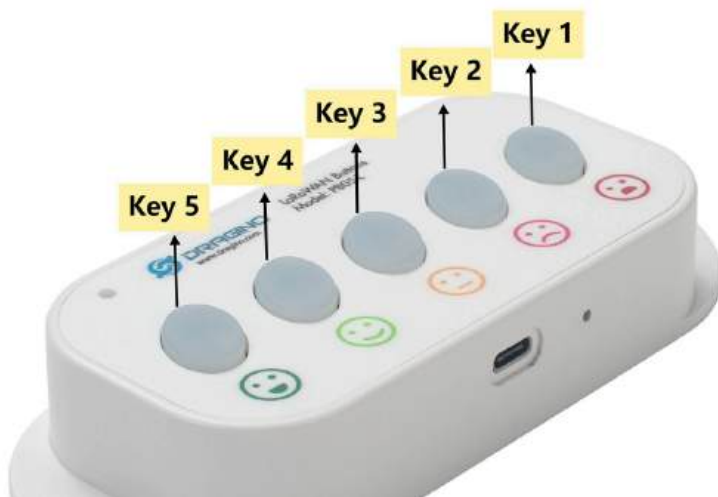
- **ACT button**

Long-press the ACT button to reset the device and allow it to join the network again.



- **Alarm buttons**

When you press the alarm button, the PB05-L immediately uplinks data. The alarm flag is set to 'TRUE,' and the corresponding button status is 'Yes'.



2.8 LED Indicators

The **PB05-L** has a **tri-color LED** for easily indicating different stages.

Hold the **ACT** button until the green light turns on to reset the device. The green LED will flash as the node restarts, the blue LED will flash once when requesting network access, and the green LED will remain on for 5 seconds after successful network access.

In a normal working state:

- When the node restarts, hold the ACT button until the GREEN LED lights up. The GREEN LED will flash as the node restarts.
- The BLUE LED will flash once upon requesting network access.
- The GREEN LED will remain on for 5 seconds after successful network access.

During OTAA Join:

- For each Join Request uplink, the GREEN LED will blink once.
- Once the Join is successful, the GREEN LED will remain on for 5 seconds.

- After joining, for each uplink, either the BLUE or GREEN LED will blink once.

Alarm Button Press:

- When an alarm button is pressed, the RED LED will flash until the node receives an ACK from the platform.
- Once the ACK is received, the BLUE LED will stay on for 5 seconds.

2.9 Buzzer

The PB05 has a **button sound** and an **ACK sound**, both of which users can turn on or off using [AT+SOUND](#).

- **Button sound** is the tone played by the node after an alarm button is pressed.
You can use [AT+OPTION](#) to set different button sounds.
- **ACK sound** is the notification tone played when the node receives an ACK.

2.10 E2 Extension Cable



1m Long Breakout Cable for PB05-L

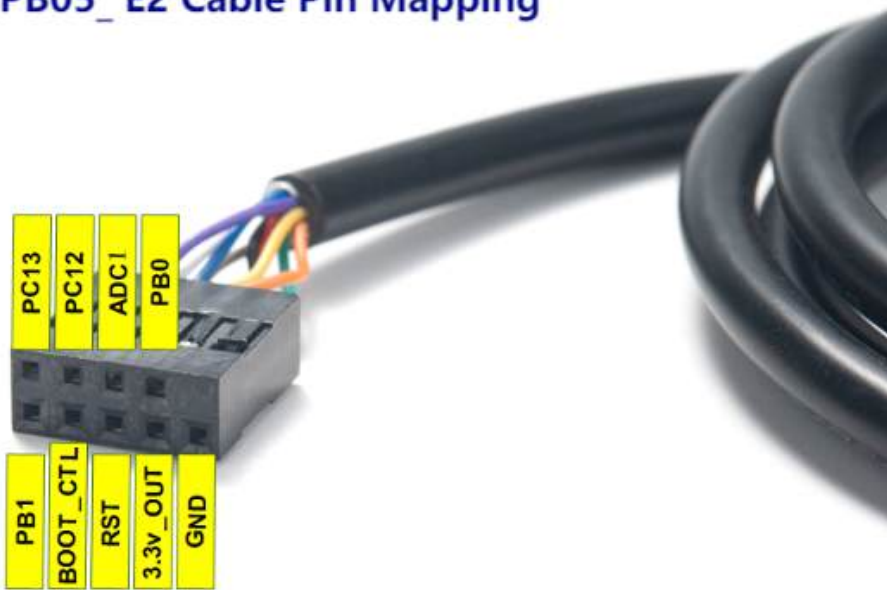
Features:

- Used for AT commands; compatible with LHT52, LHT65N, and PB05-L.
- Supports firmware updates for PB05-L; also works with LHT52 and LHT65N.

- Exposes all pins from the PB05-L Type-C connector.

The following diagram shows the pin mapping between PB05 and the E2 Cable.

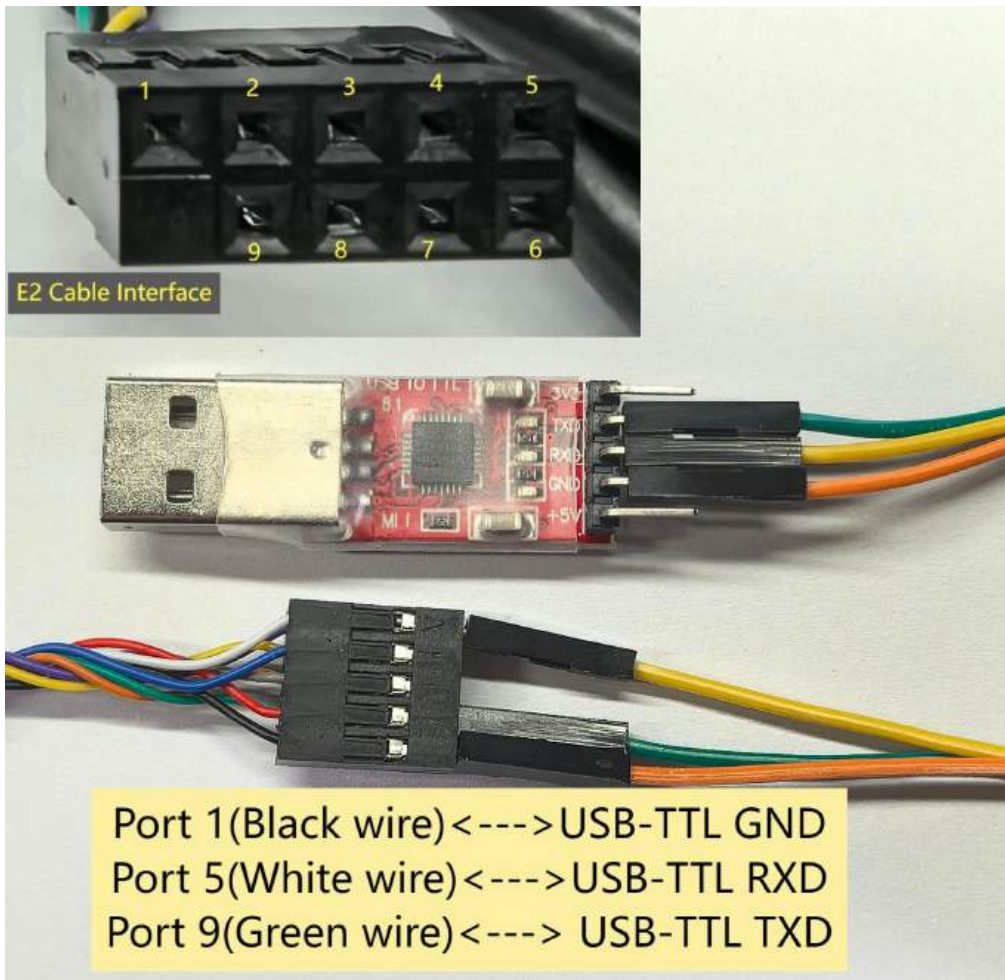
PB05_ E2 Cable Pin Mapping



3. Configure PB05-L via AT command or LoRaWAN downlink

You can configure PB05-L via AT Command or LoRaWAN Downlink command.

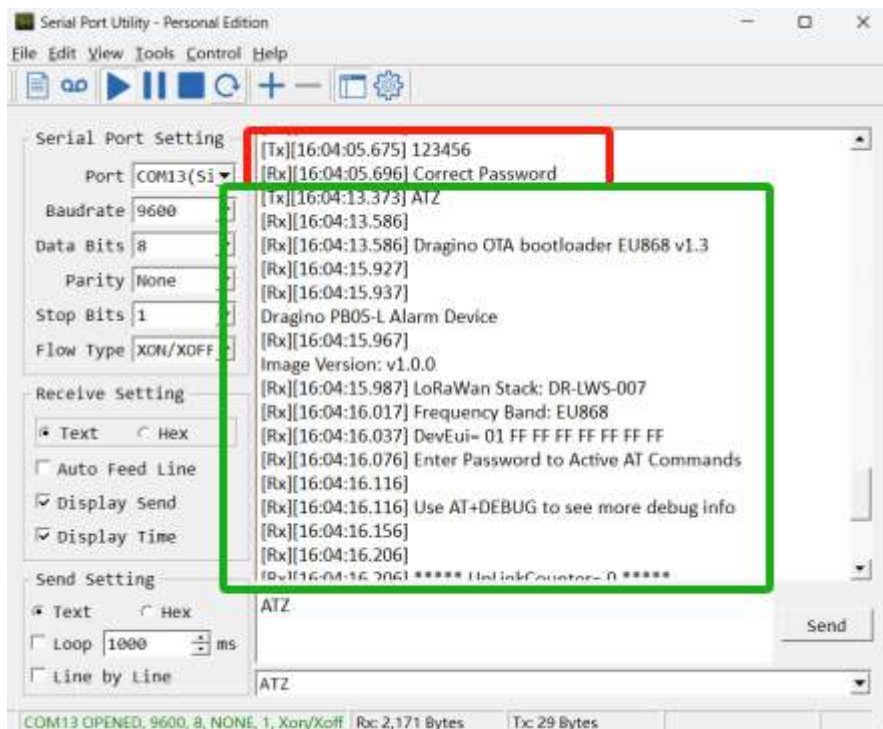
- **AT Command Connection:**



On a PC, you need to set the serial tool (such as [PuTTY](#) or SecureCRT) to a baud rate of **9600** to access the serial console for the PB05-L.

AT commands are disabled by default and require entering a password (default: **123456**) to activate them. The AT command input timeout is 5 minutes; after this period, the user must enter the password again.

Enter the password and ATZ to activate the PB05-L, as shown below:



- LoRaWAN Downlink instructions for different platforms can be found here: [IoT LoRaWAN Server](#)

There are two types of commands to configure the PB05-L:

General Commands

These commands configure:

- General system settings, such as the uplink interval.
- LoRaWAN protocol and radio-related settings.

These commands are the same for all Dragino devices that support the DLWS-005 LoRaWAN stack (**Note****). They can be found on the wiki: [End Device Downlink Command](#).

Commands Specifically Designed for PB05-L

These commands are only valid for the PB05-L, as listed below:

3.1 Downlink Command Set

Command Example	Function	Response	Downlink
AT+TDC=?	View current TDC time	1200000 OK	Default 1200000(ms)

AT+TDC=300000	Set TDC time	OK	0X0100012C: 01: Fixed command 00012C: 0X00012C= 300(seconds)
ATZ	Reset node		0x04FF
AT+FDR	Restore factory settings		0X04FE
AT+CFM=?	View the current confirmation mode status	0,7,0 OK	Default 0,7,0
AT+CFM=1,7,1	Confirmed uplink mode. The maximum number of retries is seven, and the uplink FCnt increases by 1 for each retry.	OK	05010701 05: Fixed command 01: Confirmed uplink 07: Retry 7 times 01: FCnt count plus 1
AT+NJM=?	Check the current network connection method.	1 OK	Default 1
AT+NJM=0	Change the network connection method to ABP.	Attention: Take effect after ATZ OK	0X2000: ABP 0x2001: OTAA 20: Fixed command
AT+RPL=?	View current RPL settings	0 OK	Default 0
AT+RPL=1	set RPL=1	OK	0x2101: 21: Fixed command 01: For details, check the wiki
AT+ADR=?	View current ADR status	1 OK	Default 0
AT+ADR=0	Set the ADR state to off	OK	0x2200: Close 0x2201: Open 22: Fixed command
AT+DR=?	View the current DR settings	OK	

AT+DR=1	Set DR to 1 It takes effect only when ADR=0	OK	0X22000101: 00: ADR=0 01: DR=1 01: TXP=1 22: Fixed command
AT+TXP=?	View the current TXP	OK	
AT+TXP=1	Set TXP to 1 It takes effect only when ADR=0	OK	0X22000101: 00: ADR=0 01: DR=1 01: TXP=1 22: Fixed command
AT+RJTDC=10	Set the RJTDC time interval	OK	0X26000A: 26: Fixed command 000A: 0X000A=10(min) For details, check the wiki
	Retrieve stored data for a specified period of time		0X3161DE7C7061DE8A800A: 31: Fixed command 61DE7C70:0X61DE7C70=2022/1/12 15:00:00 61DE8A80:0X61DE8A80=2022/1/12 16:00:00 0A: 0X0A=10(second) View details 2.6.2
AT+DDETECT=?	View the current DDETECT setting status and time	1,1440,2880 OK	Default 1,1440,2880(min)
AT+DDETECT=1,1440,2880	Set the DDETECT setting status and time (When the node does not receive the downlink packet within the set time, it will re-enter the network)	OK	0X320005A0: Close 0X320105A0: Open 32: Fixed command 05A0: 0X05A0=1440(min)

3.2 Set Password

Feature: Set the device password—maximum 9 digits.

AT Command: AT+PASSWORD

Command Example	Function	Response
-----------------	----------	----------

AT+PWORD=?	Show password	123456 OK
AT+PWORD=999999	Set password	OK

Downlink Command:

No downlink command is available for this feature.

3.3 Set button sound and ACK sound

Feature: Turn on/off the button sound and the ACK sound/alarm.

AT Command: AT+SOUND

Command Example	Function	Response
AT+SOUND=?	Get the current status of the button sound and the ACK sound	1,1 OK
AT+SOUND=0,1	Turn off the button sound and turn on the ACK sound	OK

Downlink Command: 0xA1

Format: Command Code/prefix (0xA1) followed by 2 bytes mode value.

The first byte after 0XA1 sets the button sound, and the second byte after 0XA1 sets the ACK sound. (**0: OFF, 1: ON**)

- Example:** Downlink Payload: **A10001** // Set AT+SOUND=0,1 Turn off the button sound and turn on ACK sound.

3.4 Set buzzer music type(0~4)

Feature: Set different alarm key response sounds. There are five different types of button music.

AT Command: AT+OPTION

Command Example	Function	Response
AT+OPTION=?	Get the buzzer music type	3 OK
AT+OPTION=1	Set the buzzer music to type 1	OK

Downlink Command: 0xA3

Format: Command Code/Prefix (0xA3) followed by 1 byte mode value.

- **Example:** Downlink Payload: **A300** // Set AT+OPTION=0 to set the buzzer music to type 0.

3.5 Set Valid Push Time

Feature: Set the holding time for pressing the alarm button to avoid miscontact. Values range from **0 ~1000ms**.

AT Command: AT+STIME

Command Example	Function	Response
AT+STIME=?	Get the button sound time	0 OK
AT+STIME=1000	Set the button sound time to 1000ms	OK

Downlink Command: 0xA2

Format: Command Code/Prefix (0xA2) followed by 2 bytes mode value.

- **Example:** Downlink Payload: **A203E8** // Set AT+STIME=1000

Explain: Hold the alarm button for 10 seconds before the node will send the alarm packet.

4. Battery & How to replace

4.1 Battery Type and Replacement

PB05-L uses 2 x AA LR6(1.5v) batteries. If the batteries are running low (Shows 2.1v in the platform). You can buy generic AA batteries and replace them.

Note:

1. The PB05-L doesn't have any screws so you can use a nail to open it by the middle.



2. Make sure the direction is correct when installing the AA batteries.



4.2 Power Consumption Analysis

All Dragino's battery-powered products run in low-power mode. We have an updated battery calculator which based on the measurement of the real device. You can use this calculator to check the battery life and calculate the battery life if you want to use a different transmit interval.

Instructions to use are as below:

Step 1: Download the up-to-date DRAGINO_Battery_Life_Prediction_Table.xlsx from the below link:

[battery calculator](#)

Step 2: Open it and choose

- Product Model
- Uplink Interval
- Working Mode

And the Life expectancy in different cases will be shown on the right.



How to use:

1.Please do not modify the formula in the table

2.After selecting the **product number** and **model**, then select the TDC unit, and finally enter the TDC, you can get the predicted battery life.

3.Explanation of abbreviations: WD -> Watchdog TX -> Transmit RX -> Receive

Product

battery capacity(mah)

ENV52_LoRaWAN_Temperature_Humidity_Sensor

1000

UNIT

TDC (Uplink Interval)

Work Mode

min

20

EXT=1



		Sleep power (mA*ms)	Sampling power (mA*ms)	TX power (mA*ms)	RX1 power (mA*ms)	RX2 power (mA*ms)	Watchdog power (mA*ms)	Average power (mA)	Detect power (mA*ms)	Life expectancy (yr)
EU868	DR5_SF7_125K_14dB	8400	787.31488	7367.8544	680.58488	4097.083	757.170667	0.018567657	0	5.5
	DR4_SF8_125K_14dB	8400	787.31488	13210.2538	950.0641	4097.083	757.170667	0.033491302	0	4.4
	DR3_SF9_125K_14dB	8400	787.31488	23052.008	1068.0330	4097.083	757.170667	0.037284892	0	3.3
	DR2_SF10_125K_14dB	8400	787.31488	42244.125	1861.0876	4097.083	757.170667	0.048089509	0	2.3
	DR1_SF11_125K_14dB	8400	787.31488	94013.4	2730.4078	4097.083	757.170667	0.091801712	0	1.2
	DR0_SF12_125K_14dB	8400	787.31488	168881	4097.083	4097.083	757.170667	0.1548162	0	0.7
US915	DR5_SF7_125K_20dB	8400	787.31488	8441.476	680.58488	1587.135	757.170667	0.01725736	0	5.9
	DR4_SF8_125K_20dB	8400	787.31488	15370.785	913.6491	1587.135	757.170667	0.02300594	0	4.5
	DR3_SF9_125K_20dB	8400	787.31488	27254.383	841.388	1587.135	757.170667	0.033802867	0	3.2
	DR2_SF10_125K_20dB	8400	787.31488	48745.32	995.2243	1587.135	757.170667	0.051023463	0	2.1

5. OTA Firmware update

You can update the firmware of PB05-L to:

- Change the Frequency band/ region.
- Update with new features.
- Fix bugs.

Firmware and changelog can be downloaded from: [Firmware download link](#)

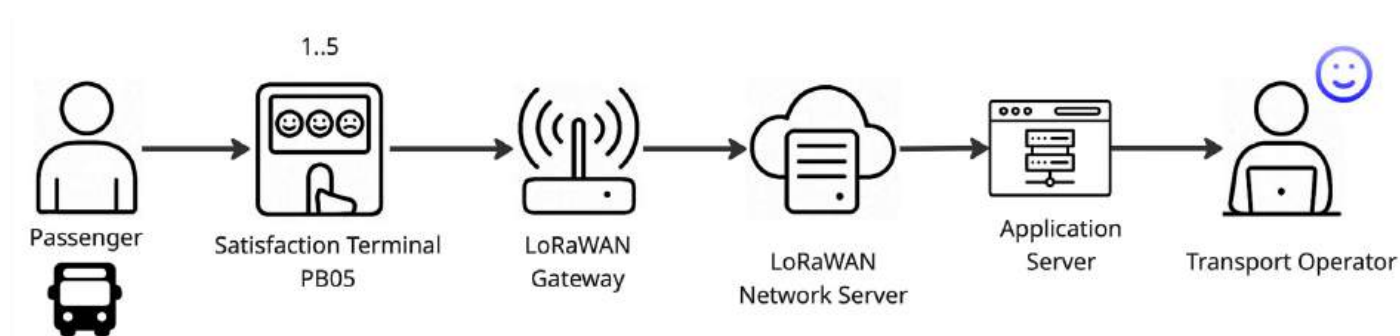
Methods to Update Firmware:

- (Recommended way) OTA firmware update via wireless: <http://wiki.dragino.com/xwiki/bin/view/Main/Firmware%20OTA%20Update%20for%20>
- Update through UART TTL interface: [Instruction](#).

6. Use Cases

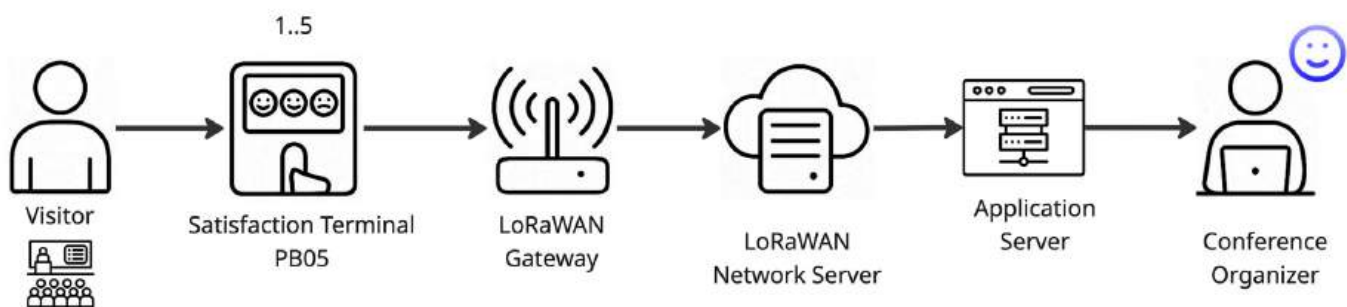
6.1 Public Transport Satisfaction

Public transport satisfaction terminals, placed inside buses, trams, or train stations, allow passengers to quickly rate aspects like cleanliness, punctuality, or overall experience after a ride, providing cities and transport operators with valuable real-time feedback, even from locations with poor cellular or WiFi coverage. This helps to improve service quality and passenger satisfaction.



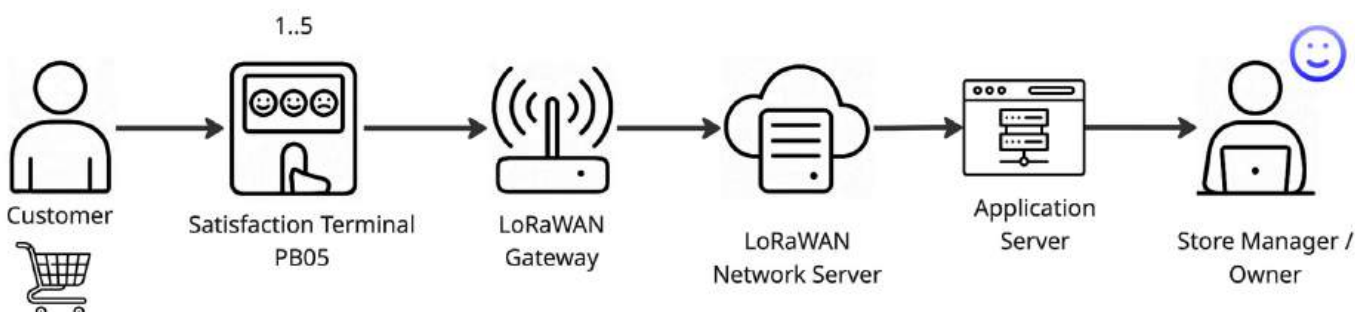
6.2 Event or Conference Feedback

Event or conference feedback terminals, strategically placed at session exits, information booths, or entrance gates, enable attendees to rate specific talks, exhibitors, or their overall event experience on the spot. This setup provides organisers with detailed, location-specific feedback in real time, without relying on constant internet connectivity, allowing them to assess and improve various aspects of the event efficiently.



6.3 Retail Stores or Service Desks

Placed at cashier counters or near store exits, these devices allow customers to quickly rate staff behaviour, checkout experience, and store cleanliness. The feedback is captured in real time, giving store managers valuable, honest insights to help improve service quality and enhance the overall shopping experience.



7. FAQ

7.1 How to design a customised sticker?

PB05-L is shipped with a default PVC stick with satisfied icons. This sticker is not attached to the design for easy customisation purposes. You can design a customised PVC sticker and change the panel design.

Follow this [link](#) for the design template.

8. Order Info

Part Number: **PB05-L-XX**

XX : The default frequency band

- **AS923**: LoRaWAN AS923 band
- **AU915**: LoRaWAN AU915 band
- **EU433**: LoRaWAN EU433 band
- **EU868**: LoRaWAN EU868 band

- **KR920**: LoRaWAN KR920 band
- **US915**: LoRaWAN US915 band
- **IN865**: LoRaWAN IN865 band
- **CN470**: LoRaWAN CN470 band

9. Packing Info

Package Includes:

- PB05-L LoRaWAN Push Buttons x 1

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 time zones, we cannot offer live support. However, your questions will be answered as soon as possible in the aforementioned schedule.
- Provide as much information as possible regarding your enquiry (product models, accurately describe your problem and steps to replicate it, etc.) and send an email to support@dragino.com.

11. Appendix A: FCC Statement

FCC Caution:

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.

IMPORTANT NOTE:

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.

FCC Radiation Exposure Statement:

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