LDS03A - Outdoor LoRaWAN Open/Close Door Sensor Manual

last modified by Xiaoling

on 2022/10/31 16:02

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  - 5.3 How to change the LoRa Frequency Bands/Region?
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1. Introduction

1.1 What is LDS03A Open/Close Door Sensor

The Dragino LDS03A is an **Open/Close LoRaWAN Door Sensor**. It detects door open/close status and uplinks to IoT server via LoRaWAN network. user can see the door status, open duration, open counts in the IoT Server.

LDS03A is powered by a **8500mAh Li-SOCI2 battery**. It can be used for up to 10 years.

The LDS03A will send periodically data every 2 hours as well as for each door open/close action. It also counts the door open times and calculates the last door open duration. Users can also disable the uplink for each open/close event, instead, LDS03A can count each open event and uplink periodically.

LDS03A has a **Datalog feature**, it will record the open/close event and the user can retrieve the history from LoRaWAN.

LDS03A has the **open alarm feature**, user can set this feature so the device will send an alarm if the door has been open for a certain time.

LDS03A is designed for outdoor use. It has a weatherproof enclosure and industrial level battery to work in low to high temperatures.

Each LDS03A is pre-load with a set of unique keys for LoRaWAN registration, register these keys to LoRaWAN server and it will auto-connect after power on.

*Battery life depends on how often to send data, please see battery analyzer.

1.2 Features

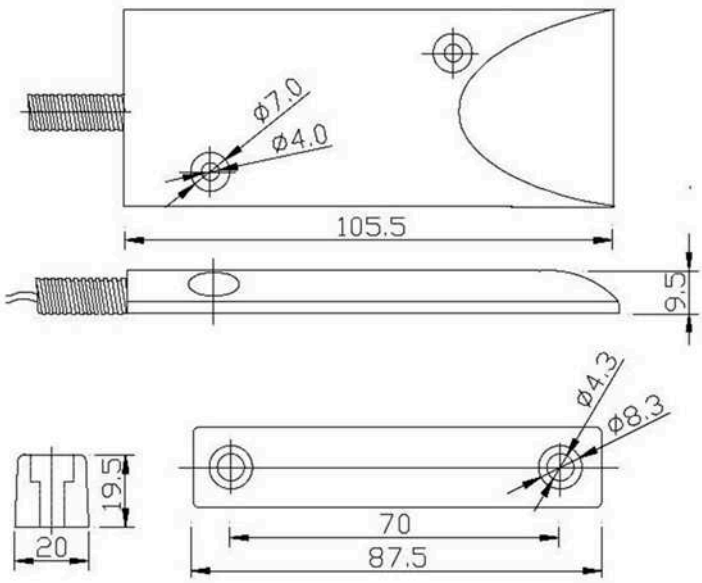
- LoRaWAN v1.0.3 Class A protocol.
- Frequency Bands: CN470/EU433/KR920/US915/EU868/AS923/AU915/IN865/RU864
- Door Open/Close detect
- Door open/close statistics
- 8500mAh industrial battery(none-rechargeable)
- AT Commands to change parameters
- Uplink on periodically and open/close event
- Datalog feature
- Remote configure parameters via LoRa Downlink
- Firmware upgradable via program port
- Wall Mountable
- Outdoor Use

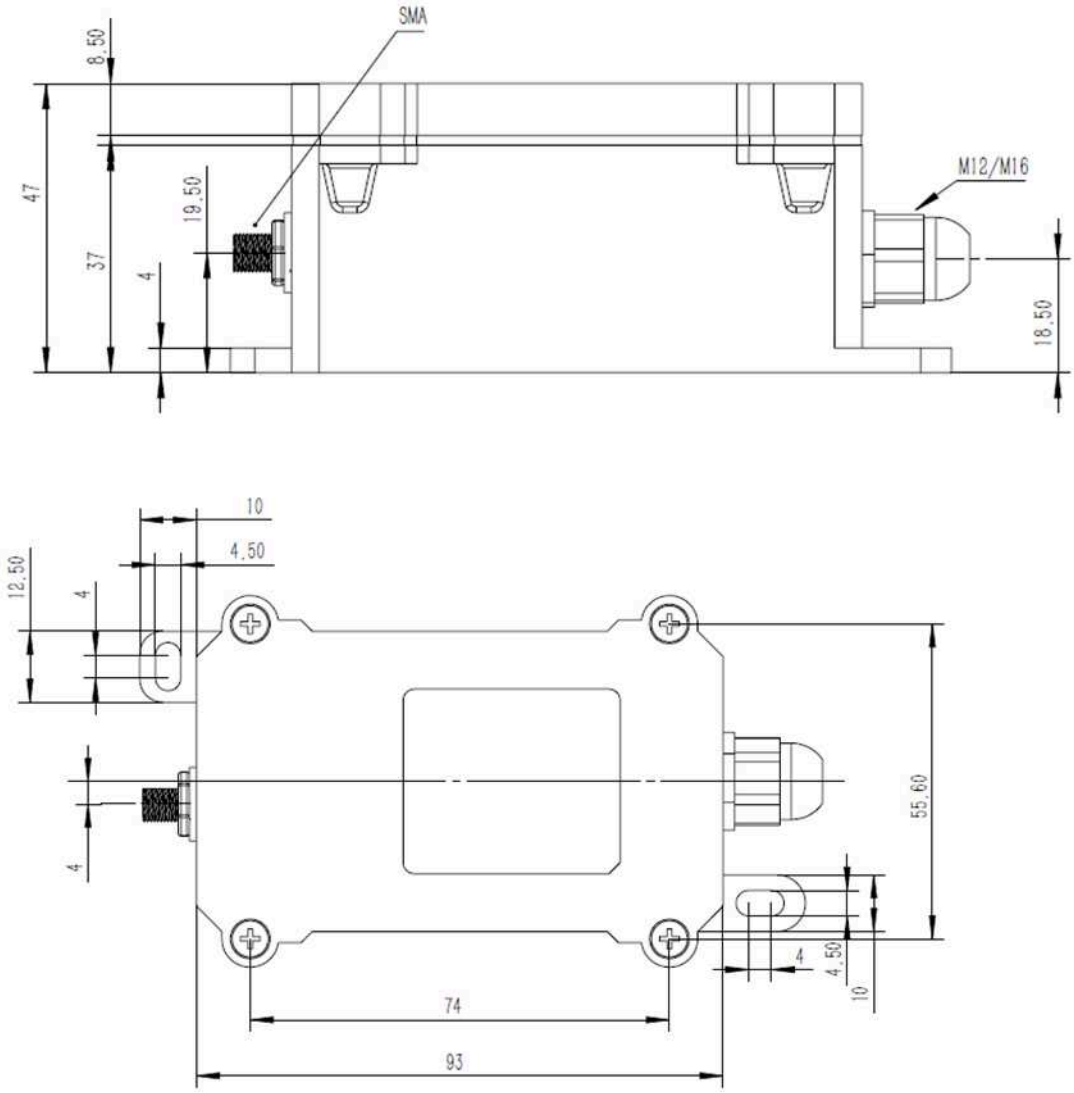
1.3 Storage & Operation Temperature

-40°C to +85°C

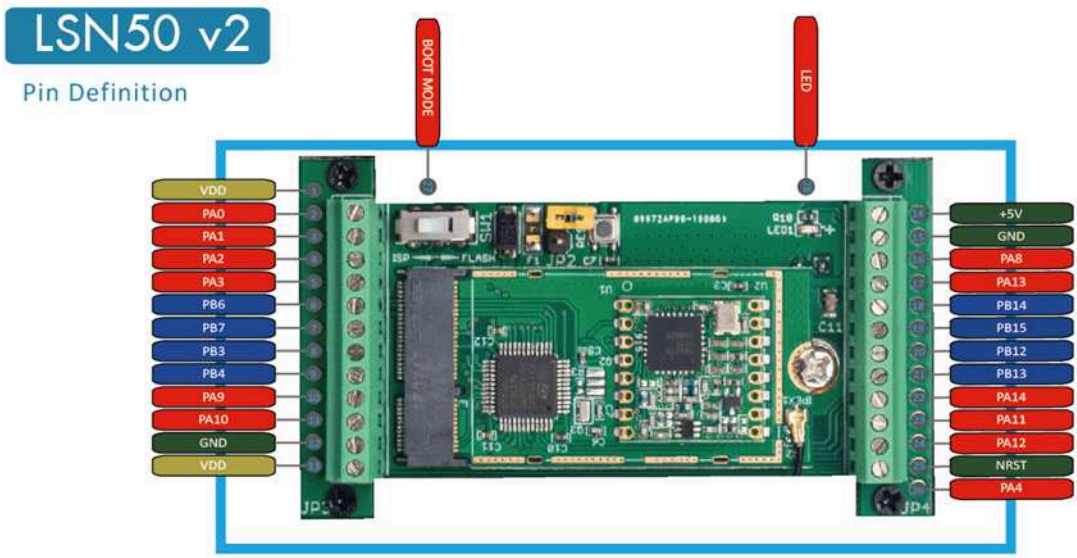
1.4 Applications

1.5 Mechanical





1.6 Pin Definitions and Switch



LDS03A is based on LSN50v2

1.6.1 Pin Definition

The device is pre-configured to connect to a door sensor. The other pins are not used. If user wants to know more about other pins, please refer to the user manual of LSN50v2 at: https://www.dropbox.com/sh/djkxs7mr17y94mi/AABVlWbM9uzK9OA3mXyAT10Za?dl=0

1.6.2 Jumper JP2(Power ON/OFF)

Power on Device when putting this jumper.

1.6.3 BOOT MODE / SW1

1) ISP: upgrade mode, device won't have any signal in this mode. but ready for upgrade firmware. LED won't work. Firmware won't run.

2) Flash: work mode, the device starts to work and send out console output for further debug

1.6.4 Reset Button

Press to reboot the device.

1.6.5 LED

It will flash:

1. Boot the device in flash mode

2. Send an uplink packet

1.7 Magnet Distance

- Wood Door: 10mm ~ 30mm
- Iron Door: 30 ~ 45mm

2. Operation Mode

2.1 How it works

Each LDS03A is shipped with a worldwide unique set of OTAA keys. To use LDS03A in a LoRaWAN network, user needs to input the OTAA keys in the LoRaWAN network server. So LDS03A can join the LoRaWAN network and start to transmit sensor data.

2.2 Example to use for LoRaWAN network

This section shows an example of how to join the TTN V3 LoRaWAN IoT server. Usages with other LoRaWAN IoT servers are similar.

- In this user case, the LDS03A is installed on the door edge to detect the open/close event and send the status to the LoRaWAN server. The LDS03A will uplink different types of messages to the LoRaWAN server. See Uplink payload for detail.

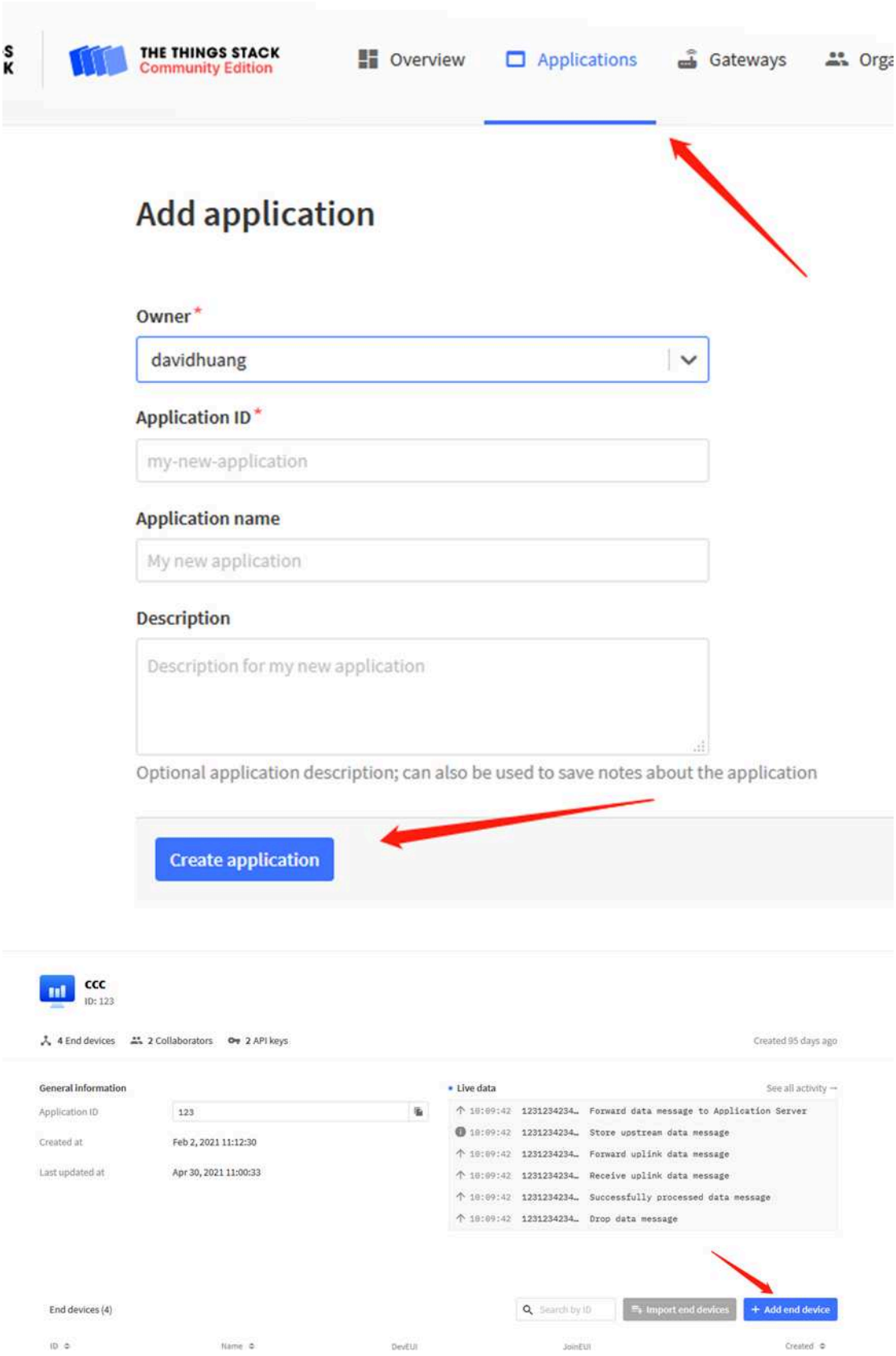
Assume the LG308 is already set to connect to the TTN V3 network . We need to add the LDS03A device in TTN V3:

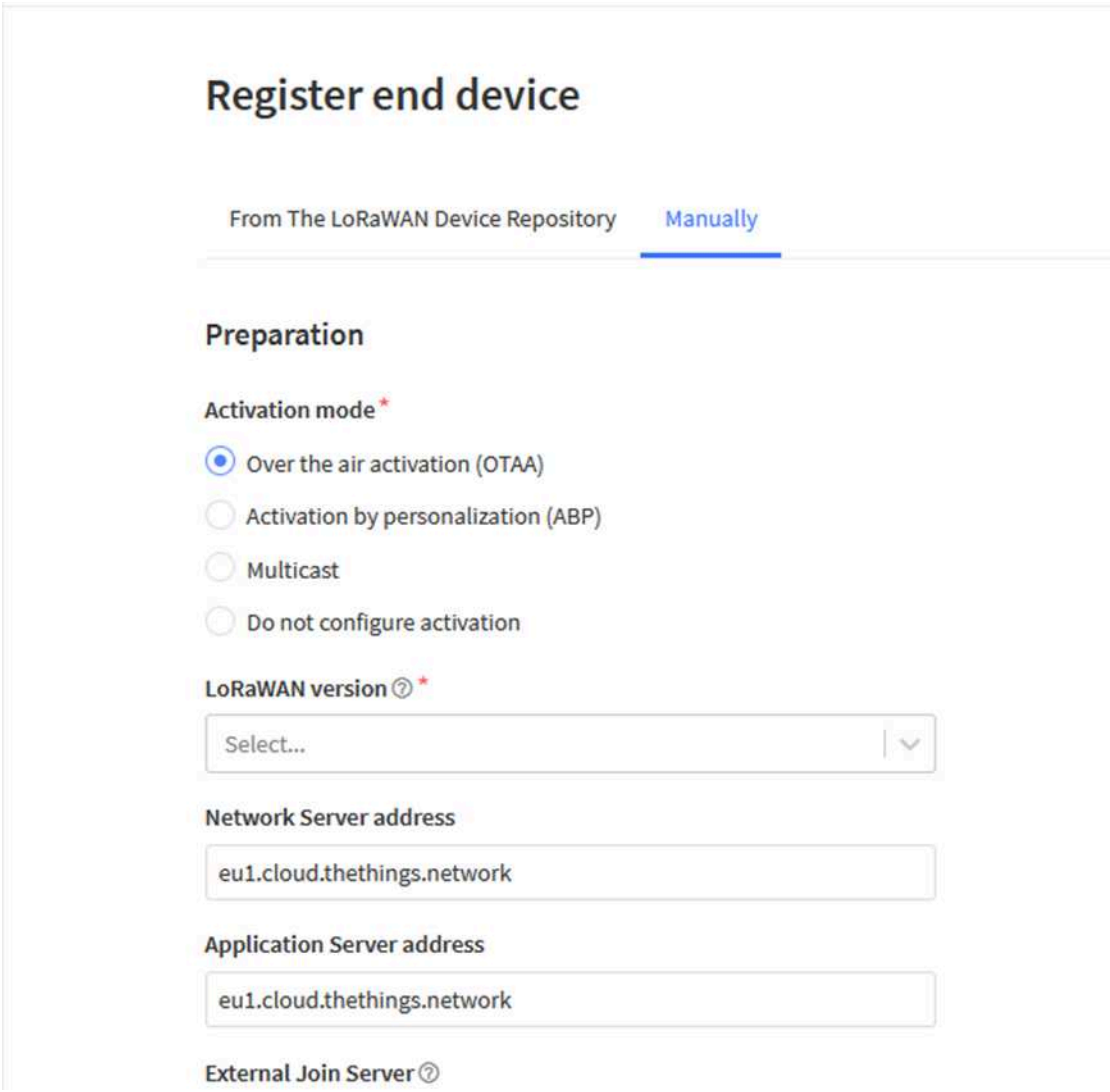
Step 1: Create a device in TTN V3 with the OTAA keys from LDS03A.

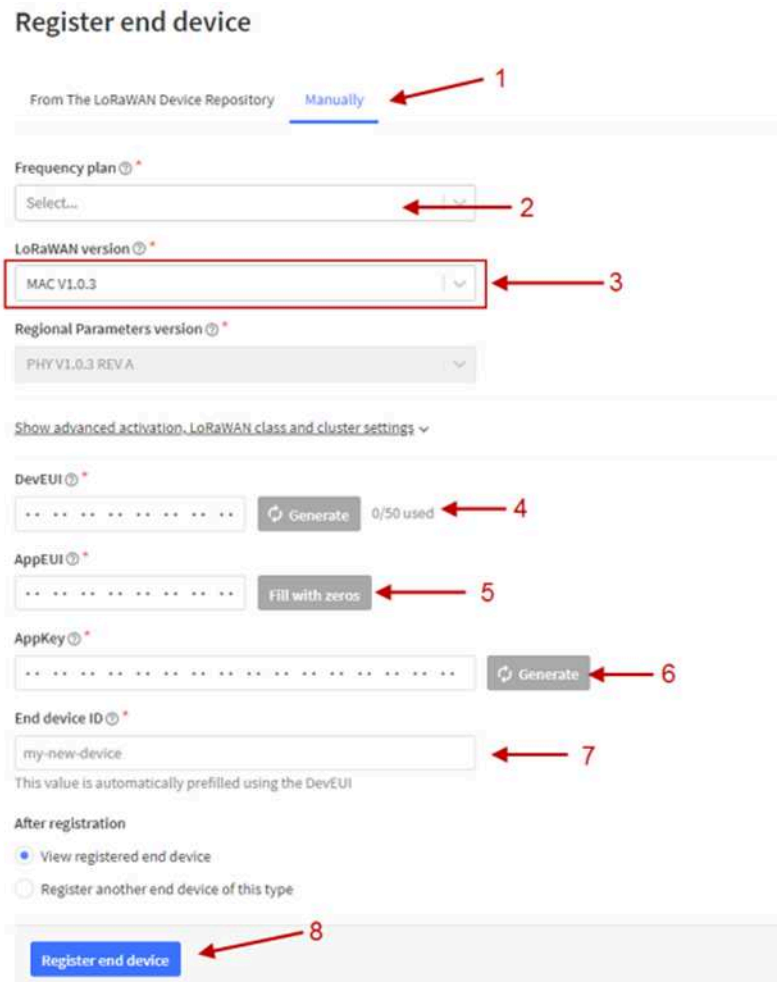
Each LDS03A is shipped with a sticker with the default device EUI as below:

Users can enter these keys in the LoRaWAN Server portal. Below is the TTN V3 screenshot:

Add APP EUI in the application:

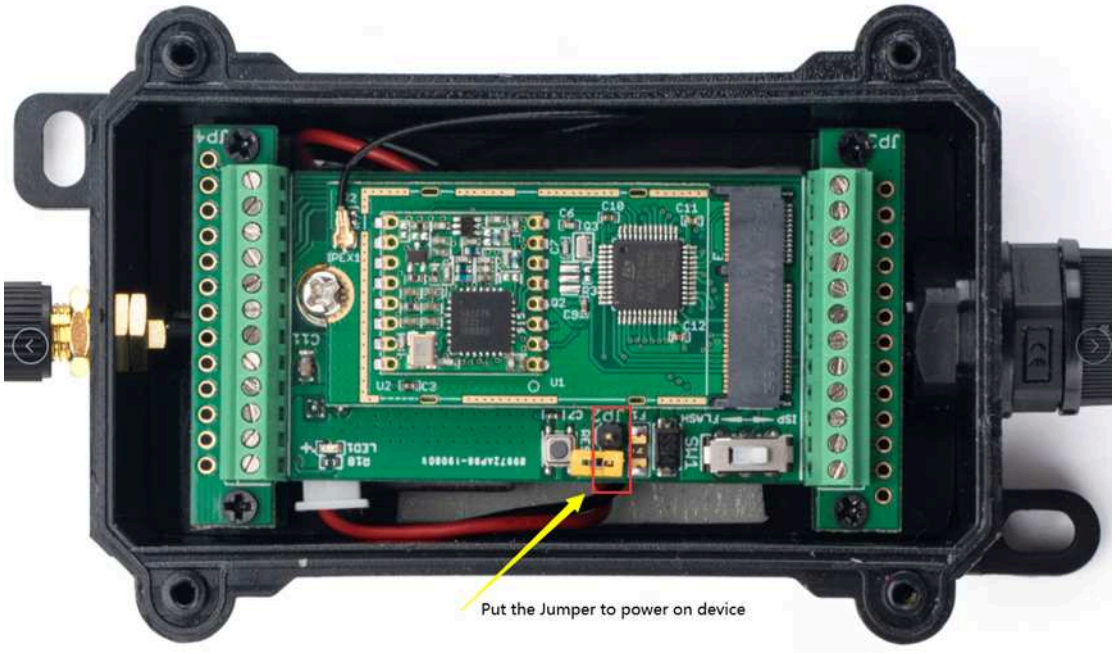

THE THINGS STACK
Community Edition
Overview
Applications
Gateways
Add application
Owner *
davidhuang
Application ID *
my-new-application
Application name
My new application
Description
Description for my new application
Optional application description; can also be used to save notes about the application
Create application
ccc
ID: 123
4 End devices
2 Collaborators
2 API keys
Created 95 days ago
General information
Application ID
123
Created at
Feb 2, 2021 11:12:30
Last updated at
Apr 30, 2021 11:00:33
Live data
See all activity
10:09:42 1231234234... Forward data message to Application Server
10:09:42 1231234234... Store upstream data message
10:09:42 1231234234... Forward uplink data message
10:09:42 1231234234... Receive uplink data message
10:09:42 1231234234... Successfully processed data message
10:09:42 1231234234... Drop data message
End devices (4)
Search by ID
Import end devices
+ Add end device
ID
Name
DevEUI
JoinEUI
Created


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 *
Select...
Network Server address
eu1.cloud.thethings.network
Application Server address
eu1.cloud.thethings.network
External Join Server

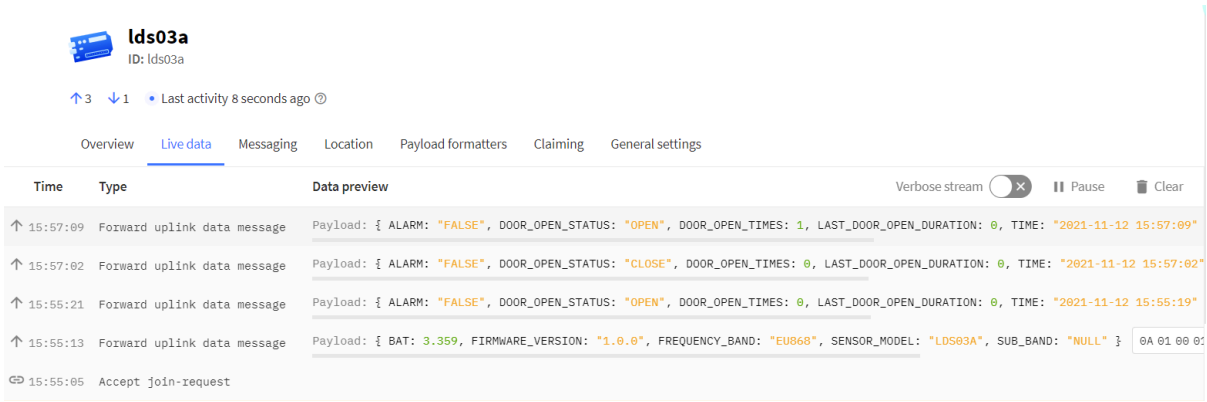


Add APP KEY and DEV EUI

Step 2: Power on LDS03A



Put the jumper to power on LDS03A and it will auto-join to the TTN V3 network. After join success, it will start to upload sensor data to TTN V3 and the user can see it in the panel.



2.3 Uplink Payload

Uplink payloads have two types:

- Open/Close Status: Use FPORT=2
- Other control commands: Use other FPORT fields.

The application server should parse the correct value based on FPORT settings.

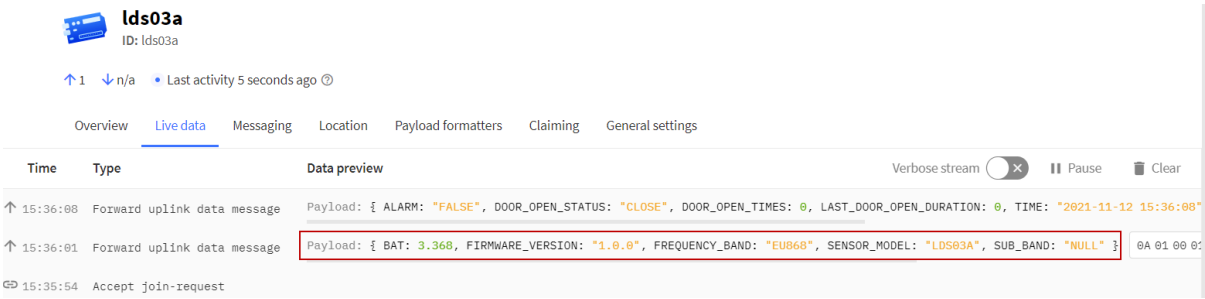
2.3.1 Device Status, FPORT=5

Include device configure status. Once LDS03A Joined the network, it will uplink this message to the server. After that, LDS03A will uplink Device Status every 12 hours.

Users can also use the downlink command**(0x26 01)** to ask LDS03A to resend this uplink. This uplink payload also includes the DeviceTimeReq to get time.

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 LDS03A, this value is 0x0A
- **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 Configuration, FPORT=4

LDS03A will only send this command after getting the downlink command (0x26 02) from the server.

Sensor Configuration FPORT=4				
Size (bytes)	**3**	**1**	**1**	**2**
Value	TDC (unit: sec)	Disalarm	Keep status	Keep time (unit: min)

- **TDC: (default: 0x001C20)**

Uplink interval for the Open/Close Event, default value is 0x001C20 which is 7200 seconds = 2 hours.

- **Disalarm: (default: 0)**

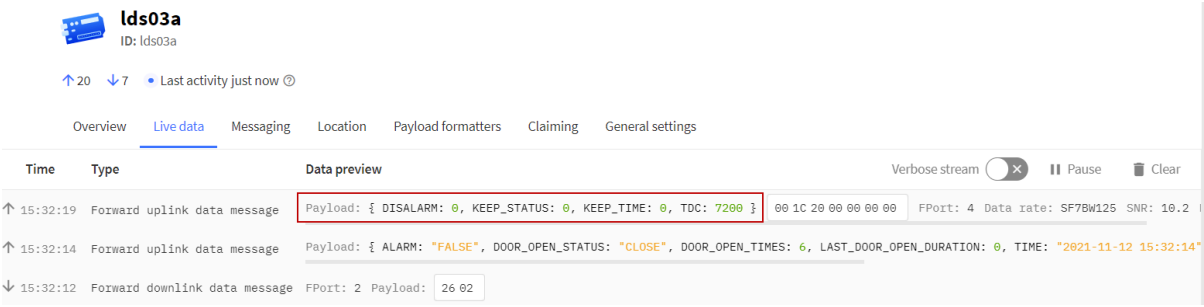
If Disalarm = 1, LDS03A will only send uplink at every TDC periodically. This is normally use for pulse meter application, in this application, there are many open/close event, and platform only care about the total number of pulse.

If Disalarm = 0, LDS03A will send uplink at every TDC periodically and send data on each open/close event. This is useful for the application user need to monitor the open/close event in real-time.

Note: When Disalarm=0, a high frequently open/close event will cause lots of uplink and drain battery very fast.

- **Keep Status & Keep Time**

Shows the configure value of Alarm Base on Timeout Feature



2.3.3 Real-Time Open/Close Status, Uplink FPORT=2

LDS03A will send this uplink **after** Device Status once join the LoRaWAN network successfully. And LDS03A will:

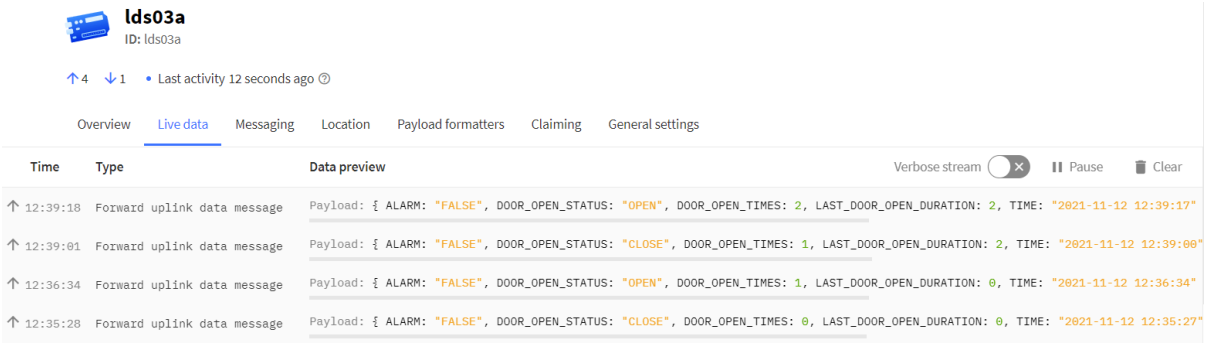
1. periodically send this uplink every 2 hours, this interval can be changed.

2. There is an Open/Close event.

Uplink Payload totals 11 bytes.

Real-Time Open/Close Status, FPORT=2				
Size(bytes)	**1**	**3**	**3**	**4**
Value	Status & Alarm	Total open door events	The last door open duration (unit: min)	Unix TimeStamp

Status & Alarm field			
Size(bit)	**6**	**1**	**1**
Value	Reserve	Enable/disable Timeout Alarm 0: No Alarm; 1: Alarm	Status 0: Close, 1: Open



2.3.4 Historical Door Open/Close Event, FPORT=3

LDS03A stores sensor values and users can retrieve these history values via the downlink command.

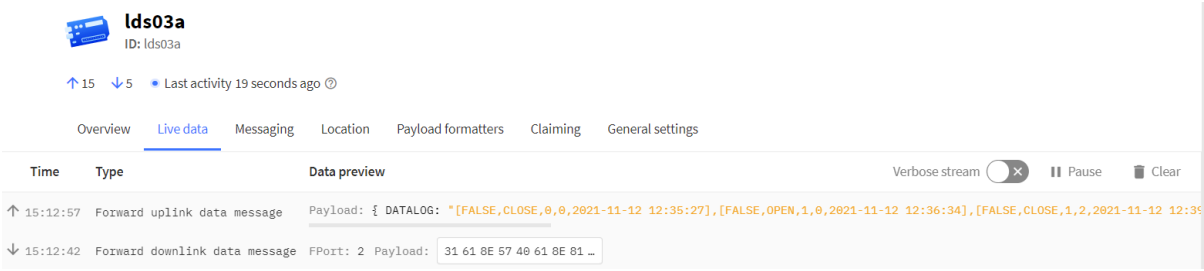
The historical payload includes one or multiplies entries and every entry has the same payload as Real-Time open/close status.

- Each data entry is 11 bytes and has the same structure as Real-Time open/close status, to save airtime and battery, LDS03A will send max bytes according to the current DR and Frequency bands.

For example, in the US915 band, the max payload for different DR is:

1. **DR0**: max is 11 bytes so one entry of data
2. **DR1**: max is 53 bytes so devices will upload 4 entries of data (total 44 bytes)
3. **DR2**: total payload includes 11 entries of data
4. **DR3**: total payload includes 22 entries of data.

If LDS03A doesn't have any data in the polling time. It will uplink 11 bytes of 0



Downlink:

0x31 61 8E 57 40 61 8E 81 70 05

Uplink:

00 00 00 00 00 00 00 61 8E 5F 8F 01 00 00 01 00 00 00 61 8E 5F D2 00 00 00 01 00 00 02 61 8E 60 64 01 00 00 02 00 00 02 61 8E 60 75 00 00 00 02 00 00 01 61 8E 60 C6 00 00 00 02 00 00 01 61 8E 7B A7 01 00 00 03 00 00 01 61 8E 7F 38 00 00 00 03 00 00 02 61 8E 7F CE 01 00 00 04 00 00 02 61 8E 81 1B 00 00 00 04 00 00 00 61 8E 81 50

Parsed Value:

[ALARM, DOOR_OPEN_STATUS, DOOR_OPEN_TIMES,LAST_DOOR_OPEN_DURATION, TIME]

[FALSE, CLOSE, 0, 0, 2021-11-12 12:35:27],

[FALSE, OPEN, 1, 0, 2021-11-12 12:36:34],

[FALSE, CLOSE, 1, 2, 2021-11-12 12:39:00],

[FALSE, OPEN, 2, 2, 2021-11-12 12:39:17],

[FALSE, CLOSE, 2, 1, 2021-11-12 12:40:38],

[FALSE, CLOSE, 2, 1, 2021-11-12 14:35:19],

[FALSE, OPEN, 3, 1, 2021-11-12 14:50:32],

[FALSE, CLOSE, 3, 2, 2021-11-12 14:53:02],

[FALSE, OPEN, 4, 2, 2021-11-12 14:58:35],

[FALSE, CLOSE, 4, 0, 2021-11-12 14:59:28],

2.4 Datalog Feature

When a user wants to retrieve sensor value, he can send a poll command from the IoT platform to ask the sensor to send value in the required time slot.

2.4.1 Unix TimeStamp

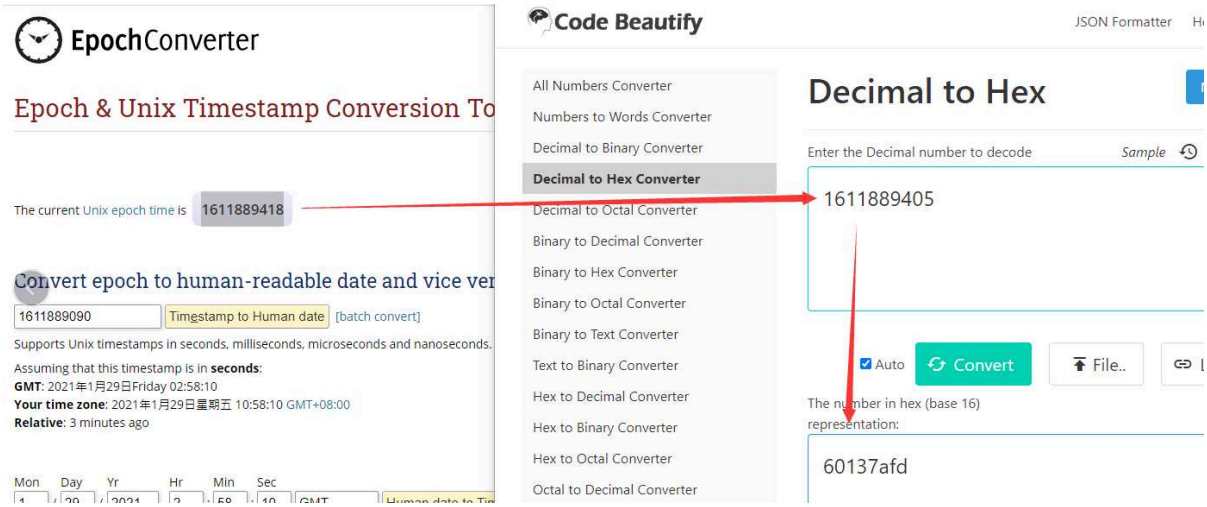
LDS03A use Unix TimeStamp format based on

Size (bytes)	4	1
DeviceTimeAns Payload	32-bit unsigned integer : Seconds since epoch*	8bits unsigned integer: fractional-second in ½^8 second steps

Figure 10 : DeviceTimeAns payload format

Users can get this time from the link: https://www.epochconverter.com/ :

Below is the converter example



So, we can use AT+TIMESTAMP=1611889405 or downlink 3060137afd00 to set the current time 2021 – Jan -- 29 Friday 03:03:25

2.4.2 Set Device Time

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

1. Through LoRaWAN MAC Command (Default settings)

Users need to set SYNCMOD=1 to enable sync time via the MAC command.

Once LDS03A Joined the LoRaWAN network, it will send the MAC command (DeviceTimeReq) and the server will reply with (DeviceTimeAns) to send the current time to LDS03A. If LDS03A fails to get the time from the server, LDS03A will use the internal time and wait for the next time request [via Device Status (FPORT=5)].

Note: LoRaWAN Server needs to support LoRaWAN v1.0.3(MAC v1.0.3) or higher to support this MAC command feature.

2. Manually Set Time

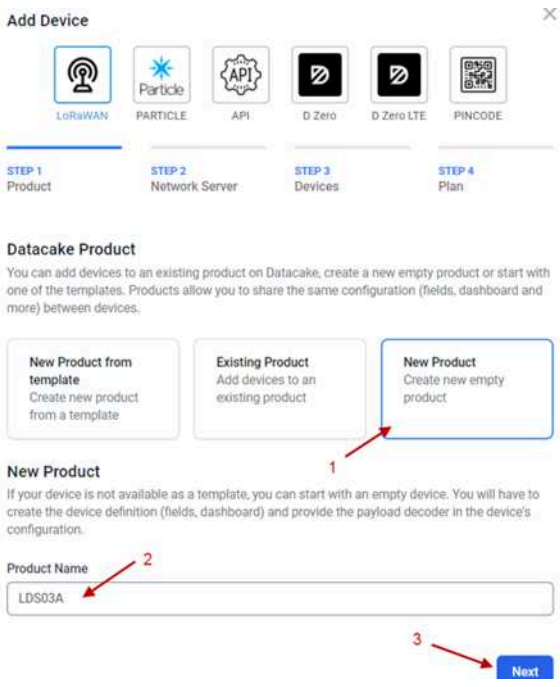
Users need to set SYNCMOD=0 to manual time, otherwise, the user set time will be overwritten by the time set by the server.

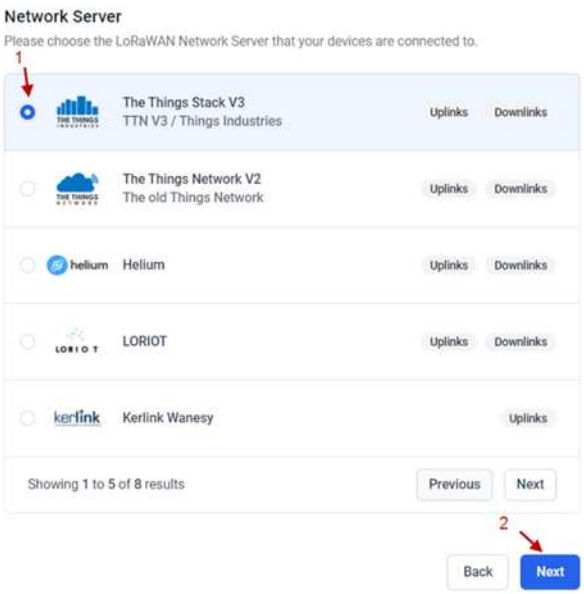
2.5 Show Data in DataCake IoT Server

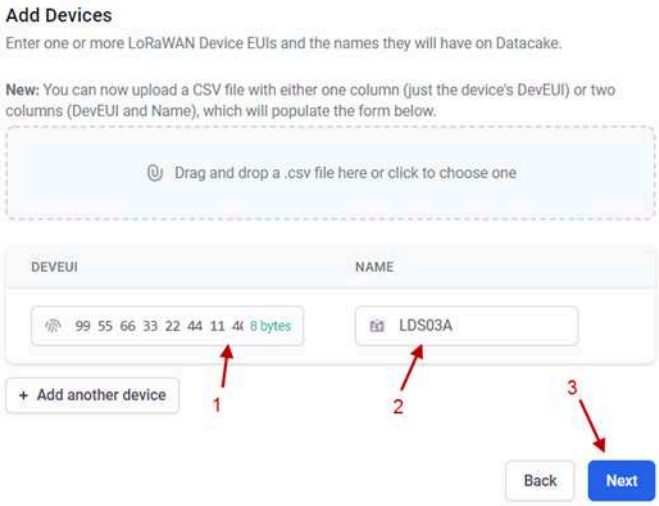
Datacake IoT platform provides a human-friendly interface to show the sensor data, once we have sensor data in TTN V3, we can use Datacake to connect to TTN V3 and see the data in Datacake. Below are the steps:

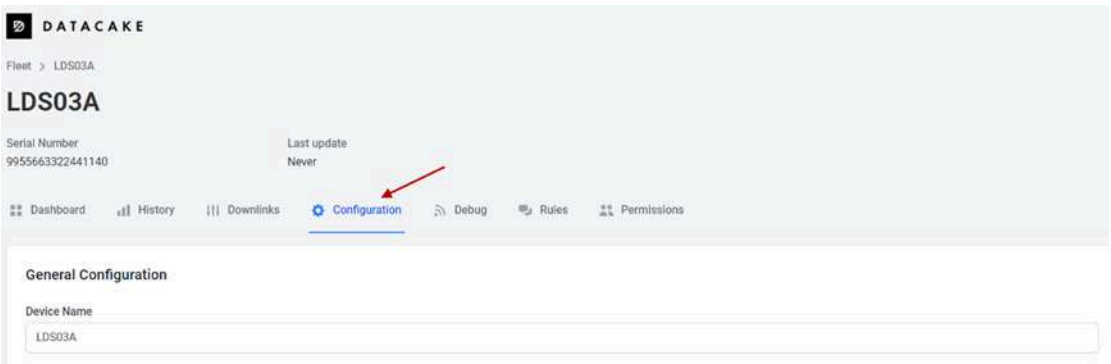
Step 1: Link TTNv3 to Datacake.https://docs.datacake.de/lorawan/lns/thethingsindustries#create-integration-on-tti

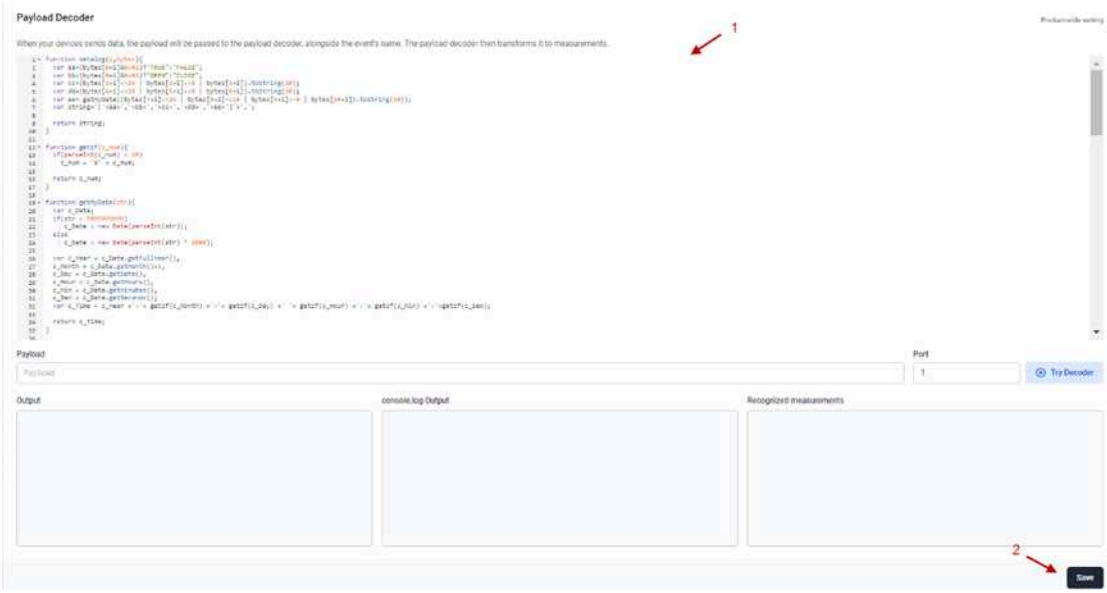
Step 2: Configure LDS03A in Datacake.



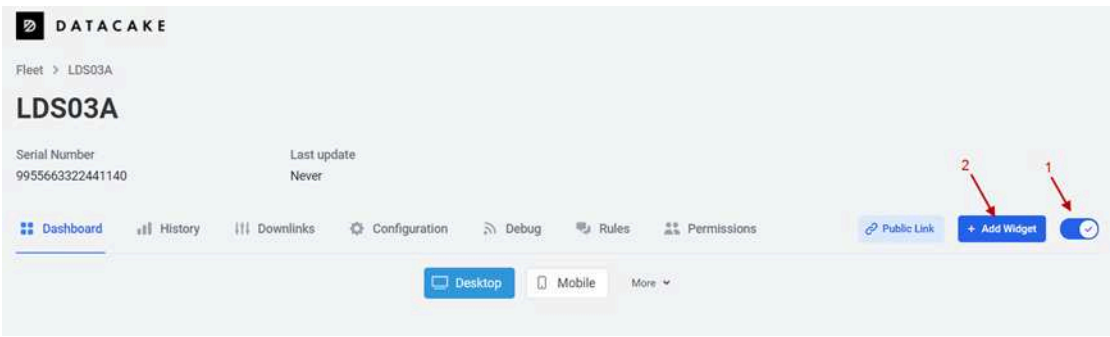

Network Server
Please choose the LoRaWAN Network Server that your devices are connected to.
1
The Things Stack V3
TTN V3 / Things Industries
Uplinks
Downlinks
The Things Network V2
The old Things Network
Uplinks
Downlinks
helium
Helium
Uplinks
Downlinks
LORIOT
Uplinks
Downlinks
kerlink
Kerlink Wanesy
Uplinks
Showing 1 to 5 of 8 results
Previous
Next
2
Back
Next

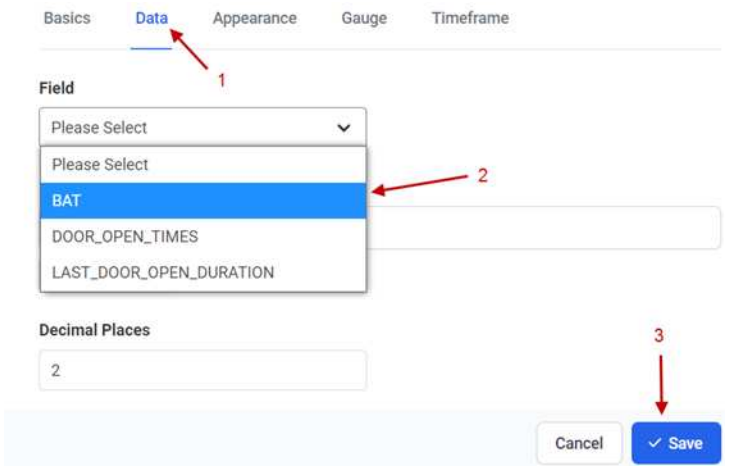

Add Devices
Enter one or more LoRaWAN Device EUIs and the names they will have on Datacake.
New: You can now upload a CSV file with either one column (just the device's DevEUI) or two columns (DevEUI and Name), which will populate the form below.
Drag and drop a .csv file here or click to choose one
DEVEUI
NAME
99 55 66 33 22 44 11 4(8 bytes
LDS03A
+ Add another device
1
2
3
Back
Next

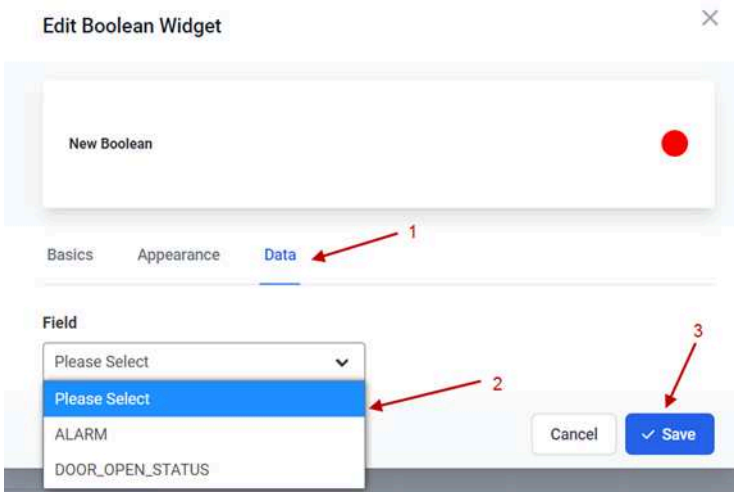

DATACAKE
Fleet > LDS03A
LDS03A
Serial Number
9955663322441140
Last update
Never
Dashboard
History
Downlinks
Configuration
Debug
Rules
Permissions
General Configuration
Device Name
LDS03A

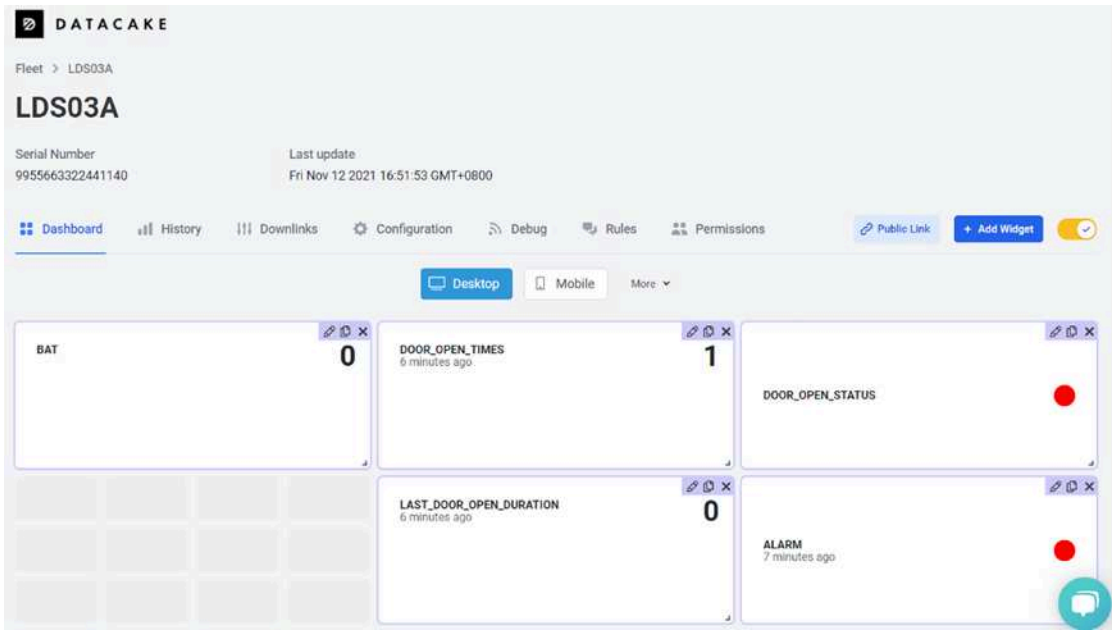

Payload Decoder
1
Payload
Port
Try Decoder
Output
console.log Output
Recognized measurements
2
Save

Fields
Fields describe the data the device will store.
+ Add Field
1
2
NAME
IDENTIFIER
TYPE
CURRENT VALUE
LAST UPDATE
BAT
BAT
Float
0
5 minutes ago
DOOR_OPEN_TIMES
DOOR_OPEN_TIMES
Float
0
3 minutes ago
LAST_DOOR_OPEN_DURATION
LAST_DOOR_OPEN_DURATION
Float
0
3 minutes ago
ALARM
ALARM
Boolean
False
a few seconds ago
DOOR_OPEN_STATUS
DOOR_OPEN_STATUS
Boolean
False
a few seconds ago


DATACAKE
Fleet > LDS03A
LDS03A
Serial Number
9955663322441140
Last update
Never
2
1
Dashboard
History
Downlinks
Configuration
Debug
Rules
Permissions
Public Link
+ Add Widget
Desktop
Mobile
More


Basics
Data
Appearance
Gauge
Timeframe
1
Field
Please Select
Please Select
BAT
DOOR_OPEN_TIMES
LAST_DOOR_OPEN_DURATION
2
Decimal Places
2
3
Cancel
Save


Edit Boolean Widget
New Boolean
Basics
Appearance
Data
1
Field
Please Select
Please Select
ALARM
DOOR_OPEN_STATUS
2
3
Cancel
Save


DATACAKE
Fleet > LDS03A
LDS03A
Serial Number
9955663322441140
Last update
Fri Nov 12 2021 16:51:53 GMT+0800
Dashboard
History
Downlinks
Configuration
Debug
Rules
Permissions
Public Link
Add Widget
Desktop
Mobile
More
BAT
0
DOOR_OPEN_TIMES
6 minutes ago
1
DOOR_OPEN_STATUS
LAST_DOOR_OPEN_DURATION
6 minutes ago
0
ALARM
7 minutes ago

3. Configure LDS03A via AT Command or LoRaWAN Downlink

Use can configure LDS03A via AT Command or LoRaWAN Downlink.

- AT Command Connection: See FAQ.
- LoRaWAN Downlink instruction for different platforms: IoT LoRaWAN Server

There are two kinds of commands to configure LDS03A, they are:

- **General Commands.**

These commands are to configure:

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

They are same for all Dragino Device which support DLWS-005 LoRaWAN Stack. These commands can be found on the wiki: End Device AT Commands and Downlink Command

- **Commands special design for LDS03A**

These commands only valid for LDS03A, as below:

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

3.2 Set Password

Feature: Set device password, max 9 digits.

AT Command: AT+PWORD

Command Example	Function	Response
AT+PWORD=?	Show password	123456 OK
AT+PWORD=999999	Set password	OK

Downlink Command:

No downlink command for this feature.

3.3 Quit AT Command

Feature: Quit AT Command mode, so user needs to input the password again before using AT Commands.

AT Command: AT+DISAT

Command Example	Function	Response
AT+DISAT	Quit AT Commands mode	OK

Downlink Command:

No downlink command for this feature.

3.4 Enable / Disable Alarm

Feature: Enable/Disable Alarm for open/close event. Default value 0.

AT Command:

Command Example	Function	Response
AT+DISALARM=1	End node will only send packets in TDC time.	OK
AT+DISALARM=0	End node will send packets in TDC time or status change for door sensor	OK

Downlink Command:

0xA7 01 // Same As AT+DISALARM=1

0xA7 00 // Same As AT+DISALARM=0

3.5 Clear count

Feature: Clear current door open.

AT Command:

Command Example	Function	Response

AT+CLRC	Clear the count of door open events.	OK

Downlink Command:

0xA6 01 // Same As AT+ CLRC

3.6 Set system time

Feature: Set system time, Unix format. See here for format detail.

AT Command:

Command Example	Function	Response
AT+TIMESTAMP=1611104352	Set System time to 2021-01-20 00:59:12	OK

Downlink Command:

0x306007806000 // Set timestamp to 0x(6007806000),Same as AT+TIMESTAMP=1611104352

3.7 Set Time Sync Mode

Feature: Enable/Disable Sync system time via LoRaWAN MAC Command (DeviceTimeReq), LoRaWAN server must support v1.0.3 protocol to reply to this command.

SYNCMOD is set to 1 by default. If user wants to set a different time from the LoRaWAN server, the user needs to set this to 0.

AT Command:

Command Example	Function	Response
AT+SYNCMOD=1	Enable Sync system time via LoRaWAN MAC Command (DeviceTimeReq) The default is zero time zone.	OK
AT+SYNCMOD=1,8	Enable Sync system time via LoRaWAN MAC Command (DeviceTimeReq) Set to East eight-time zone.	OK
AT+SYNCMOD=1,-12	Enable Sync system time via LoRaWAN MAC Command (DeviceTimeReq) Set to West Twelve Time Zone.	OK

Downlink Command:

0x28 01 // Same As AT+SYNCMOD=1

0x28 01 08 // Same As AT+SYNCMOD=1,8

0x28 01 F4 // Same As AT+SYNCMOD=1,-12

0x28 00 // Same As AT+SYNCMOD=0

3.8 Alarm Base on Timeout

LDS03A can monitor the timeout for a status change, this feature can be used to monitor some events such as door opening too long etc. Related Parameters are:

- **Keep Status: Status to be monitor**

Keep Status = 1: Monitor Close to Open event

Keep Status = 0: Monitor Open to Close event

- **Keep Time: Timeout to send an Alarm**

Range 0 ~ 65535(0xFFFF) seconds.

If keep time = 0, Disable Alarm Base on Timeout feature.

If keep time > 0, device will monitor the keep status event and send an alarm when status doesn't change after timeout.

AT Command to configure:

- **AT+TTRIG=1,30** **-->** When the **Keep Status** change from close to open, and device remains in open status for more than 30 seconds. LDS03A will send an uplink packet, the Alarm bit (the second bit of 1st byte of payload) on this uplink packet is set to 1.
- **AT+TTRIG=0,0** **-->** Default Value, disable timeout Alarm.

Downlink Command to configure:

Command: 0xA9 aa bb cc

A9: Command Type Code

aa: status to be monitored

bb cc: timeout.

If user send 0xA9 01 00 1E: equal to AT+TTRIG=1,30

Or

0xA9 00 00 00: Equal to AT+TTRIG=0,0. Disable timeout Alarm.

3.9 Clear Flash Record

Feature: Clear flash storage for data log feature.

AT Command: AT+CLRDTA

Command Example	Function	Response
AT+CLRDTA	Clear flash storage for data log feature.	Clear all stored sensor data... OK

Downlink Command:

Example: 0xA301 // Same as AT+CLRDTA

3.10 Count Mod (Since firmware v1.2.0)

AT Command:

Command Example	Function	Response
AT+COUNTMOD=0	the count value keeps accumulating mode	OK
AT+COUNTMOD=1	the count value will be reset after each TDC time (Last Close Duration Reset after each uplink)	OK

Downlink Command:

Example: 0B aa => AT+COUNTMOD = second byte

3.11 Interrupt Pin Channel Mod(Since firmware v1.2.0)

AT Command:

Command Example	Function	Response
AT+TTRCHANNEL=1	set as single channel, only use PB14 pin as interrupt pin.	OK
AT+TTRCHANNEL=2	is set as dual channel, use PB14 pin and PB15 pin as interrupt pin.	OK

Downlink Command:

Example: 0D aa => AT+TTRCHANNEL = second byte

3.12 Change the name of AT+TTRIG to AT+TTRIG1(Since firmware v1.2.0)

Downlink Command:

Example: A9 01 aa bb cc => AT+TTRIG1= third byte, 4th byte and 5th byte

3.13 Added AT+TTRIG2 for PB15 pin(Since firmware v1.2.0)

Downlink Command:

Example: A9 02 aa bb cc => AT+TTRIG2= third byte, 4th byte and 5th byte

3.14 TTRIG1/2 timeout status alarm(Since firmware v1.2.0)

It needs to be used with AT+TTRIG1 or AT+TTRIG2. When TTRIG1 or TTRIG2 times out and causes an alarm, and the status does not change subsequently, an alarm packet will be sent at the alarm interval.

AT Command:

Command Example	Function	Response
AT+TTRALARM=0	disable continuous alarm	

		OK
AT+TTRALARM=60	The alarm interval is 60 minutes (unit: minutes)	OK

Downlink Command:

Example: 0C aa => AT+TTRALARM= third byte

3.15 Select counting mode (Since firmware V1.2.1)

AT+TTRMODx=a,b

When **a=0**, the door is opened to count, and when **a=1**,the closed door is counted.

When **b=0**, it is the last door open duration, and when **b=1**,the last door close duration.

AT Command:

Command Example	Function	Response
AT+TTRMODx=1,0	Door closed count and record the last door opened duration	OK
AT+TTRMODx=0,1	Door opened count and record the last door Door Door open closed duration	OK

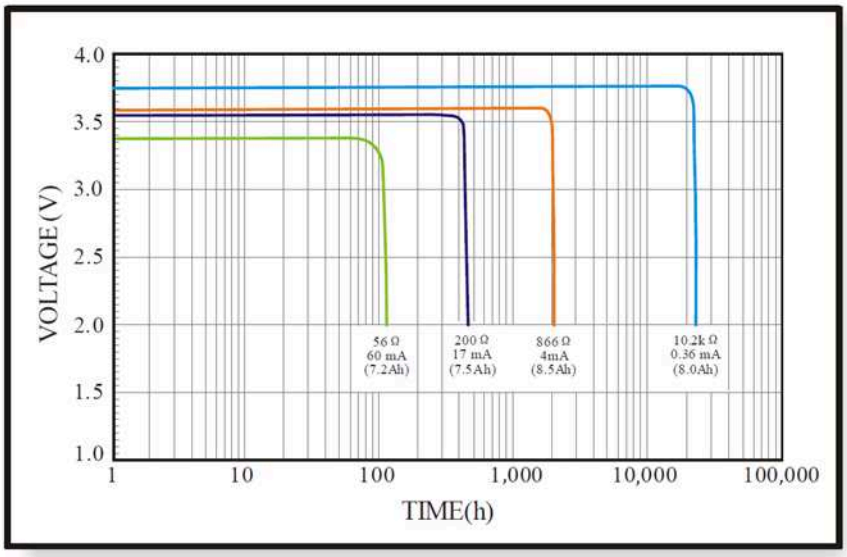
4. Battery & How to replace

4.1 Battery Type

LDS03A is equipped with a 8500mAH ER18505 Li-SOCI2 battery. The battery is an un-rechargeable battery with a low discharge rate targeting 8~10 years of use. This type of battery is commonly used in IoT targets for long-term running, such as water meters.

The discharge curve is not linear so can't simply use percentage to show the battery level. Below is the battery performance.

1. Typical discharge profile at +20℃(Typical value)



Minimum Working Voltage for the LDS03A:

LDS03A: 2.45v ~ 3.6v

4.2 Replace Battery

Any battery with range 2.45 ~ 3.6v can be a replacement. We recommend to use Li-SOCl2 Battery.

And make sure the positive and negative pins match.

4.3 Power Consumption Analyze

Dragino Battery powered product are all runs in Low Power mode. We have an update battery calculator which base on the measurement of the real device. User can use this calculator to check the battery life and calculate the battery life if want to use different transmit interval.

Instruction to use as below:

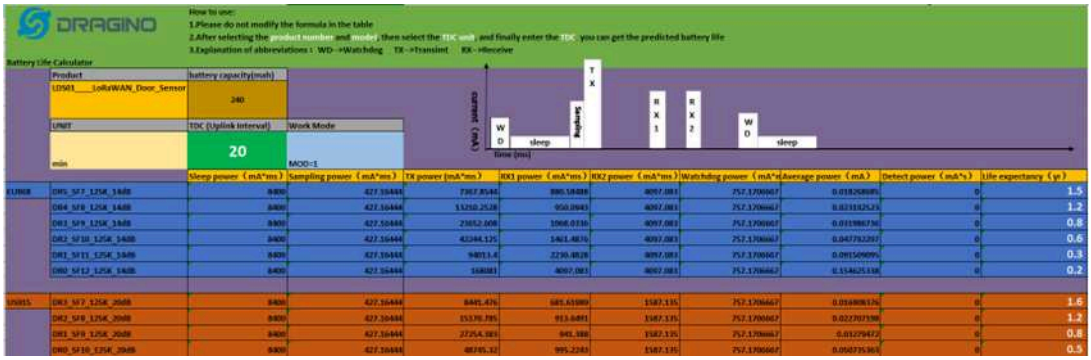
Step 1: Downlink the up-to-date DRAGINO_Battery_Life_Prediction_Table.xlsx from:

https://www.dragino.com/downloads/index.pHp?dir=LoRa_End_Node/Battery_Analyze/

Step 2: Open it and choose

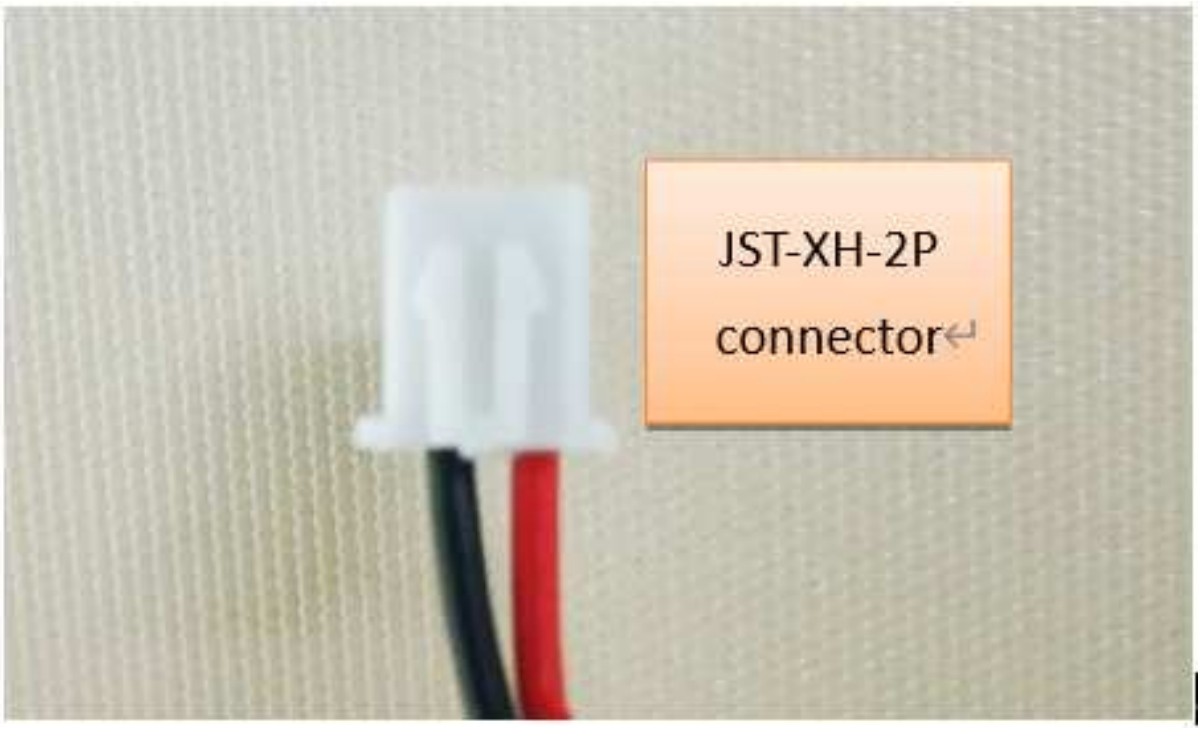
- Product Model
- Uplink Interval
- Working Mode

And the Life expectation in difference case will be shown on the right.



The battery related documents as below:

- Battery Dimension,
- Lithium-Thionyl Chloride Battery datasheet,
- Lithium-ion Battery-Capacitor datasheet, Tech Spec



4.3.1 Battery Note

The Li-SICO battery is designed for small current / long period application. It is not good to use a high current, short period transmit method. The recommended minimum period for use of this battery is 5 minutes. If you use a shorter period time to transmit LoRa, then the battery life may be decreased.

4.3.2 Replace the battery

You can change the battery in the LDS03A.The type of battery is not limited as long as the output is between 3v to 3.6v.

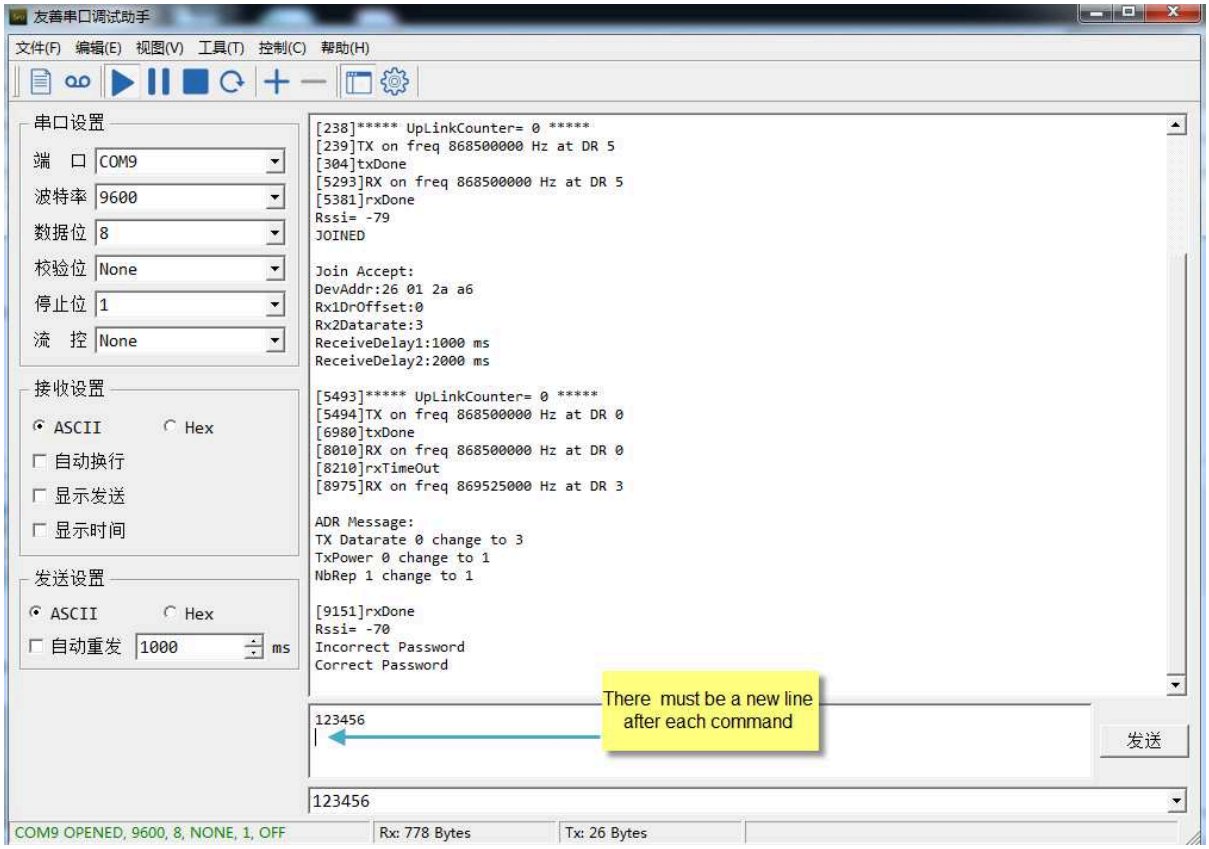
The default battery pack of LDS03A includes an ER18505 plus super capacitor. If user can't find this pack locally, they can find ER18505 or equivalence, which will also work in most cases. The SPC can enlarge the battery life for high-frequency use (update period below 5 minutes)

5. FAQ

5.1 How to use AT Command to configure LDS03A

LDS03A UART connection photo

In the PC, you need to set the serial baud rate to **9600** to access the serial console for LSN50. LSN50 will output system info once power on as below:



5.2 How to upgrade the firmware?

A new firmware might be available for:

- Support new features
- For bug fix
- Change LoRaWAN bands.

Instruction for how to upgrade: Firmware Upgrade Instruction

Firmware location: https://www.dropbox.com/sh/x9rpz9ftyljg135/AAAhC5hqtQOAw9_AoEEZbl9Ca?dl=0

5.3 How to change the LoRa Frequency Bands/Region?

Users can follow the introduction for how to upgrade image. When downloading the images, choose the required image file for download.

6. Trouble Shooting

6.1 AT Commands input doesn't work

In the case if user can see the console output but can't type input to the device. Please check if you already include the **ENTER** while sending out the command. Some serial tool doesn't send **ENTER** while press the send key, user need to add ENTER in their string.

7. Order Info

Part Number: **LDS03A-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

8. Packing Info

Package Includes:

- LDS03A Open/Close Sensor x 1

DIREKTRONIK

10. FCC Warning

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;

(2) this device must accept any interference received, including interference that may cause undesired operation.