



LoRaWAN Distance Detection Sensor User Manual

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Version	Description	Date
1.0	Release	2020-Jun-09
1.1	Add mechanical drawing, Add UART Connection for different hardware	2020-Nov-5
1.2	Update Beam Map	2020-Dec-28
1.3	Update Battery Option	2021-Mar-17
1.4	Update to use TTN v3, update to firmware v1.1.4	2021-May-13

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1. Introduction

1.1 What is LoRaWAN Distance Detection Sensor

The Dragino LDDS75 is a **LoRaWAN Distance Detection Sensor** for Internet of Things solution. It is used to measure the distance between the sensor and a flat object. The distance detection sensor is a module that uses **ultrasonic sensing** technology for distance measurement, and **temperature compensation** is performed internally to improve the reliability of data. The LDDS75 can be applied to scenarios such as horizontal distance measurement, liquid level measurement, parking management system, object proximity and presence detection, intelligent trash can management system, robot obstacle avoidance, automatic control, sewer, bottom water level monitoring, etc.

It detects the distance **between the measured object and the sensor**, and uploads the value via wireless to LoRaWAN IoT Server.

The LoRa wireless technology used in LDDS75 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.

LDDS75 is powered by **4000mA or 8500mAh Li-SOC12 battery**; It is designed for long term use up to 10 years*.

Each LDDS75 pre-loads with a set of unique keys for LoRaWAN registrations, register these keys to local LoRaWAN server and it will auto connect if there is network coverage, after power on.

*Actually lifetime depends on network coverage and uplink interval and other factors

LDDS75 in a LoRaWAN Network



1.2 Features

- ✧ LoRaWAN 1.0.3 Class A
- ✧ Ultra low power consumption
- ✧ Distance Detection by Ultrasonic technology
- ✧ Flat object range 280mm - 7500mm
- ✧ Accuracy: $\pm(1\text{cm}+S*0.3\%)$ (S: Distance)
- ✧ Cable Length : 25cm
- ✧ Bands: CN470/EU433/KR920/US915/EU868/AS923/AU915/IN865
- ✧ AT Commands to change parameters
- ✧ Uplink on periodically
- ✧ Downlink to change configure
- ✧ IP66 Waterproof Enclosure
- ✧ 4000mAh or 8500mAh Battery for long term use

1.3 Specification

1.3.1 Rated environmental conditions

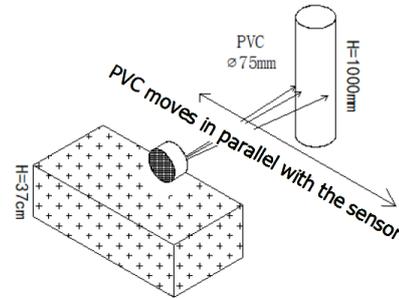
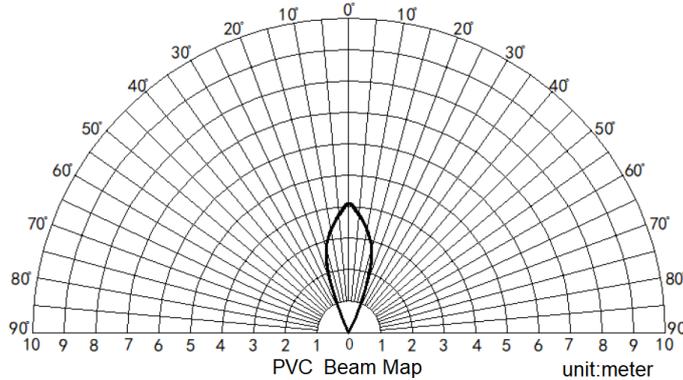
Item	Minimum value	Typical value	Maximum value	Unit	Remarks
Storage temperature	-25	25	80	°C	
Storage humidity		65%	90%	RH	(1)
Operating temperature	-15	25	60	°C	
Working humidity		65%	80%	RH	(1)

Remarks: (1) a. When the ambient temperature is 0-39 °C, the maximum humidity is 90% (non-condensing)

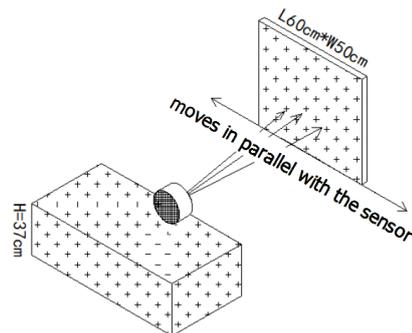
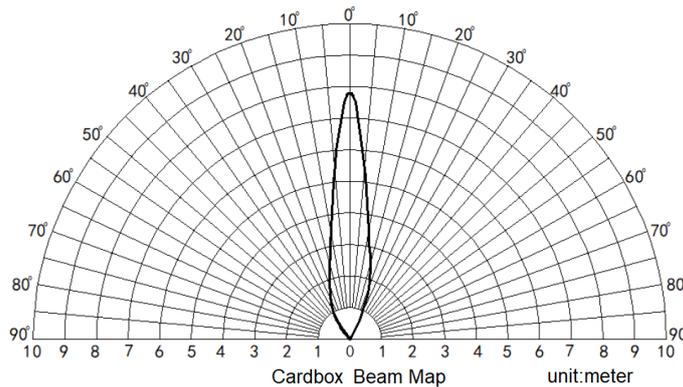
b. When the ambient temperature is 40-50 °C, the highest humidity is the highest humidity in the natural world at the current temperature (no condensation)

1.3.2 Effective measurement range Reference beam pattern

(1) The tested object is a white cylindrical tube made of PVC, with a height of 100cm and a diameter of 7.5cm.



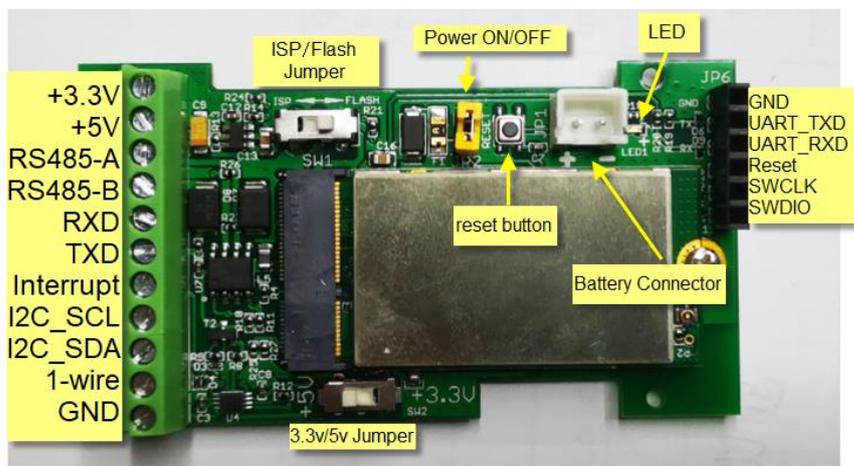
(2) The object to be tested is a "corrugated cardboard box" perpendicular to the central axis of 0°, and the length * width is 60cm * 50cm.



1.4 Applications

- ✧ Horizontal distance measurement
- ✧ Liquid level measurement
- ✧ Parking management system
- ✧ Object proximity and presence detection
- ✧ Intelligent trash can management system
- ✧ Robot obstacle avoidance
- ✧ Automatic control
- ✧ Sewer
- ✧ Bottom water level monitoring

1.5 Pin mapping and power on



2. Configure LDDS75 to connect to LoRaWAN network

2.1 How it works

The LDDS75 is configured as LoRaWAN OTAA Class A mode by default. It has OTAA keys to join LoRaWAN network. To connect a LoRaWAN network, you need to input the OTAA keys in the LoRaWAN IoT server and power on the LDDS75. If there is coverage of the LoRaWAN network, it will automatically join the network via OTAA and start to send the sensor value

In case you can't set the OTAA keys in the LoRaWAN OTAA server, and you have to use the keys from the server, you can [use AT Commands](#) to set the keys in the LDDS75.

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 [LG308](#) as a LoRaWAN gateway in this example.

LDDS75 in a LoRaWAN Network



The LG308 is already set to connected to [TTN V3 network](#), so what we need to now is configure the TTN V3 server.

Step 1: Create a device in TTN V3 with the OTAA keys from LDDS75.

Each LDDS75 is shipped with a sticker with the default device keys, user can find this sticker in the box. it looks like below.



For OTAA registration, we need to set **APP EUI/ APP KEY/ DEV EUI**. Some server might no need to set APP EUI.

Enter these keys in the LoRaWAN Server portal. Below is TTN V3 screen shot:

Add APP EUI in the application

Add application

Owner*

Application ID*

Application name

Description

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

Create application



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

1. Select the end device

Brand*

Model*

Cannot find your exact end device? [Device registration.](#)

- LBT1
- LDDS20
- LDDS75
- LDS01
- LGT92
- LHT65
- LSE01
- LSN50-V2

2. Enter registration data

Please choose an end device first to

2. Enter registration data

Frequency plan

The frequency plan used by the end device

AppEUI

The AppEUI uniquely identifies the owner of the end device. If no AppEUI is provided by the device manufacturer (usually for development), it can be filled with zeros.

You can also choose to create the device manually.

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... | v

Network Server address

eu1.cloud.thethings.network

Application Server address

eu1.cloud.thethings.network

External Join Server ⓘ

Add APP KEY and DEV EUI

2. Enter registration data

Frequency plan ⓘ *

The frequency plan used by the end device

AppEUI ⓘ *

The AppEUI uniquely identifies the owner of the end device. If no AppEUI is provided by the device manufacturer (usually for dev

DevEUI ⓘ *

The DevEUI is the unique identifier for this end device

AppKey ⓘ *

The root key to derive session keys to secure communication between the end device and the application

End device ID *

After registration

Step 2: Power on LDDS75

Put a Jumper on JP2 to power on the device. (The switch must be set in FLASH position).



Step 3: The LDDS75 will auto join to the TTN V3 network. After join success, it will start to upload messages to TTN V3 and you can see the messages in the panel.

↑ 10:35:00	Forward data message to Applic...	DevAddr: 26 08 52 6E	MAC payload: 17 BF BD 86 C1	FPort: 2 SNR: 9.5 RSSI: -53 Bandwidth: 125000
↑ 10:35:00	Forward uplink data message	DevAddr: 26 08 52 6E	Payload: { bat: 3.35, distance: 2671 } 80 16 8A 6F 00	FPort: 2 SNR: 9.5 RSSI: -53 Bandwidth: 125000
↑ 10:35:00	Receive uplink data message	DevAddr: 26 08 52 6E		
↑ 10:35:00	Successfully processed data me...	DevAddr: 26 08 52 6E	FCnt: 14770 FPort: 2 MAC payload: 17 BF BD 86 C1	Bandwidth: 125000 SNR: 9.5 RSSI: -53 Raw payload: 40 €
↑ 10:35:00	Drop data message	Uplink is a duplicate		
↑ 10:35:00	Receive data message	DevAddr: 26 08 52 6E	FCnt: 14770 FPort: 2 MAC payload: 17 BF BD 86 C1	Bandwidth: 125000 SNR: 9.5 RSSI: -58 Raw payload: 40 €
↑ 10:35:00	Receive data message	DevAddr: 26 08 52 6E	FCnt: 14770 FPort: 2 MAC payload: 17 BF BD 86 C1	Bandwidth: 125000 SNR: 9.5 RSSI: -53 Raw payload: 40 €

2.3 Uplink Payload

LDDS75 will uplink payload via LoRaWAN with below payload format:

Uplink payload includes in total 4 bytes.

Payload for firmware version v1.1.4. . Before v1.1.3, there is on two fields: BAT and Distance

Size(bytes)	2	2	1	2	1
Value	BAT	Distance (unit: mm)	Digital Interrupt (Optional)	Temperature (Optional)	Sensor Flag



10:35:00	Forward data message to Applic...	DevAddr: 26 0B 52 6E	MAC payload: 17 BF BD 86 C1	FPort: 2 SNR: 9.5 RSSI: -53 Bandwidth: 125000	
10:35:00	Forward uplink data message	DevAddr: 26 0B 52 6E	Payload: { bat: 3.35, distance: 2671, 0D 16 0A 6F 00 }	FPort: 2 SNR: 9.5 RSSI: -53 Bandwidth: 125000	
10:35:00	Receive uplink data message	DevAddr: 26 0B 52 6E			
10:35:00	Successfully processed data me...	DevAddr: 26 0B 52 6E	FCnt: 14770	FPort: 2 MAC payload: 17 BF BD 86 C1 Bandwidth: 125000 SNR: 9.5 RSSI: -53 Raw payload: 40 00	
10:35:00	Drop data message	Uplink is a duplicate			
10:35:00	Receive data message	DevAddr: 26 0B 52 6E	FCnt: 14770	FPort: 2 MAC payload: 17 BF BD 86 C1 Bandwidth: 125000 SNR: 9.5 RSSI: -50 Raw payload: 40 00	
10:35:00	Receive data message	DevAddr: 26 0B 52 6E	FCnt: 14770	FPort: 2 MAC payload: 17 BF BD 86 C1 Bandwidth: 125000 SNR: 9.5 RSSI: -53 Raw payload: 40 00	

2.3.1 Battery Info

Check the battery voltage for LDDS75.

Ex1: 0x0B45 = 2885mV

Ex2: 0x0B49 = 2889mV

2.3.2 Distance

Get the distance. Flat object range 280mm - 7500mm.

For example, if the data you get from the register is 0x0B 0x05, the distance between the sensor and the measured object is

$$0B05(H) = 2821 (D) = 2821 \text{ mm.}$$

- If the sensor value is 0x0000, it means system doesn't detect ultrasonic sensor.
- If the sensor value lower than 0x0118 (280mm), the sensor value will be invalid. Since v1.1.4, all value lower than 280mm will be set to 0x0014(20mm) which means the value is invalid.

2.3.3 Interrupt Pin

This data field shows if this packet is generated by interrupt or not. [Click here](#) for the hardware and software set up.

Example:

0x00: Normal uplink packet.

0x01: Interrupt Uplink Packet.

2.3.4 DS18B20 Temperature sensor

This is optional, user can connect external DS18B20 sensor to the [+3.3v, 1-wire and GND pin](#) and this field will report temperature.

Example:

If payload is: 0105H: (0105 & FC00 == 0), temp = 0105H /10 = 26.1 degree

If payload is: FF3FH : (FF3F & FC00 == 1) , temp = (FF3FH - 65536)/10 = -19.3 degrees.

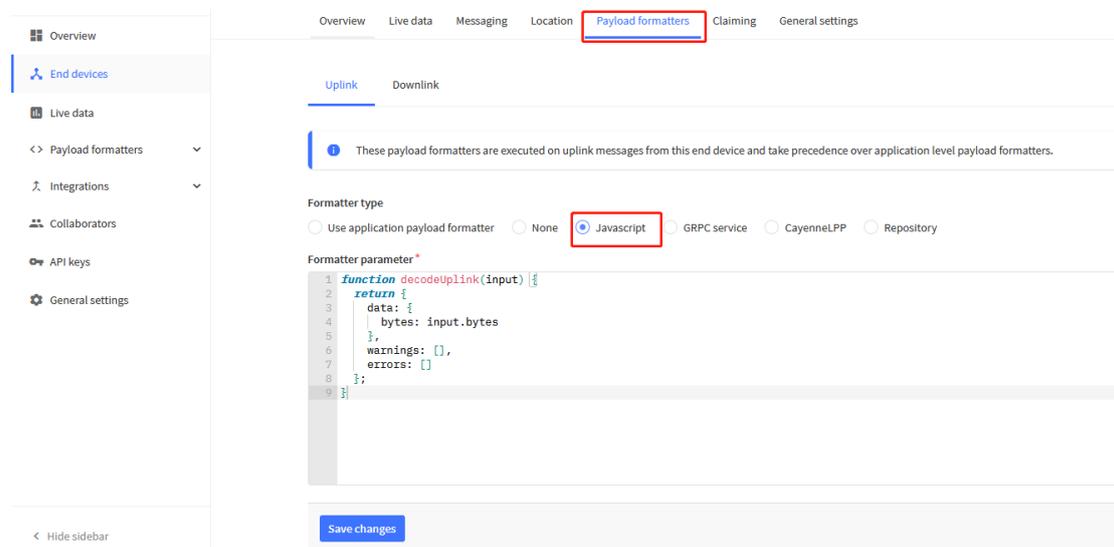
2.3.5 Sensor Flag

0x01: Detect Ultrasonic Sensor

0x00: No Ultrasonic Sensor

2.3.6 Decode payload in The Things Network

While using TTN V3 network, you can add the payload format to decode the payload.



The screenshot shows the 'Payload formatters' configuration page in the Dragino web interface. The 'Formatter type' section has 'Javascript' selected. The 'Formatter parameter' field contains the following JavaScript code:

```

1 function decodeUplink(input) {
2   return {
3     data: {
4       bytes: input.bytes
5     },
6     warnings: [],
7     errors: []
8   };
9 }

```

The payload decoder function for TTN V3 is here:

LDDS75 TTN V3 Payload Decoder:

http://www.dragino.com/downloads/index.php?dir=LoRa_End_Node/LDDS75/Payload_Decoder/

2.4 Uplink Interval

The LDDS75 by default uplink the sensor data every 20 minutes. User can change this interval by AT Command or LoRaWAN Downlink Command. See this link:

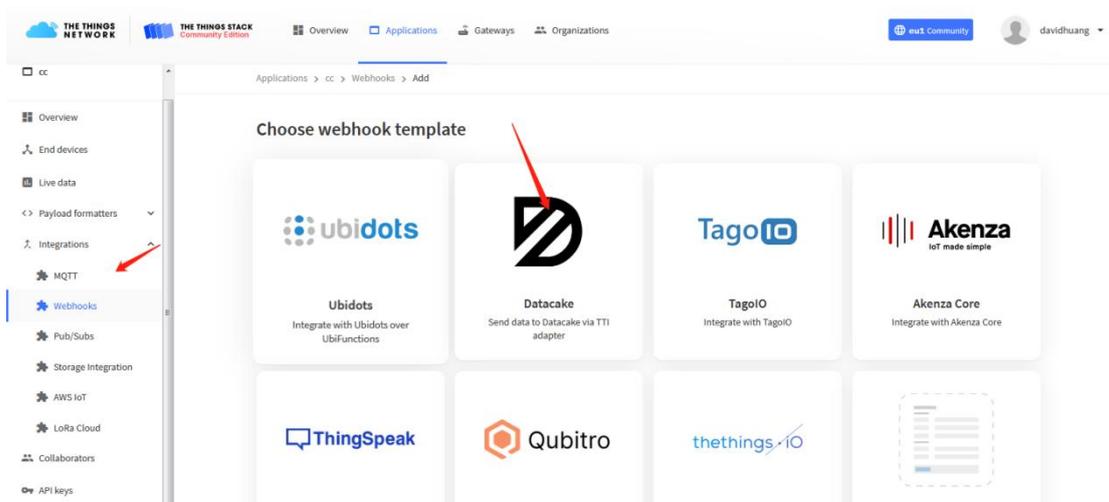
http://wiki.dragino.com/index.php?title=End_Device_AT_Commands_and_Downlink_Commands#Change_Uplink_Interval

2.5 Show Data in Datacake IoT Server

Datacake provides a human friendly interface to show the sensor data, once we have 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: 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 Datacake you will need to add integration. To add the Datacake 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: Search the LDDS75 and add DevEUI.

Complex configuration and setup.

All Manufacturers

Dragino LSE01
Dragino

Dragino LT-22222-L
Dragino

Dragino LWL01
Dragino

ESP32-Paxcounter
cyberman54

Elsys ELT-2
Elsys.se

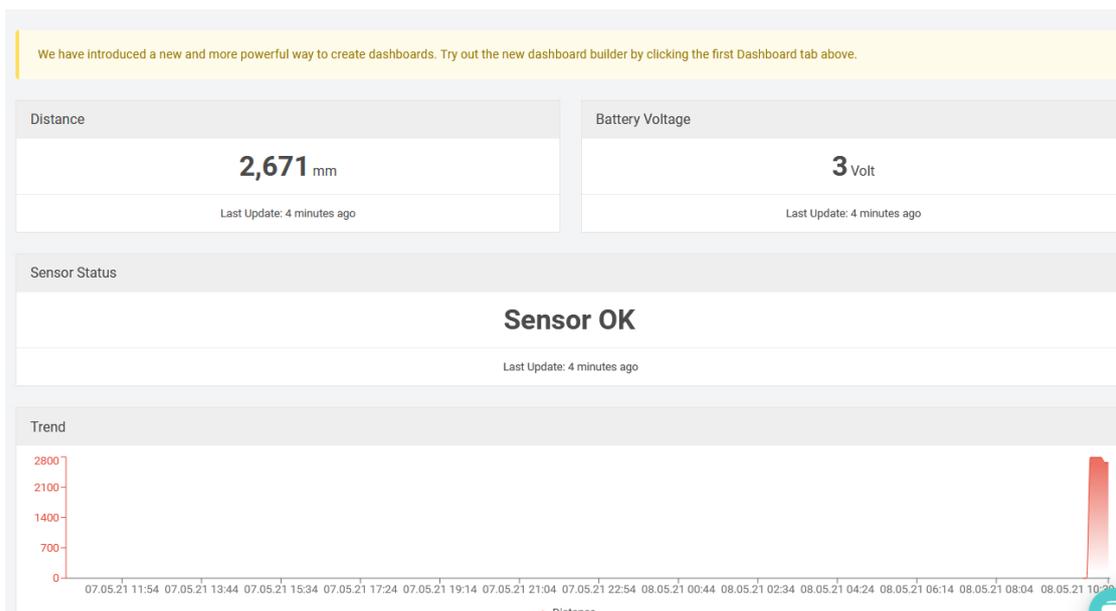
Showing 26 to 30 of 79 results

Previous

Next

Next

After added, the sensor data arrive TTN V3, it will also arrive and show in Datacake.



2.6 Frequency Plans

The LDDS75 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.

2.6.1 EU863-870 (EU868)

Uplink:

868.1 - SF7BW125 to SF12BW125
868.3 - SF7BW125 to SF12BW125 and SF7BW250
868.5 - SF7BW125 to SF12BW125
867.1 - SF7BW125 to SF12BW125
867.3 - SF7BW125 to SF12BW125
867.5 - SF7BW125 to SF12BW125
867.7 - SF7BW125 to SF12BW125
867.9 - SF7BW125 to SF12BW125
868.8 - FSK

Downlink:

Uplink channels 1-9 (RX1)
869.525 - SF9BW125 (RX2 downlink only)

2.6.2 US902-928(US915)

Used in USA, Canada and South America. Default use CHE=2

Uplink:

903.9 - SF7BW125 to SF10BW125
904.1 - SF7BW125 to SF10BW125
904.3 - SF7BW125 to SF10BW125
904.5 - SF7BW125 to SF10BW125
904.7 - SF7BW125 to SF10BW125
904.9 - SF7BW125 to SF10BW125
905.1 - SF7BW125 to SF10BW125
905.3 - SF7BW125 to SF10BW125

Downlink:

923.3 - SF7BW500 to SF12BW500
923.9 - SF7BW500 to SF12BW500
924.5 - SF7BW500 to SF12BW500
925.1 - SF7BW500 to SF12BW500
925.7 - SF7BW500 to SF12BW500
926.3 - SF7BW500 to SF12BW500
926.9 - SF7BW500 to SF12BW500
927.5 - SF7BW500 to SF12BW500
923.3 - SF12BW500(RX2 downlink only)

2.6.3 CN470-510 (CN470)

Used in China, Default use CHE=1

Uplink:

486.3 - SF7BW125 to SF12BW125
486.5 - SF7BW125 to SF12BW125
486.7 - SF7BW125 to SF12BW125
486.9 - SF7BW125 to SF12BW125
487.1 - SF7BW125 to SF12BW125

487.3 - SF7BW125 to SF12BW125
487.5 - SF7BW125 to SF12BW125
487.7 - SF7BW125 to SF12BW125

Downlink:

506.7 - SF7BW125 to SF12BW125
506.9 - SF7BW125 to SF12BW125
507.1 - SF7BW125 to SF12BW125
507.3 - SF7BW125 to SF12BW125
507.5 - SF7BW125 to SF12BW125
507.7 - SF7BW125 to SF12BW125
507.9 - SF7BW125 to SF12BW125
508.1 - SF7BW125 to SF12BW125
505.3 - SF12BW125 (RX2 downlink only)

2.6.4 AU915-928(AU915)

Default use CHE=2

Uplink:

916.8 - SF7BW125 to SF12BW125
917.0 - SF7BW125 to SF12BW125
917.2 - SF7BW125 to SF12BW125
917.4 - SF7BW125 to SF12BW125
917.6 - SF7BW125 to SF12BW125
917.8 - SF7BW125 to SF12BW125
918.0 - SF7BW125 to SF12BW125
918.2 - SF7BW125 to SF12BW125

Downlink:

923.3 - SF7BW500 to SF12BW500
923.9 - SF7BW500 to SF12BW500
924.5 - SF7BW500 to SF12BW500
925.1 - SF7BW500 to SF12BW500
925.7 - SF7BW500 to SF12BW500
926.3 - SF7BW500 to SF12BW500
926.9 - SF7BW500 to SF12BW500
927.5 - SF7BW500 to SF12BW500
923.3 - SF12BW500(RX2 downlink only)

2.6.5 AS920-923 & AS923-925 (AS923)

Default Uplink channel:

923.2 - SF7BW125 to SF10BW125
923.4 - SF7BW125 to SF10BW125

Additional Uplink Channel:

(OTAA mode, channel added by JoinAccept message)

AS920~AS923 for Japan, Malaysia, Singapore:

922.2 - SF7BW125 to SF10BW125
922.4 - SF7BW125 to SF10BW125
922.6 - SF7BW125 to SF10BW125
922.8 - SF7BW125 to SF10BW125
923.0 - SF7BW125 to SF10BW125
922.0 - SF7BW125 to SF10BW125

AS923 ~ AS925 for Brunei, Cambodia, Hong Kong, Indonesia, Laos, Taiwan, Thailand,**Vietnam:**

923.6 - SF7BW125 to SF10BW125
923.8 - SF7BW125 to SF10BW125
924.0 - SF7BW125 to SF10BW125
924.2 - SF7BW125 to SF10BW125
924.4 - SF7BW125 to SF10BW125
924.6 - SF7BW125 to SF10BW125

Downlink:

Uplink channels 1-8 (RX1)
923.2 - SF10BW125 (RX2)

2.6.6 KR920-923 (KR920)

Default channel:

922.1 - SF7BW125 to SF12BW125
922.3 - SF7BW125 to SF12BW125
922.5 - SF7BW125 to SF12BW125

Uplink: (OTAA mode, channel added by JoinAccept message)

922.1 - SF7BW125 to SF12BW125
922.3 - SF7BW125 to SF12BW125
922.5 - SF7BW125 to SF12BW125
922.7 - SF7BW125 to SF12BW125
922.9 - SF7BW125 to SF12BW125
923.1 - SF7BW125 to SF12BW125
923.3 - SF7BW125 to SF12BW125

Downlink:

Uplink channels 1-7(RX1)
921.9 - SF12BW125 (RX2 downlink only; SF12BW125 might be changed to SF9BW125)

2.6.7 IN865-867 (IN865)

Uplink:

865.0625 - SF7BW125 to SF12BW125
865.4025 - SF7BW125 to SF12BW125
865.9850 - SF7BW125 to SF12BW125

Downlink:

Uplink channels 1-3 (RX1)
866.550 - SF10BW125 (RX2)

2.7 LED Indicator

The LDDS75 has an internal LED which is to show the status of different state.

- Blink once when device power on.
- The device detects the sensor and flashes 5 times.

- Solid ON for 5 seconds once device successful Join the network.
- Blink once when device transmit a packet.

2.8 Firmware Change Log

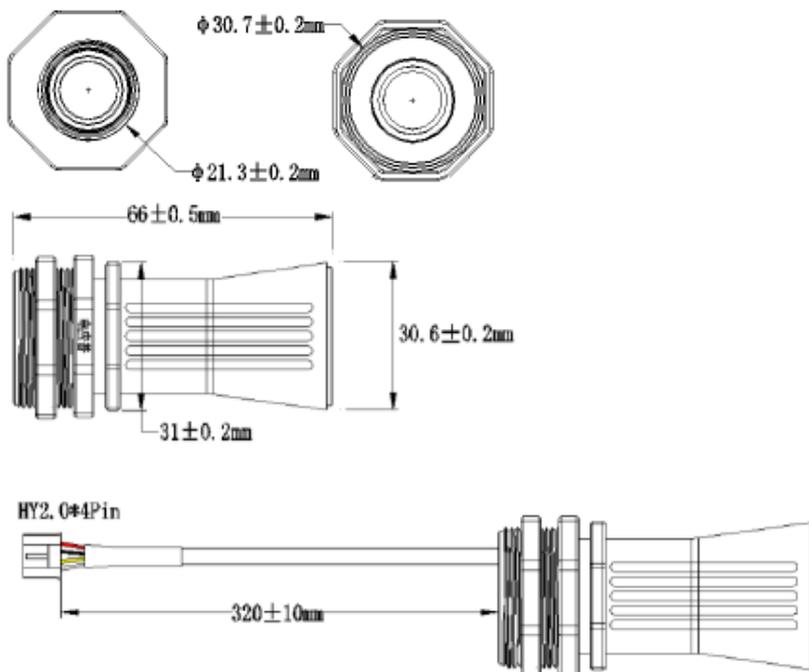
Firmware download link:

http://www.dragino.com/downloads/index.php?dir=LoRa_End_Node/LSE01/Firmware/

Firmware Upgrade Method:

http://wiki.dragino.com/index.php?title=Firmware_Upgrade_Instruction_for_STM32_base_products#Introduction

2.9 Mechanical



2.10 Battery Analysis

2.10.1 Battery Type

The LDDS75 battery is a combination of a 4000mAh or 8500mAh Li/SOCI2 Battery and a Super Capacitor. The battery is non-rechargeable battery type with a low discharge rate (<2% per year). This type of battery is commonly used in IoT devices such as water meter.

The battery related documents as below:

- [Battery Dimension](#),
- [Lithium-Thionyl Chloride Battery](#) datasheet, [Tech Spec](#)
- [Lithium-ion Battery-Capacitor](#) datasheet, [Tech Spec](#)



2.10.2 Replace the battery

You can change the battery in the LDD575. The type of battery is not limited as long as the output is between 3v to 3.6v. On the main board, there is a diode (D1) between the battery and the main circuit. If you need to use a battery with less than 3.3v, please remove the D1 and shortcut the two pads of it so there won't be voltage drop between battery and main board.

The default battery pack of LDD575 includes a ER18505 plus super capacitor. If user can't find this pack locally, they can find ER18505 or equivalence, which will also work in most case. The SPC can enlarge the battery life for high frequency use (update period below 5 minutes)

3. Configure LDDS75 via AT Command or LoRaWAN Downlink

User can configure LDDS75 via AT Command or LoRaWAN Downlink.

- AT Command Connection: See [FAQ](#).
- LoRaWAN Downlink instruction for different platforms:

http://wiki.dragino.com/index.php?title=Main_Page#Use_Note_for_Server

There are two kinds of commands to configure LDDS75, 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:

http://wiki.dragino.com/index.php?title=End_Device_Downlink_Command

- **Commands special design for LDDS75**

These commands only valid for LDDS75, as below:

3.1 Access AT Commands

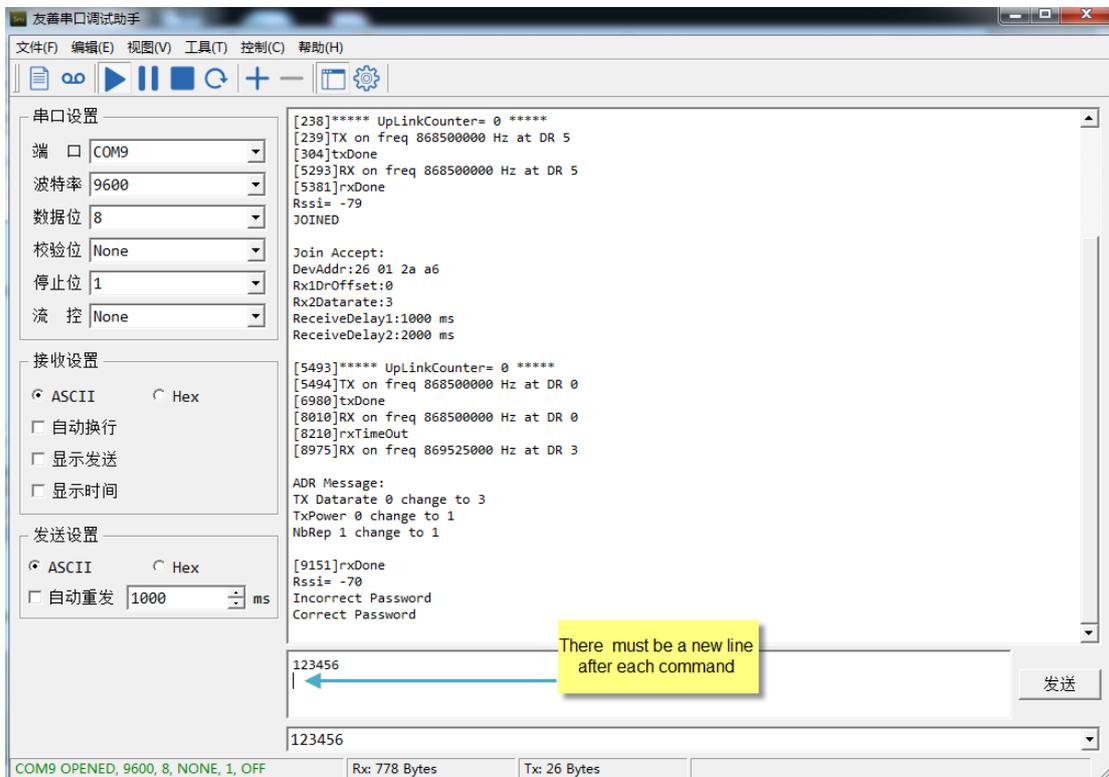
LDDS75 supports AT Command set in the stock firmware. You can use a USB to TTL adapter to connect to LDDS75 for using AT command, as below.



Or if you have below board, use below connection:



In the PC, you need to set the serial baud rate to **9600** to access the serial console for LDDS75. LDDS75 will output system info once power on as below:



3.2 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 Set Interrupt Mode

Feature, Set Interrupt mode for GPIO_EXIT.

AT Command: AT+INTMOD

Command Example	Function	Response
AT+INTMOD=?	Show current interrupt mode	0 OK the mode is 0 = No interruption
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 Set transmit interval to 60000ms = 60 seconds

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

4. FAQ

4.1 What is the frequency plan for LDDS75?

LDDS75 use the same frequency as other Dragino products. User can see the detail from this link:

http://wiki.dragino.com/index.php?title=End_Device_Frequency_Band#Introduction

4.2 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.

5. Trouble Shooting

5.1 Why I can't join TTN V3 in US915 / AU915 bands?

It is due to channel mapping. Please see below link:

http://wiki.dragino.com/index.php?title=LoRaWAN_Communication_Debug#Notice_of_US915.2FCN470.2FAU915_Frequency_band

5.2 AT Command 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.

6. Order Info

Part Number: **LDDS75-XX-YY**

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

YY: Battery Option

- **4:** 4000mAh battery
- **8:** 8500mAh battery

7. Packing Info

Package Includes:

- LDDS75 LoRaWAN Distance Detection x 1

Dimension and weight:

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

8. 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.com