CHOOVIO SL100 LoRaWAN Temperature and Humidity Sensor User Manual

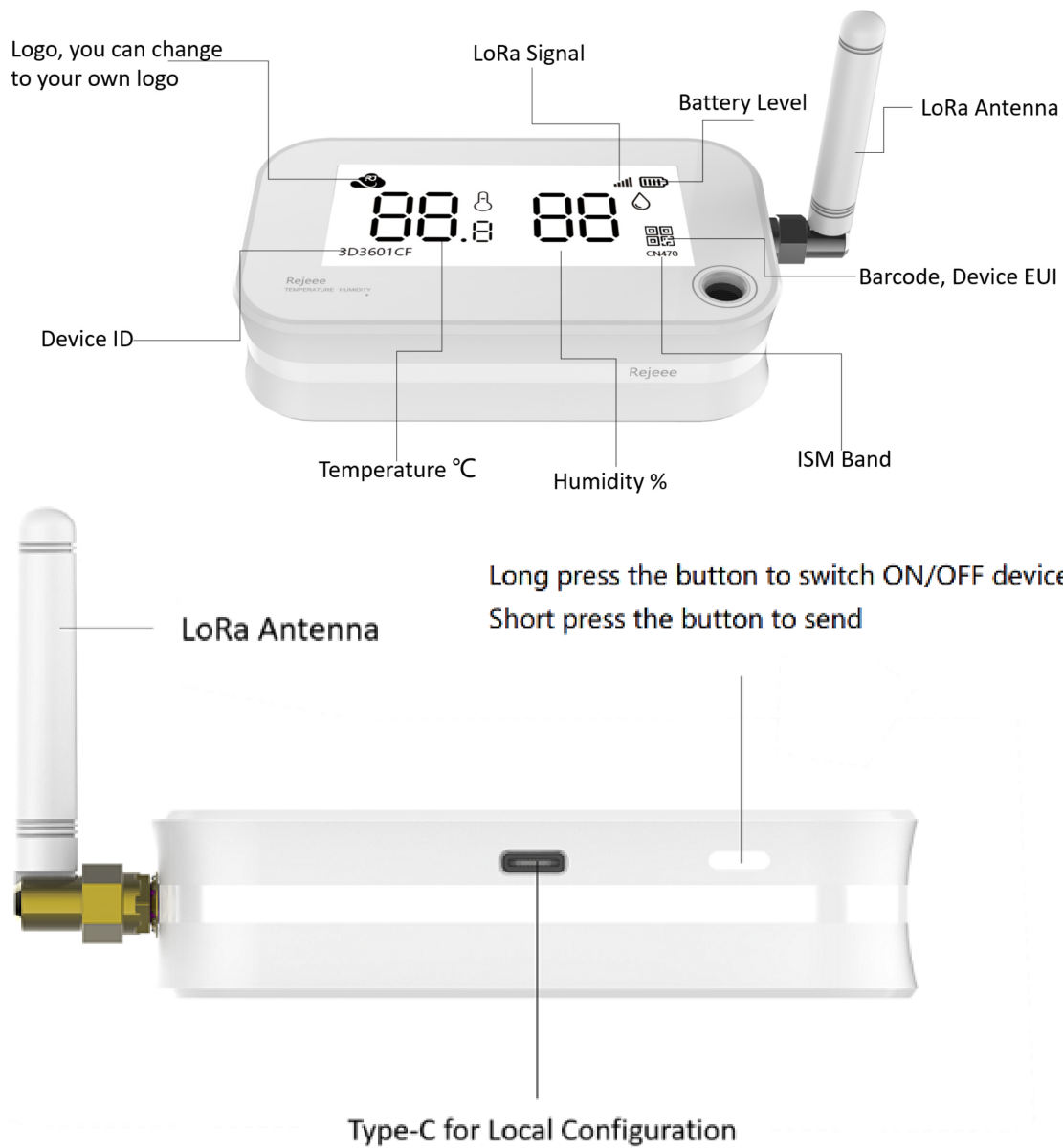**CHOOVIO SL100 LoRaWAN Temperature and Humidity Sensor User Manual**

Contents

General Information

SL101 is long range low power temperature and humidity sensor based on Semtech SX1262/SX1268.

Sensor Type	Product Number
Built-in SHT30 2.9-inch E-Paper	SL101CN, SL101EU,SL101US,SL101AS

Main features

- Sensirion High Sensitivity Sensor
- 2.9-inch Screen Local Display
- Type-C for Local Configuration
- Internal Battery Up to 5 Years
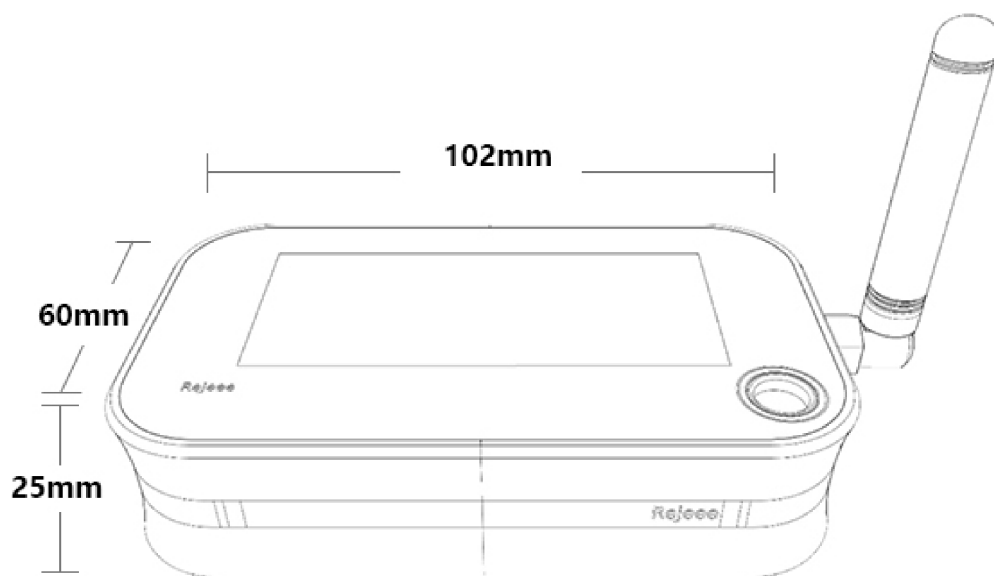- LoRa SX1262/SX1268, Long Range Low Power

Details

Logo, you can change
to your own logo

LoRa Signal

Battery Level

LoRa Antenna

Device ID

Temperature ℃

Humidity %

Barcode, Device EUI

ISM Band

LoRa Antenna

Long press the button to switch ON/OFF device
Short press the button to send

Type-C for Local Configuration

Parameters	Feature
CPU	STM32L151
Wireless	LoRaWAN(SX1262/SX1268)
Encryption	AES128
Battery	Built-in Li-battery (Changeable, and No Recharge)
Battery Capacity	5400mAh
E-Paper Temperature	0℃~+ 50℃

Sensor Temperature	-45℃~+ 85℃
Sensor Humidity	0 ~100 %RH
Communication	Half duplex
Accuracy	Temperature : ±0.3℃ Humidity ±3%RH
Lifespan	5 Years(Every 30 Minutes for data uploading)
Data Speed	300bps-62.5k bps
Size	102mm*60mm*25mm
TX Power	22dBm Max
RX Sensitivity	-140 dBm
Frequency	SX1268: CN470 SX1262: EU868 / US915 / AS923

Dimensions

Size: 102mm*60mm*25mm

Installation

User Guide

Make sure antenna is installed before turn on the device.

Turn on/off the device

When you get the device, it is off, and on the screen, you can find the device EUI as below, the QR on the screen is Rejeee website. Just press the button for more than 3 seconds, then you can turn on the device. If you want to turn off the device, just press the button 3 seconds. You can change the QR code on the screen to your own website **QR code: SensorTool Manual**.
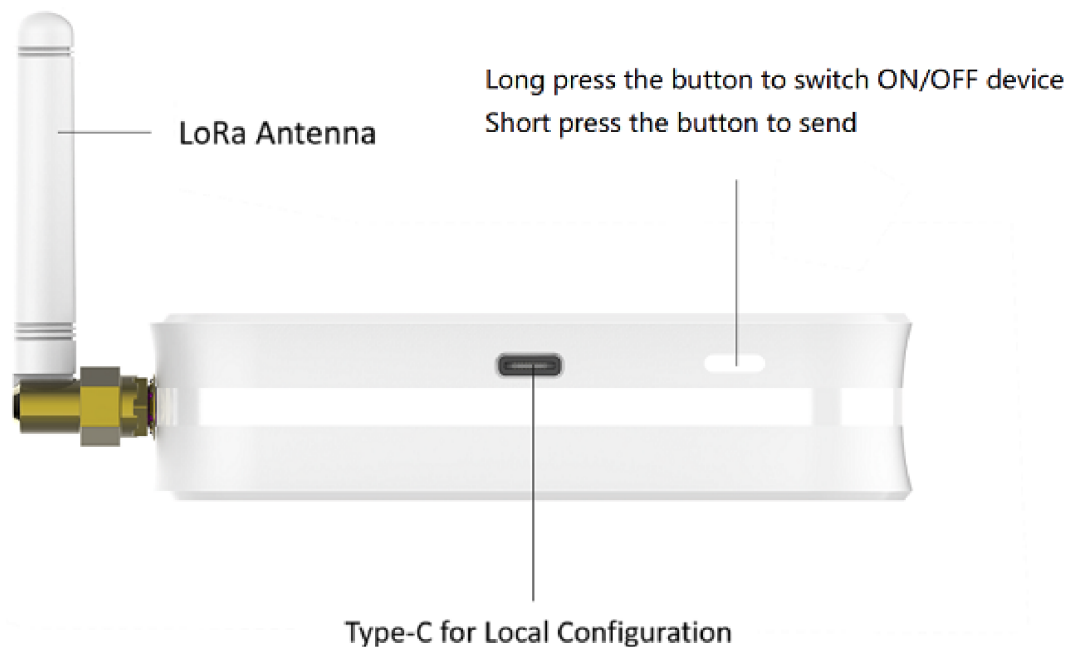
Information display on screen

The device screen is 2.9-inch low power e-paper, when turn on the device, you can find information displaying on the screen as below, you can change the logo as you like. **SensorTool Manual**.

USB-C Configuration

There is one USB-C port as below, which is for power on and config, connect device to laptop with a USB-C cable,
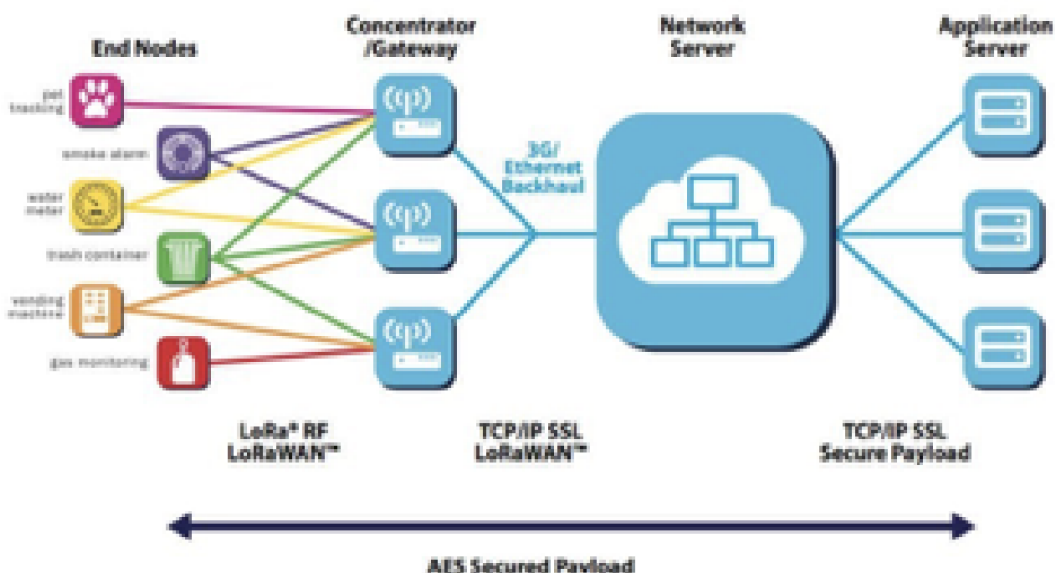and you can config the device, make sure to install CH34x USB driver and here is the link for driver: **USB-to-Serial Driver**.

Long press the button to switch ON/OFF device

Short press the button to send

LoRa Antenna

Type-C for Local Configuration

Data Uploading

When turn on the device, it will send data immediately, also you can press the button a short time(0.1 seconds), then the device will also send data. Normally when you get the device from factory, the reset time for data sending is every 30 mins, and if you want to change the time, you can connect the device to computer for config, here there is instruction about the time configuration. **SensorTool Manual**.

Connect to LoRaWAN Network

LoRaWAN Network Structure

SL101 temperature and humidity sensor is based on standard LoRaWAN Class A, so you can connect to any LoRaWAN network as below through OTAA: On the back of device, you can find information as below, with this information, you can connect to any LoRaWAN server.

Device EUI: CACBB80100002296

APP EUI: CACBB80000000001

APP Key: 11223344556677889900AABBCCDDEEFF

Connecting to The Things Network, please make sure choose manually connect and OTAA as below:

Sensor	LoRaWAN

SL100CN	From The LoRaWAN Device Repository **Manually**
	Frequency plan ⓘ *
	China 470-510 MHz, FSB 11
	LoRaWAN version ⓘ *
	MAC V1.0.3
	Regional Parameters version ⓘ *
	PHY V1.0.3 REV A
	Show advanced activation, LoRaWAN class and cluster settings ∧
	Activation mode ⓘ *
	◉ Over the air activation (OTAA)

SL100EU	**Frequency plan** ⓘ * Europe 863-870 MHz (SF12 for RX2) ⌄ **LoRaWAN version** ⓘ * MAC V1.0.3 ⌄ **Regional Parameters version** ⓘ * PHY V1.0.3 REV A ⌄ Show advanced activation, LoRaWAN class and cluster settings ⌃ **Activation mode** ⓘ * 🔘 Over the air activation (OTAA)
SL100US	From The LoRaWAN Device Repository **Manually** **Frequency plan** ⓘ * United States 902-928 MHz, FSB 2 (used by TTN) ⌄ **LoRaWAN version** ⓘ * MAC V1.0.3 ⌄ **Regional Parameters version** ⓘ * PHY V1.0.3 REV A ⌄ Show advanced activation, LoRaWAN class and cluster settings ⌃ **Activation mode** ⓘ * 🔘 Over the air activation (OTAA)

SL100AS	From The LoRaWAN Device Repository **Manually** **Frequency plan** ⊘ * Asia 923 MHz with only default channels ∨ **LoRaWAN version** ⊘ * MAC V1.0.3 ∨ **Regional Parameters version** ⊘ * PHY V1.0.3 REV A ∨ Show advanced activation, LoRaWAN class and cluster settings ∧ **Activation mode** ⊘ * ◉ Over the air activation (OTAA)

Set ID and Key

Show advanced activation, LoRaWAN class and cluster settings ⌄

DevEUI ⓘ *

```
.. .. .. .. .. .. .. ..
```
⟳ Generate   0/50 used

AppEUI ⓘ *

```
.. .. .. .. .. .. .. ..
```
Fill with zeros

AppKey ⓘ *

```
.. .. .. .. .. .. .. .. .. .. .. .. .. .. .. ..
```
⟳ Generate

End device ID ⓘ *

```
my-new-device
```
This value is automatically prefilled using the DevEUI

After registration

🔘 View registered end device

⭕ Register another end device of this type

Register end device

Data analysis example for JavaScript:

```javascript
function decodeUplink(input) {
var obj = {};
var warnings = [];
obj.battery = (input.bytes[1]&0x1F);
obj.vol = (input.bytes[2]);
obj.temperature = (((input.bytes[4] & 0x80 ? input.bytes[4] – 0x100 : input.bytes[4]) << 8)
+
input.bytes[5]) / 10;
obj.humidity = input.bytes[7];
if (obj.temperature < -10) {
warnings.push("it's cold");
}
return {
data: obj,
warnings: warnings
};
}
```

Wireless LoraWAN Sensor Data Format

LoRaWAN Format:
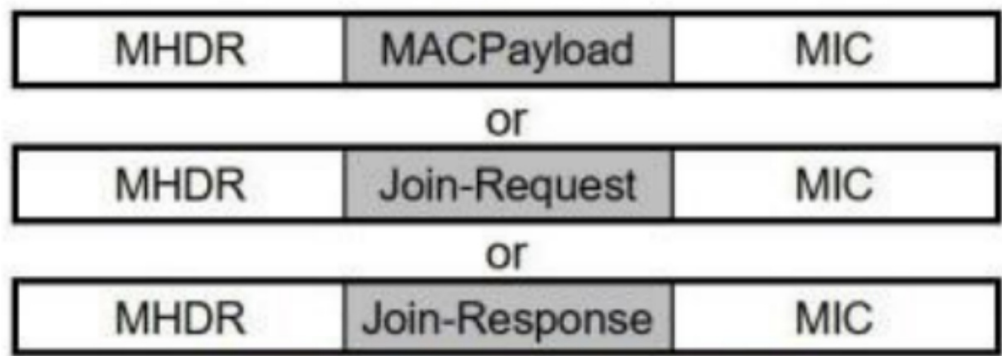Picture as below, FRMPayload is sensor data.

PHYPayload:

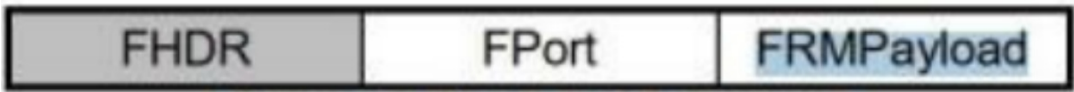*Figure 6: PHY Payload structure*

MACPayload:

Figure 7: MAC Payload structure

MHDR	FHDR	FPort	FRMPayload=Sensor Data(Message)			MIC 4 Bytes
		FPort	Data 1	…	Data N	
		FPort	Type+Data N Bytes	Type+Data N Bytes	Type+Data N Bytes	

Sensor Data Definition

Device Information(0x00)

Type	Value	Value	Value
1 Byte	3 bit	5bit	1 Byte
0x00	Version	Battery Level	Reserve

Temperature(0x04)

Type 1 Byte	Value 2 Bytes	Comments
0x04	Temperature	2-byte signed integer with negative value below zero The default unit is 0.1 degrees, that is 201 means 20.1 degrees

Humidity(0x05)

Type 1 Byte	Value 1 Byte	Comments
0x05	Humidity	Unsigned integer of 1 byte. The default unit is 1%RH, that is 10 means 10%RH

FRMPayload Example: 00 3F 24 04 01 1C 05 3E
00 3F24 Device Information, Version is 0x01, level is 0x1F = 31
04 011C Temperature is 0x011C = 284 = 28.4 ℃
05 3E Humidity is 0x3E = 62 = 62 %RH

Local Configuration

Note: Factory reset data uploading is every 30 mins, customers can change data uploading frequency as below:
Connect sensor with a USB-C cable to computer for local configuration, through local configuration, you can change the packet frequency. Refer SensorTool Manual.

Contact Us

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Documents / Resources

CHOOVIO SL100 LoRaWAN Temperature and Humidity Sensor [pdf] User Manual
SL100, LoRaWAN Temperature and Humidity Sensor, SL100 LoRaWAN Temperature and Humidity Sensor

References

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