

# SL100--Temperature and Humidity Sensor



## User Manual for SL100 Series

LoRaWAN Temperature and Humidity Sensor V1.0



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## 1. General Information

SL100 is long range low power temperature and humidity sensor based on Semtech SX1262/SX1268.

Sensor Type	Product Number
Built-in SHT30	SL100CN, SL100EU,SL100US,SL100AS

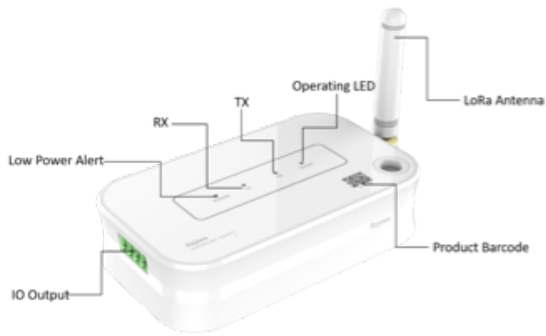
### 1.1 Main features:

Sensirion High Sensitivity Sensor

Type-C for Local Configuration

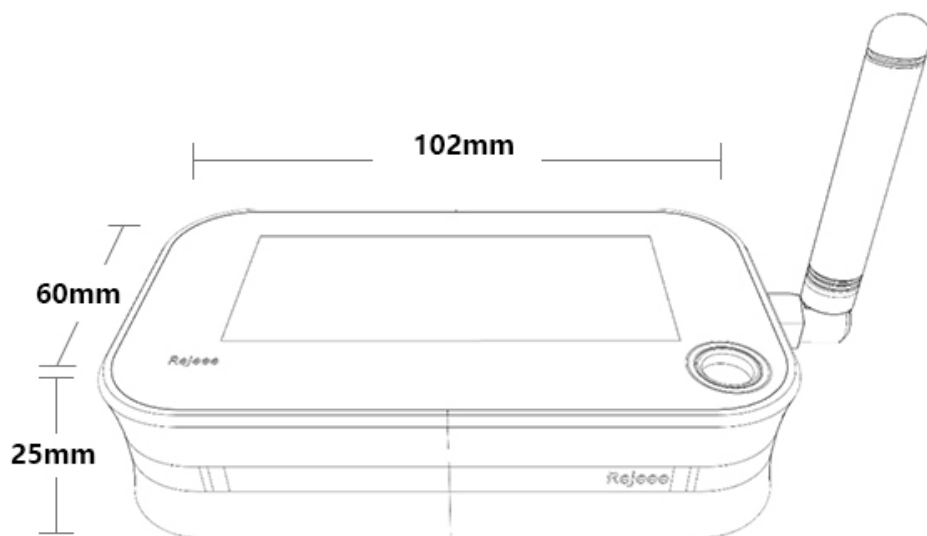
Internal Battery Up to 5 Years(LCP=5s, LFT=600s @SF9)  
 LoRa Long Range Low Power

### 1.2 Details



Parameters	Feature
CPU	STM32L151
Wireless	LoRaWAN(SX1262/SX1268)
Encryption	AES128
Battery	Built-in Li-battery (Changeable, and No Recharge)
Battery Capacity	5400mAh
Working Temperature	-45°C~+ 85°C
Working Humidity	0-100%RH
Communication	Half duplex
Accuracy	Temperature : ±0.3°C, Humidity: ±3%RH
Lifespan	5 Years(Every 10 Minutes for data uploading @SF9)
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

### 1.3 Size: 102mm\*60mm\*25mm



### 1.4 Installation:



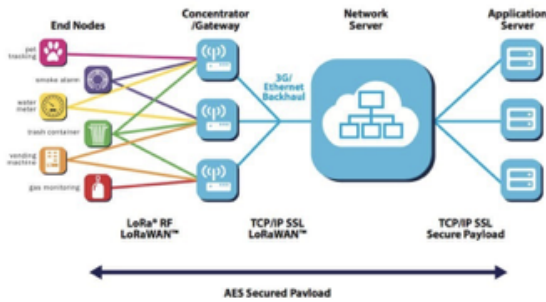
Lay the product flat on the table



Hang on the wall

## 2. Connect to LoRaWAN Network

### LoRaWAN Network Structure



SL100 temperature and humidity sensor is based on standard LoRaWAN Class A, so you can connect to any LoRaWAN network as below:

SL100 sensor data uplink format with LoRaWAN OTAA, OTAA parameter as below:

AppEUI: CACBB8000000001

AppKey: 11223344556677889900AABBCCDDEEFF

DevEUI: Customer can find DevEUI on the product, also you can read DevEUI through Rejeee SensorTool SensorTool

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

Sensor	LoRaWAN
SL100CN	<p>From The LoRaWAN Device Repository <a href="#">Manually</a></p> <hr/> <p>Frequency plan <sup>Ⓞ</sup> *</p> <p>China 470-510 MHz, FSB 11 <span style="float:right">  v</span></p> <p>LoRaWAN version <sup>Ⓞ</sup> *</p> <p>MAC V1.0.3 <span style="float:right">  v</span></p> <p>Regional Parameters version <sup>Ⓞ</sup> *</p> <p>PHY V1.0.3 REVA <span style="float:right">  v</span></p> <p><a href="#">Show advanced activation, LoRaWAN class and cluster settings</a> ^</p> <p>Activation mode <sup>Ⓞ</sup> *</p> <p><input checked="" type="radio"/> Over the air activation (OTAA)</p>

Sensor	LoRaWAN
SL100EU	<p>Frequency plan ⓘ *</p> <p>Europe 863-870 MHz (SF12 for RX2)   v</p> <p>LoRaWAN version ⓘ *</p> <p>MAC V1.0.3   v</p> <p>Regional Parameters version ⓘ *</p> <p>PHY V1.0.3 REV A   v</p> <hr/> <p><a href="#">Show advanced activation, LoRaWAN class and cluster settings</a> ^</p> <p>Activation mode ⓘ *</p> <p><input checked="" type="radio"/> Over the air activation (OTAA)</p>
SL100US	<p>From The LoRaWAN Device Repository <a href="#">Manually</a></p> <hr/> <p>Frequency plan ⓘ *</p> <p>United States 902-928 MHz, FSB 2 (used by TTN)   v</p> <p>LoRaWAN version ⓘ *</p> <p>MAC V1.0.3   v</p> <p>Regional Parameters version ⓘ *</p> <p>PHY V1.0.3 REV A   v</p> <hr/> <p><a href="#">Show advanced activation, LoRaWAN class and cluster settings</a> ^</p> <p>Activation mode ⓘ *</p> <p><input checked="" type="radio"/> Over the air activation (OTAA)</p>
SL100AS	<p>From The LoRaWAN Device Repository <a href="#">Manually</a></p> <hr/> <p>Frequency plan ⓘ *</p> <p>Asia 923 MHz with only default channels   v</p> <p>LoRaWAN version ⓘ *</p> <p>MAC V1.0.3   v</p> <p>Regional Parameters version ⓘ *</p> <p>PHY V1.0.3 REV A   v</p> <hr/> <p><a href="#">Show advanced activation, LoRaWAN class and cluster settings</a> ^</p> <p>Activation mode ⓘ *</p> <p><input checked="" type="radio"/> Over the air activation (OTAA)</p>

## 2.1 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 ? \*

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:

```
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
  };
}
```

### 3. Wireless LoraWAN Sensor Data Format

LoRaWAN Format:

Picture as below, FRMPayload is sensor data.

**PHYPayload:**

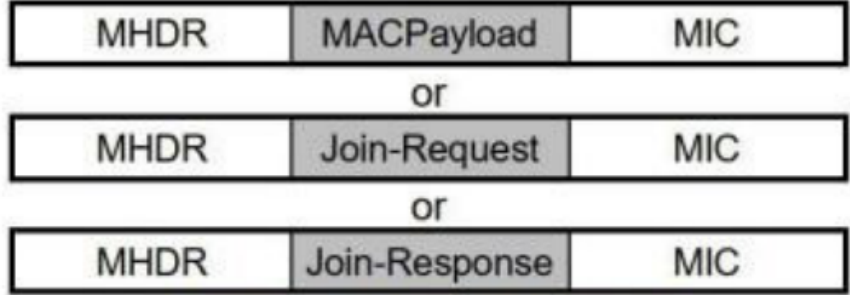


Figure 6: PHY payload structure

**MACPayload:**

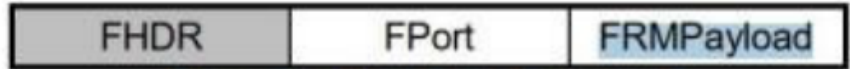


Figure 7: MAC payload structure

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

## 4. Sensor Data Definition

### 4.1 Device Information(0x00)

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

### 4.2 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

e.g. 0xFF88 is -120 (-12°C), Network byte order mode is {04 FF 88}

### 4.3 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 °C

05 3E Humidity is 0x3E = 62 = 62 %RH

## 5. Local Configuration:

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Note: Factory reset data uploading is every 10 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](#).