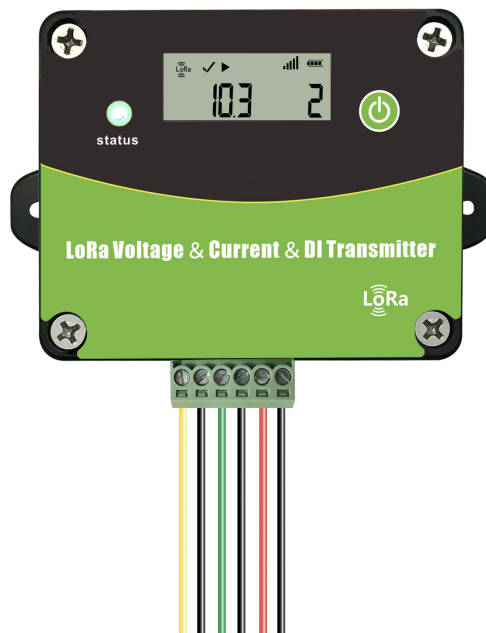


TZ-Tag11

---User Manual V1.1



1 Product Overview

TZ-Tag11 is a high quality wireless voltage and current transmitter developed by our company. This product fully considers the harsh field environment and the field implementation situation, and successfully solves many deficiencies of similar products. It achieves ultra-long range (5km), small size (109mm*69mm*40mm), and ultra-long endurance. The product has been verified in many key projects, with stable and reliable characteristics. The transmitter collects data periodically and sends it out through the embedded LoRa communication module. After receiving the signal, the receiver can parse the voltage value, current value, digital input and other information, and realize real-time transmission and data storage functions at the same time. In addition, the product is also equipped with LCD, LED and buzzer to make you view the voltage value, current value, digital input, RSSI signal strength, battery level, and other information in a more intuitive way, with sound and light alarm functions. This product, in conjunction with our LoRa Gateway, can be widely used in all kinds of testing occasions.

Tag11 transmits the data collected by the external user equipment to the server through our LoRa Gateway, so as to realize remote data transmission.

Tag11 can be connected to all kinds of sensors whose output is voltage and current, such as voltage and current, temperature and humidity, pressure, gas, door contact and water immersion sensors.

2 Product Application

1. Industries for monitoring gas, such as air quality;
2. Industries for using digital input, such as door contact and water immersion;
3. Industries for monitoring liquid, such as water quality testing and oil extraction plant;
4. Industries for monitoring temperature and humidity, such as cold chain, agricultural shed, pharmaceutical warehouse and biochemical laboratory;

3 Product Features

1. The transmitter can be compatible with user equipment in three output modes, namely 0-10V, 0-20mA and digital input, with a wide range of application;
2. The transmitter adopts the new-generation LoRa chip from Semtech, with strong transmitting

power, strong penetrating diffraction and weak attenuation.

3. The transmitter has an user-defined sending interval from 1min to 1440min, which meets most application scenarios.
4. The transmitter supports three working modes, namely normal mode, low voltage mode, and voltage and current alarm mode, to complete monitoring in a more effective and intelligent way;
5. The transmitter is equipped with high-performance lithium battery, with current less than 5uA in sleep mode, long standby time and stable performance. In addition, it is equipped with super capacitor to effectively realize the full use of the battery, thus solving the problem of battery instability under high and low temperature;
6. All the data collected by the transmitter can be stored in memory, which can be read by USB;
7. The transmitter adopts FDMA, TDMA and other technologies to effectively avoid wireless conflict;
8. The transmitter has the ACK function to ensure that data is not lost;
9. The transmitter supports setting parameters by sending commands through gateway;
10. The transmitter is equipped with LCD display to enable users to view the voltage value, current value, digital input, RSSI signal strength, battery level, and other information in an intuitive way;
11. The transmitter is equipped with buzzer to sound an alarm when the current and voltage exceed the limit;

4 Advantages of LoRa Communication Applied in the Product

The wireless communication of the transmitter is based on the RF module of SEMTECH's RF integrated chip SX127X, which is a high-performance IoT wireless transceiver. Its special LoRa debugging mode can greatly increase the communication distance, which can be widely used in the short-distance IoT wireless communication field in various occasions. It has the characteristics of small size, low power consumption, long transmission distance and strong anti-interference ability. LoRa combines digital spread spectrum, digital signal processing and forward error correction coding to deliver unprecedented performance over traditional wireless communications. It uses spread spectrum modulation technology to demodulate noise below 20dB, which ensures a highly sensitive and reliable connection while improving communication efficiency and eliminating interference. LoRa technology enables communication over a much longer distance than any other wireless protocol, allowing LoRa systems to operate without a repeater, thereby reducing the overall cost of ownership.

5 Product Specifications

Table 5.1 Product Specifications of TZ-Tag11

Items	Features
Power supply	Built-in 4000mAh/3.6V battery
Working environment	-30℃~+60℃; 0%RH ~ 85%RH (with no condensation)
Frequency band	433/470/868/915 (optional)
Wireless modulation mode	LoRa modulation
Voltage range	0-10V
Voltage resolution	1mV
Current range	0-20mA
Current resolution	1uA
Max open air transmission distance	5000m
Transmission power	20dbm (adjustable)
Acquisition interval	1min-1440min, user-definable,default 15 minutes
Low voltage alarm	Support, user-definable
Voltage and current alarm	Support, user-definable
Standby current	<5uA
Data storage capacity	50000
Battery life	3 years (15min sending interval)
Net weight	135g
Dimensions	109mm*69mm*40mm

6 Working Mode

Working mode	Working status
Normal mode	The transmitter collects the voltage and current data at preset acquisition interval and then starts the LoRa module to send it out
Low voltage alarm mode	When the transmitter voltage is lower than 2.2V (settable), data will be collected and sent at an interval of 30min (settable). At this time, the power supply of transmitter is nearly exhausted, and the customer should replace battery in time
Voltage and current alarm	When the ambient voltage and current exceed the range set by the

mode	user, the transmitter can collect and send data at a relatively fast interval to facilitate the customer to record the changes of the ambient voltage and current
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Note: Priority: Voltage and current alarm mode>Low voltage alarm mode>Normal mode

7 Device Status When Sending Data

When the device sends a packet of data, the LED flashes once, and the corresponding sending icon of the LCD will also be displayed;

LED flashing includes green flashing and red flashing, which is red flashing when the device is abnormal (voltage and current exceeding limit, low voltage of battery), and green flashing when the device is normal;

See the LCD commands below for LCD indicator.

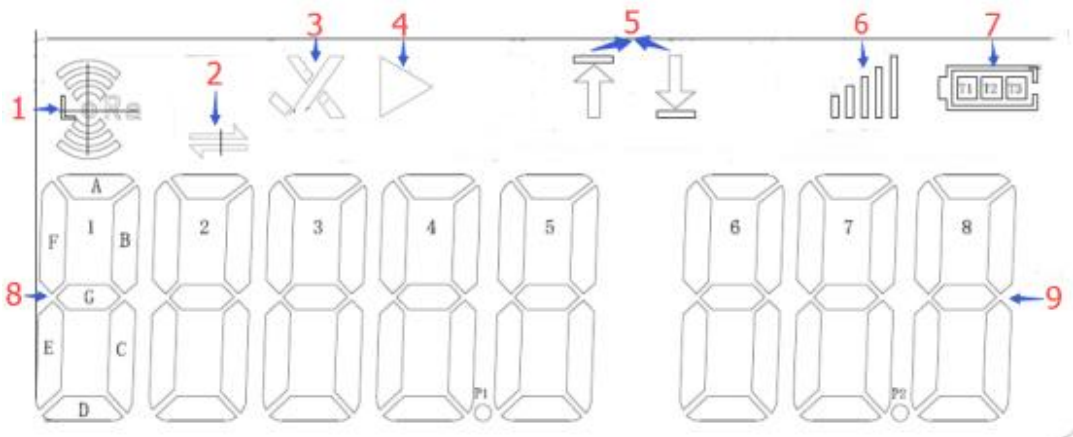
8 Key Functions








Mode	Operation method	Indicator status	Command
On	Long press for 3s	1. Green LED is on for 5s 2. LCD display is disabled	The device starts sending data
Off	Long press for 3s	1. Red LED is on for 5s 2. LCD display is disabled	The device no longer sends data
Sending data	Short press once	LED flashes once	Valid only in "On" mode LED flashing is the same as that when sending data, that is, red flashing when it is abnormal and green flashing when it is normal


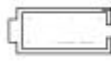
9 LCD Display Commands

LCD display is disabled when the device is in "Off" mode, and LCD display is enabled when the device is in "On" mode. It can display LoRa icon, sending icon, voltage and current alarm icon, running status, voltage and current overload icon, RSSI signal icon, battery status, voltage, current

and digital input.

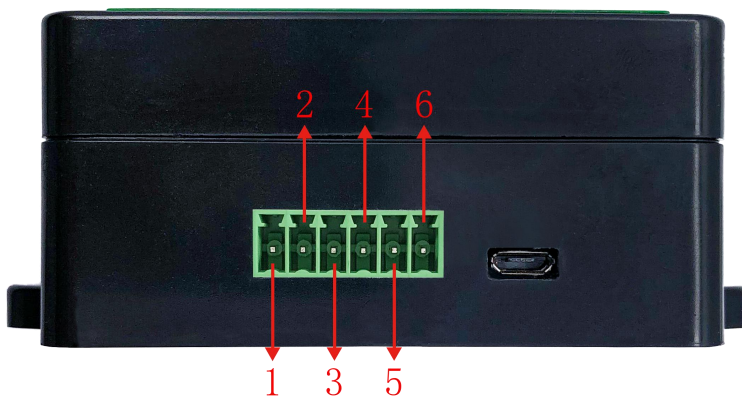


No.	Functions	Commands
1	LoRa icon	LoRa sensor
2	Sending icon	Only flash when the device sends data. It is not displayed when sending is completed
3	Voltage and current alarm icon	Normal: √ Alarm: ×
4	Running status	▷ Start running
5	Voltage and current overload icon	Exceed upper limit: ↑ Exceed lower limit: ↓ Exceed upper and lower limit: ↑↓
6	RSSI signal icon	 : [-80,0];  : [-100,-80];  : [-115,-100];  : [-125,-115];  : [-138,-125]; The RSSI value is updated each time the gateway response is received after sending data, so the RSSI value is not displayed if no ACK is enabled or no response is received
7	Battery status	 : [3.2,3.6];  : [3.0,3.2];

		 : [2.8,3.0];  : [2.5,2.8];
8	Voltage, current and digital input	Voltage: display voltage value, unit :V Current: display current value, unit:mA digital input: display ON when connected, display OFF when disconnected Display mode: display voltage value, current value and digital input in turn in 10s interval
9	Serial number	The serial number "1" means that the "8" position displays the voltage value The serial number "2" means the "8" position displays the current value The serial number "3" means that the "8" position displays the digital input

10 Electrical Connection

The interfaces of Tag11 consists of three parts: voltage part, current part and digital input part respectively from left to right. Each part has two interfaces: voltage positive, voltage negative, current positive, current negative, and two interfaces of digital input respectively from left to right. The power supply range of voltage interface is 0-10V; The power supply range of current interface is 0-20mA; When the two interfaces of digital input are open, it is OFF; when the two interfaces are closed, it is ON. The following figure shows the interface part of Tag11:



Interface Description:

Serial number	Interface	Caption
1	Voltage positive	Connect to the positive pole of the voltage output
2	Voltage negative	Connect to the negative pole of the voltage output
3	Current positive	Connect to the positive pole of the current output
4	Current negative	Connect to the negative pole of the current output
5	digital input interface 1	Connect one end of the digital input
6	digital input interface 2	Connect one end of the digital input

11 Working Mode of Buzzer

When the voltage and current exceed the limit, the buzzer is enabled to work, with intermittent beeping;

Commands need to be enabled: 1. Commands 03
2. Commands 36

Way to disable the buzzer:

1. Voltage and current return to normal;
2. Short press the key;
3. The working time of buzzer is up.

Commands:

1. After a buzzer is completed, it will work again when the voltage and current are abnormal again (voltage and current are normal first and then abnormal again);
2. The buzzer function is disabled by default. The customer needs to enable the buzzer function;
3. The buzzer consumes a large amount of power, thus shortening the battery life. The customer should set this function based on actual requirements.

12 Commands for Use

The device received by the customer is in “Off” mode by default. After the customer gets it, please refer to the key functions described above and press the key for 3s to complete the startup. After the startup, the device will automatically send data to the gateway. The data sending interval is 15min by default. If the customer needs to send data quickly, he/she can short press the key once. TZ-Tag11, as the data sending end, should be used in conjunction with LoRa Gateway/LoRa Gateway_WIFI and other devices of our company. The customer can check the user manual of these devices or contact our staff.

After completing the above steps, the customer can query data on our platform.

For the query method, please see “LoRa Gateway and Tag11 Quick Use Steps and FAQ”;

If the customer needs to configure the device parameters,

please use our enclosed configuration cable to connect to PC USB port. At this time, the green LED is on, indicating that the device has entered the configuration mode. The customer can use the configuration software to configure parameters. After the configuration is completed, pull out the USB. At this time, the LED is off, indicating that the device has exited the configuration mode. For detailed configuration commands and method, please see “Tag11 Configuration Manual”.

13 Precautions

1. When the product is close to the metal object, the signal will be interfered, resulting in signal attenuation;
2. The product should be kept away from water and corrosive objects;
3. Please inform us of the use environment and standby requirements before ordering, and we will configure the device and guide the installation accordingly.