LoRa Gateway

--User Manual V2.2

1 Product overview

The LoRa Gateway is an ultra-long-range wireless data acquisition gateway dedicated to receiving our temperature and humidity LoRa sensor. Support GPRS (850,900,1800,1900MHz), RS485, MODBUS-RTU interface. LoRa Gateway uses high-performance 32-bit industrial processor and industrial-grade wireless module, with high reliability, stability and data security. LoRa Gateway support the local sound and light alarm, SMS alarm, GPRS alarm and other alarm methods.
Different from the previous ASK, FSK,GFSK, this gateway use a special spread spectrum modulation technology LoRa greatly improved the sensitivity of the received, up to 157db link budget so that the wireless communication distance has improved significantly. The distance can up to 5km in open area.

2 Product feature

- Four band GPRS(850、900、1800、1900MHz);
- RS-485;
- Support MODBUS-RTU;
- Compatible with TCP/UDP/HTTP;
- 1 digital output ,can be used to alert;
- Kinds of alarm method;
- External special USB configure interface, user can configure LoRa Gateway operating module;
- Can be download command to LoRa Sensor;
- Prevent collision: advanced technology to prevent the collision;
- Security: encryption algorithm and certification to ensure data security, to prevent the data link eavesdropping and data to be cracked;
- Metal shell, resistance to high pressure;

3 Technical Parameters

RF frequency	433/470/868/915 MHZ
RF Receiving Sensitivity	-148dBm
RF Modulation	LoRa
LoRa sensor identification Angle	3D
Interface	TCP/UDP/HTTP/RS485/MODBUS-RTU
GSM	Support 4 band（850/ 900/1800 /1900MHZ）
LED	3 LED (RF、GSM、power)

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Firmware update	Support
RF protocol	Private protocol
Flash Memory	32Mb
Supply power	DC12V
Net weight	0.27kg
Operating temperature.	-20°C~+60°C
Operating humidity.	5% ~ 95% (non-condensing)
Dimension	112mm*105mm*27mm

4 Definition of interfaces

4.1 Appearance

4.2 All interfaces

Interfaces	Functions
A.LED light	RF、GSM、Power
B.Expansion interface	Expand functions（Pls check explanation following）
C.USB	Configure device and save log
D.Switch of power	Turn on/off
E.Charge interface	Connect power plug
F.SIM card slot	Insert SIM card
G.RF antenna interface	Connect RF antenna
H.GSM antenna interface	Connect GSM antenna

4.3 Expand interfaces

Interfaces	Functions
1- RS-485B	RS-485B
2- RS-485A	RS-485A
3- GND	GND
4- OUT	Output
5-GND	GND
6-12V	12V output

5 LED light indicating status

Blue light - RF	
RF light status	**Explanations**

Keep on always	OTA、Read or write configure
Sparkling 0.1 second	Receive LoRa sensor

Green light - GSM	
GSM light status	Explanations
Keep on always	OTA 、Read or write configure、In communicating
On 0.1second,off 0.1second	Can't read IMEI、Wait for picking up
On 0.1second,off 0.2second	Receive SMS
On 0.1second,off 0.9second	Connect with GPRS network
On 0.1second,off 2.9sedond	Connect with GSM network
On 1second,off 2second	Can't connect with GSM network
On 0.5second,off 0.5second	Can't connect with SIM card

Red light - Charging	
Charging light status	**Explanations**
Keep on always	OTA、 Read or write configure、connect power
Sparkling each 2seconds	not connect power

6 GPRS data Protocol

Pls read the document LoRa Gateway GPRS data protocol.

7 HTTP data Protocol

Pls read the document LoRa Gateway HTTP data protocol.

8 RS485 data protocol

8.1 Report automatically

Pls read the document LoRa Gateway RS485 report automatically protocol.

8.2 Modbus Protocols

LoRa Gateway support standard RS485 modbus protocol, pls read the document RS485 modbus protocol.

9 Command List

The following commands is ASCII, can be set via SMS, or can be set by serial port and GPRS.

Note: $$$$$$ is LoRa Gateway `s password, and the initial password is 000000

Note: (1) The default has been configured for 5 minutes to send a GPRS data to the Tzone platform;

If the SIM card needs to set APN to be used, please set 011 instructions.

(2) Set LORA Gateway RTC time :

The machine cannot get the right time on its own,so when the server receives the machine data,the following information can be sent to the machine to modify the machine's RTC time

Format: @UTC,yyyy-MM-dd HH:mm:ss#

For example: @UTC,2021-11-24 02:56:43#

Set the APN (Access Point Name)

Format: *$$$$$$,011,APN,Username,Password#

Notes: The username and password could to be null.

For example: *000000,011,cmnet,,#

Explication: The China Mobile's APN is "cmnet", and the username and password are empty.

After you send the command of SMS to device, it will reply to your mobile phone:

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Receive:'011'OK

***000000,011,cmnet,,#**

If you send the command of USB to device, the serial port tool will shows:

CMD bytes: 14

***000000,011,cmnet,,#**

ComdType:011(SETAPN)

APNnumber:cmnet

Username:

Password:

NO.	Instruction	Format	Note
001	Modify user password	*$$$$$$,001,@@@@@@@#	$$$$$$: old password @@@@@@ : new Password (default:000000)
003	Set a preset SMS number	*$$$$$$,003,SMS Number#	SMS Number: must less than 25 digits
008	Extend setting	*$$$$$$,008,ABCDEFG#	A=0,disable Sensor ACK download function; A=1,enable Sensor ACK download function(default); Note:when the Sensor ACK is disable, the machine will no longer reply the ACK information to the Sensor. B=0, C=0, D=0, default, D=1,Close all SMS function' E=0, F=0, G=0,disable Server ACK function, default, G=1,enable Server ACK function Note: if enable ACK function, every time the machine sends data to the server, the server

			must respond @ACK,Packet index(Hex converted into decimal)# to the machine. Then the machine will continue to send next data to the server, Otherwise, the data will be sent repeatedly.
009	Change band	*$$$$$$,009,S#	S=0, work in 900/1800 S=1, work in 850/1900 S=2, Automatic selection S=3, not set(default) Note: the default of parameter is S=3, not set the frequency band, if the unit of GSM module support three frequency(900/1800/1900), then you could set the parameter to S=0, if the unit of GSM module support the four frequency(850/900/1800/1900), then you could set the parameter to S=1.
011	Set APN,Username,Password	*$$$$$$,011,APN,Username,Password#	APN : must < 28 character; Username: must<28character ; Password: must<28 character; * If haven't username or password, then left it blank. For example: *000000,011,CMNET,,#
014	Set DNS	*$$$$$$,014, X,DNS1,DNS2# Disable the DNS	X=0 Disable the DN(default) X=1 Enable the DNS DNS is the domain name server , xxx.xxx.xxx.xxx
015	Set IP Address & port number	*$$$$$$,015,X,IP,PORT#	X=0 use IP connect the server X=1 use DN connect the server IP : xxx.xxx.xxx.xxx DN:(domain name) www.xxx.com If select the HTTP protocol, Pleas write URL in here PORT : [1,65535] If select the HTTP protocol, can fill in any Port

016	Enable/Disable GPRS function	*$$$$$$,016,X#	X=0 Disable GPRS unction X=1 Enable GPRS Function This is the last step of GPRS setting.(default)
018	Set the time intervals of GPRS Data	*$$$$$$,018,X#	X=0 stop send time interval GPRS =[10,6000] Time interval (unit: sec) (default:300)
019	Set the GPRS mode	*$$$$$$,019,X#	X=0, Use the UDP mode X=1, Use the TCP mode (default)
020	Local digital OUTPUT alarm function	*$$$$$$,020,X#	X=0, disable X=1, enable,(default)
030	Set SMS alarm function	*$$$$$$,030, ABCDEFG#	A=1,Enable SMS alarm for temperature and humidity alert, (default)； B=1; C=1; D=0; E=0; F=0; G=0;
040	RS485 setting	*$$$$$$,040, A,B,C,D #	A:Baud rate[1200,115200], 9600 (default); B:Data bit, 0-8bit(default), 1-9bit； C:Stop bit, 0-0.5bit, 1-1bit(default) 2-1.5bit, 3-2bit D:Parity 0-null(default), 1-Even parity, 2-Odd parity
041	RS485 working mode	*$$$$$$,041, X#	X:0-Report automatically； X:1-modbus, Should add Sensor to channels(command 144) ,default；
042	RS485 address	*$$$$$$,042, AB#	AB:[0-F], Can’t be 00,

			default:01
043	RS485 Anti-Reread	*$$$$$$,043, X#	X:[0-3600],unit:s,default:0 RS485 send once sensor data within this time period, no matter LoRa Gateway receive this sensor many times. Only use in RS485 Report automatically mode
044	Max sensor online time	*$$$$$$,044, X#	X:[0-86400],unit:s,default:3600 LoRa Gateway will think sensor is offline if it do not receive this sensor within this time period Only use in RS485 modbus mode
136	Enable RF function	*$$$$$$,136,X#	X:0:disable RF function 1:enable RF function（default）
142	Set Sensor temperature and humidity alert function	*$$$$$$,142,X,Temp_H,Temp_L, RH_H,RH_L#	X=0:disable (default) X=1: If sensor's temperature exceed Temp_H、under Temp_L、humidity exceed RH_H、under RH_L, gateway alert; X=2: If sensor's status means alert gateway alert; X=3: If sensor's temperature exceed Temp_H gateway alert, when temperature under

			Temp_L gateway relieve alert; If sensor's humidity exceed RH_H gateway alert, when humidity under RH_L gateway relieve alert; X=4: If sensor's temperature under Temp_L gateway alert, when temperature exceed Temp_H gateway relieve alert; If sensor's humidity under RH_L gateway alert, when humidity exceed RH_H gateway relieve alert; Temp_H: high temperature threshold, [-55~125],unit:℃, default: 100; Temp_L: low temperature threshold, [-55~125],unit:℃, default: 0 RH_H: high humidity threshold, [0~100],unit:%, default: 80 RH_L: low humidity threshold,

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			[0~100],unit:%, default: 0
144	Add a LoRa sensor	*$$$$$$,144,X,Y,ID#	X: LoRa sensor type X=0, TAG07/TAG07B/TAG08/TAG08B/TAG08L/TAG09 (Humidity unit % TAG) X=2,TAG07B/TAG08B (Humidity unit 0.1%) X=3,TAG09 (double temperature) X=4,TAG11 Y: Channel, [1,100]; ID: LoRa sensor ID, 8 characters; Note:The number of all sensor should not be more than 100. By default, all sensor in all ranges can be received. This function needs to be configured only when binding sensor and using RS485 Modbus mode, and the TAG07B default is %, TAG08B default humidity unit is 0.1%.
144	Add a LoRa sensor	*$$$$$$,144,X,Y,ID,N#	X: LoRa sensor type X=0, TAG07/TAG07B/TAG08/TAG08B/TAG08L/TAG09 (Humidity unit % TAG) X=2,TAG07B/TAG08B (Humidity unit 0.1%) X=3,TAG09 (double temperature) X=4,TAG11 Y: Channel, [1,100]; ID: LoRa sensor ID, 8 characters; N:The number of sensor ID added, followed by 1 Note:The number of all sensor should not be more than 100.

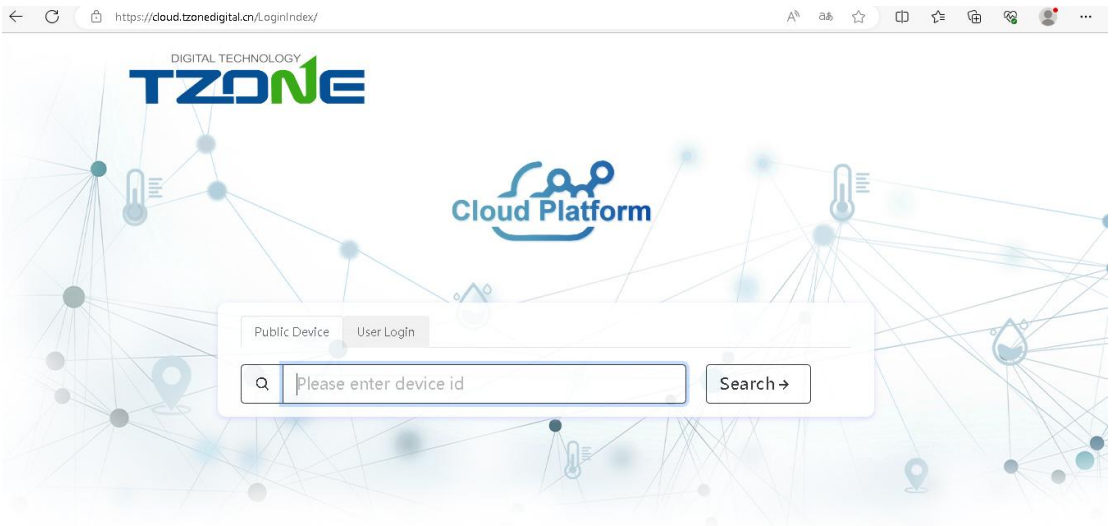
			By default, all sensor in all ranges can be received. This function needs to be configured only when binding sensor and using RS485 Modbus mode, and the TAG07B default is %, TAG08B default humidity unit is 0.1%.
145	Delete a LoRa sensor	*$$$$$$,145,X,Y#	X: LoRa sensor type X=0, TAG07/TAG07B/TAG08/TAG 08B(Humidity unit %TAG) X=2,TAG07B/TAG08B(Humid ity unit 0.1% TAG) X=3,TAG09 (double temperature) X=4,TAG11 Y: Channel, [1,100];
146	Delete all LoRa sensor	*$$$$$$,146,1#	
147	Read all added LoRa sensor	*$$$$$$,147,1#	
148	RF reboot	*$$$$$$,148,X#	X:[1,1440],default:20,unit:min RF module will reboot if gateway cannot receive any sensor within this time period
200	Set GPRS transmission format	*$$$$$$,200,X#	X:0-TCP/IP(default); X:1-Http
201	Set Http Proxy Server	*$$$$$$,201,X,IP,PORT#	X=0 disable X=1 enable IP:Proxy Server IP PORT:[1,65535] Proxy Server Port
500	Clear data flash	*$$$$$$,500#	Clear stored in the flash memory inside the machine
600	Auto Reboot	*$$$$$$,600,X,Y#	X=0,Disable his function X=1, Active this function. (Default) Y:Reboot time interval, [10,9999],unit: min, (default: 1440)
800	Query command	*$$$$$$,800,X #	X:The instruction that needs to be queried

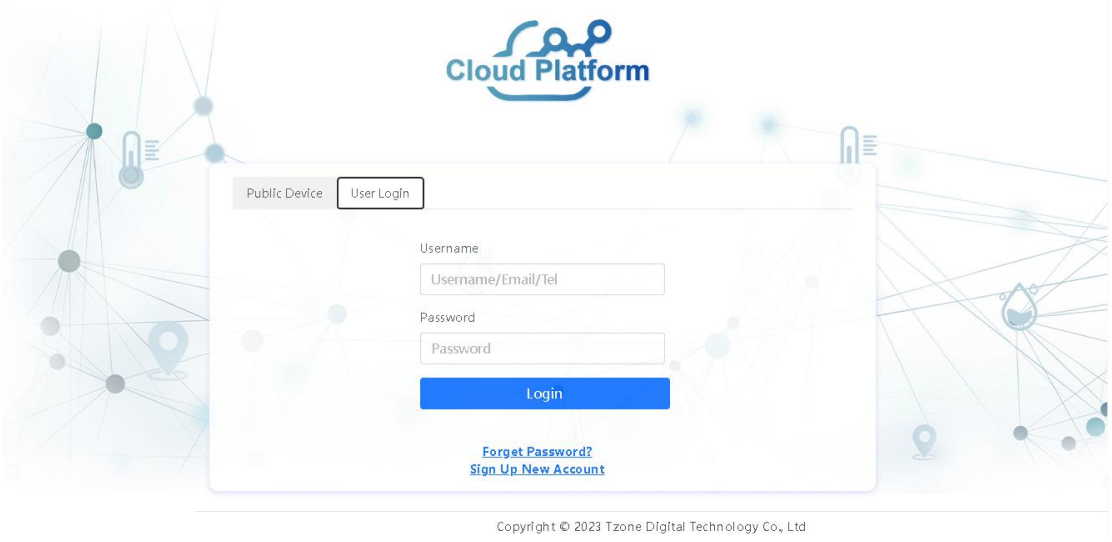
801	Reading the IMEI number	*$$$$$$,801#	LoRa Gateway reply the IMEI
900	Download command to LoRa Sensor	*$$$$$$,900,ID,cmd#	ID: Sensor ID; cmd: Sensor command, please see the LoRa Sensor download command V1.0 Note: if need use this function, please enable the ACK function in LoRa Sensor
901	Delete download command	*$$$$$$,901#	
990	Initialization Tracker	*$$$$$$,990,099#	It will set all parameter to factory default value (Excluding the Frequency band).
991	Reboot now	*$$$$$$,991#	Reboot the LoRa Gateway

10 Data query

TZONE cloud platform.

Please register an account and add a device. After adding a device, you can query the data by device ID.
For more details, please log in and view the help documentation.
Tzone cloud platform website: http://cloud.tzonedigital.com/
Tzone Server Domain: t-gateway.tzonedigital.cn(default)
Tzone Server Port: 54929 (default)
URL：http://g.cloud.tzonedigital.cn:18811/Receive（HTTP）

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User Login
Username
Username/Email/Tel
Password
Password
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