TMG07 USER MANUAL

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1. Preface

This guide provides the user with an overview of the features available on the TMG07 device.

2. Introduction

One TMG07 device unit contains a gateway host, and four accessories: AC Power, power cord, socket, enclosure. AC Power provides power to the gateway through the Type-C interface. And the AC Power can transmit data to the gateway host through the Type-C interface. TMG07 is an LTE, Wi-Fi gateway that supports Bluetooth pairing with sensors. TMG07 sends the collected sensor data to the cloud platform. And the platform can manage TMG07 through MQTT protocol.

3. Specifications

More detailed specifications are as follows:

Overall size of device unit: 190x170x88mm

Overall weight of device unit: 1365±20g

Table 1 – TMG07 gateway host Specifications

Cellular Technology	LTE FDD: B1/3/7/8/20/28
	LTE TDD: B38/40
	WCDMA: B1/2/5/8
	GSM: 850/900/1800/1900MHz
GNSS Positioning	GPS/Beidou/GLONASS/Galileo
Location System	LBS, Google Wi-Fi
Wi-Fi Version	IEEE 802.11 b/g/n
Bluetooth Version	BLE V5.0
BLE Max. connection	8 (Door x 4, Temp/Humidity x 4)
Li-on Battery Capacity	18650 2600mAh rechargeable, 500~ cycle, (-20 °C ~ 60 °C)
Wi-Fi/BT Antenna	PCB Antenna
Ext. Antenna Connection	SMA x 2 Cellular and GPS (External FPC antennas in enclosure)
Operating Temperature	-20 °C ~ 60 °C
Storage Temperature	-40 °C ~ 80 °C (Battery not included)
Battery Storage Temperature	1 year: 20~35 °C, 3 months: 35~45 °C

Operating Humidity	10% ~ 95% RH
IP Rating	IP 54
Indicator Green LED	x1 (Cellular)
Indicator White LED	x1 (GPS)
Indicator Yellow LED	x1 (Wi-Fi)
Indicator Blue LED	x1 (Bluetooth)
Power/BT Pairing Button	x1 (Press 3 sec to pair, >5 sec long press to Power on/off)
RESET	x1 (Short press to restart)
SIM Card Type	Micro-SIM (3FF) (Clamshell)
DB9 Connector	Pin definition in HW-Connector
DB15 Connector	Pin definition in HW-Connector
USB-C Connector	5V/2A Input + RS485, Pin definition in HW-Connector

Table 2 – Power Meter - 13A Hardware Specifications

Voltage range	AC 100 ~ 240V
USB-C port	Output 5V 2A
Withstand current	13A
Operating Temperature	-30 °C ~ 75 °C
Storage Temperature	-40 °C ~ 80 °C
Operating Humidity	10% ~ 95% RH
Indicator Yellow LED	x1
AC-Reset Button	X1, press to recover the fuse
Reset Button	X1, press to restart the device
Wi-Fi Pairing Button	x1
IP Rating	IP30
Cable Plug	250V 16A 3 meters long
Material	Fire rating V0

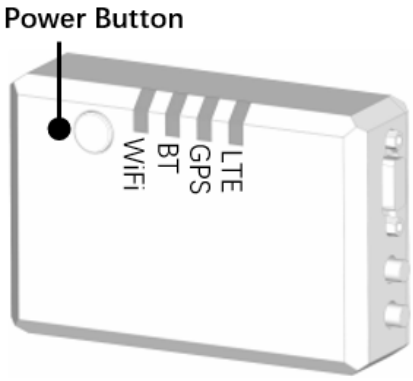
Table 3 – Power Meter - 16A Hardware Specifications

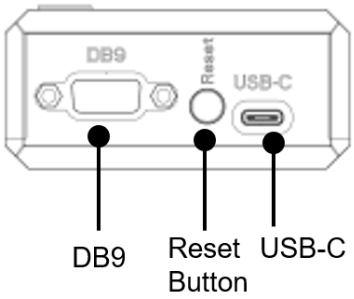
Voltage range	AC 100 ~ 240V
USB-C port	Output 5V 2A
Withstand current	16A
Operating Temperature	-30 °C ~ 75 °C
Storage Temperature	-40 °C ~ 80 °C
Operating Humidity	10% ~ 95% RH
Indicator Yellow LED	x1
AC-Reset Button	X1, press to recover the fuse
Reset Button	X1, press to restart the device

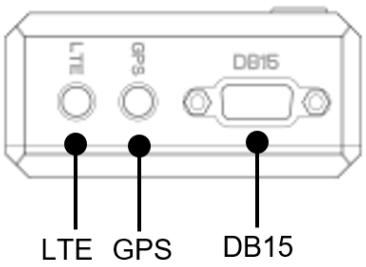
Wi-Fi Pairing Button	x1
IP Rating	IP30
Cable Plug	250V 16A 3 meters long
Material	Fire rating V0

4. Appearance

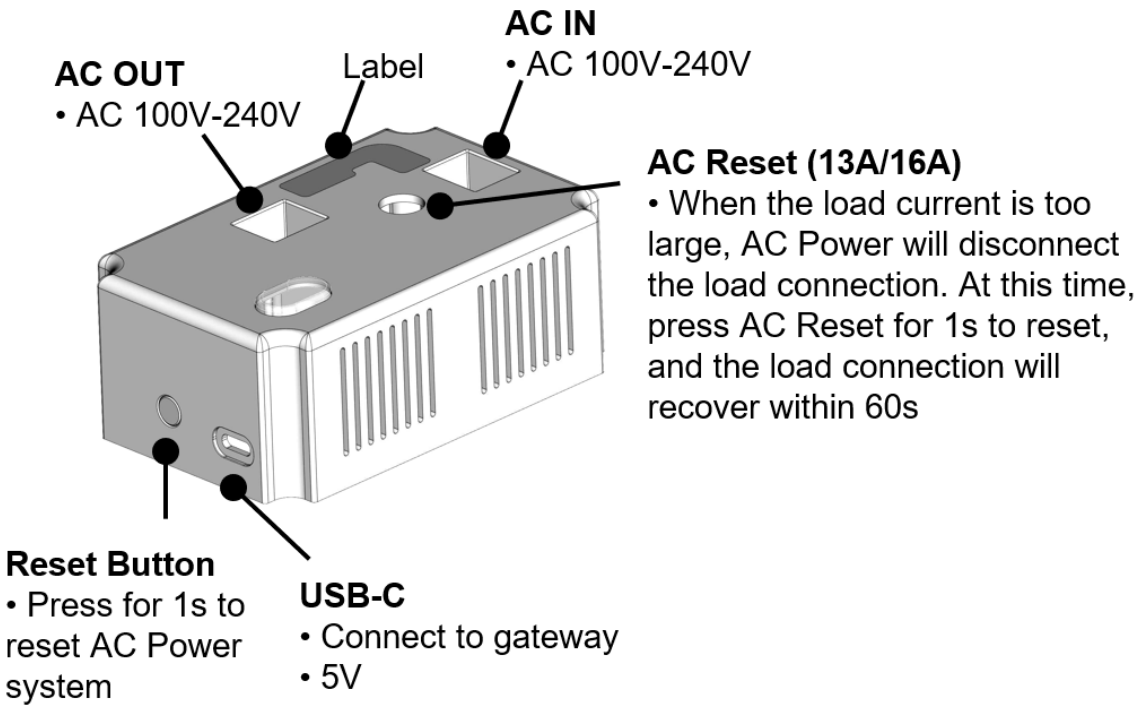
TMG07 Gateway appearance







TMG07-16A / TMG07-13A AC Power



5. Functional Operation

- Install GPS antenna and LTE antenna before power up.
- Provide a DC 5V/2A power supply to the equipment with the Type-C interface.
- The device will automatically enter the standard mode when connecting with external power. Long press the power button for more than 5 seconds and less than 10 seconds until the blue and amber LEDs light up, and the device will enter shutdown mode and vice versa.
- Press the Power Button briefly for 3 seconds to enter the Bluetooth pairing state. In paring mode, the LED will be flashing. If the Bluetooth pairing is successful within 60 seconds, the blue indicator light is solid on.
- Reset to default: Long press the power button for more than 10 seconds until the blue, amber and white LEDs light up, and then the gateway can be restored to factory settings.
- When in Standby Mode, short press the Power Button, then Amber/Blue/White LED will flash for 10 seconds.

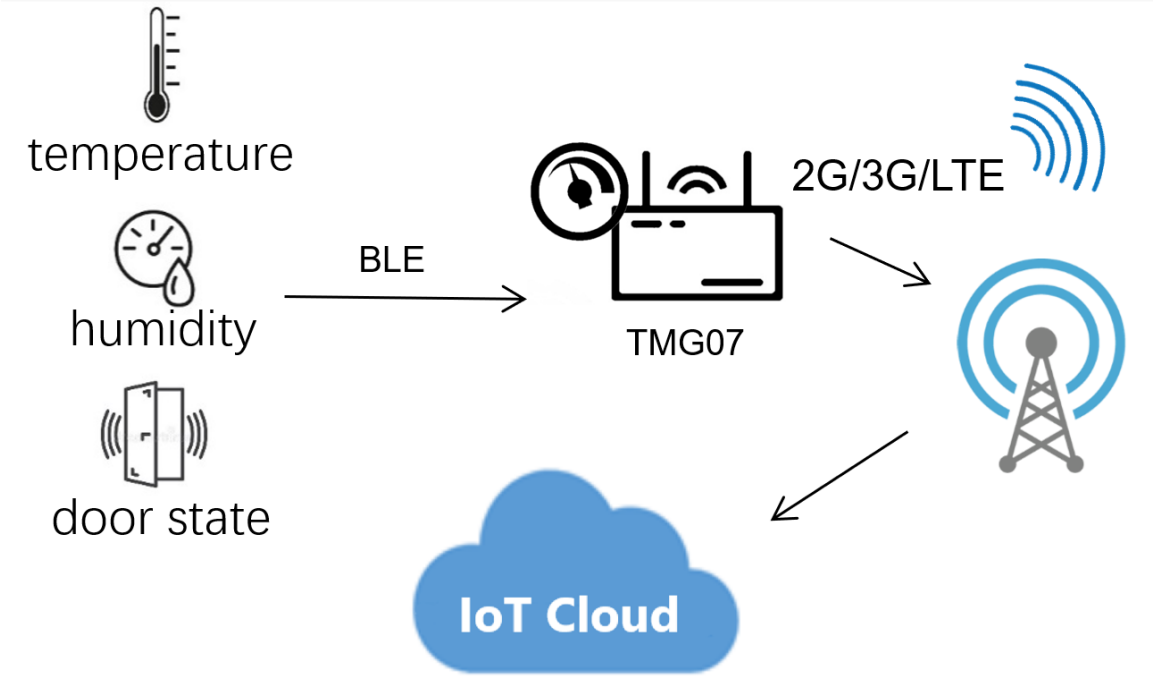
- The current software version can only pair two sensors, and must pair the “THS” sensor before the “DOR” sensor. Note viewing the text on the back of the sensor to distinguish the sensor type.
- Please successfully connect the platform before operating the pairing to avoid the platform receiving repeated pairing reports.

Notice：After the gateway is powered on, WiFi scanning will start automatically, and Bluetooth pairing cannot be operated during the time. The WiFi scan lasts about 130 seconds. After the platform receives the first report data (not sub-device list) from the gateway, it can be considered that the WiFi scan is complete. Please operate Bluetooth pairing after this.

6. Application Scenarios

TMG07 is to act like a bridge, to translate different Bluetooth sensor data into MQTT messages, which is then transmitted to the remote control platform via cellular network.

The AC Power can provide gateway host with a stable and safe power supply. Meanwhile, AC Power can communicate with the gateway host through the Type-C data cable.



7.Work Mode

TMG07 supports three modes. Standard/Standby/Shutdown mode.

- Shutdown mode: when device is powered off, it stays in Shutdown mode.
- Standard mode: Device turns on and automatic enters Standard mode when plug in with external power. Press Power Button for 5 sec while the external power is connected, the device will be switched from Shutdown mode to Standard mode. On the contrary, it is turned off. And platform can also send command to switch device from Standard mode to Shutdown mode or Standby mode.
- Standby mode: the device is battery-powered, with no external power supply. In Standby mode, when press Power button for 5 seconds or press Reset button, it enters Standard mode. And platform can also send command to switch device from Standby mode to Standard mode when plug in with external power.

8.LED Indicator

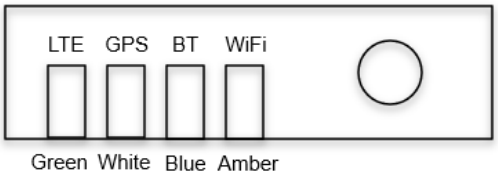


Table 4 – LED Status Description

LED	Status	Description
GPS (White)	On	GPS Fixed
	Flashing	Acquiring
	10s Flash, then Off	Standby Mode
LTE (Green)	Slow Flashing	No SIM & Network
	Fast Flashing	Connected
	10s Flash, then Off	Standby Mode
	Off	Shutdown Mode
WiFi (Amber)	On	Link
	Fast Flashing	No Link
	10s Flash, then Off	Standby Mode
BT (Blue)	On	Paired
	Flashing	Pairing
	10s Flash, then Off	Standby Mode

9. Interfaces

9.1 Hardware Interfaces

TMG07 hardware interface type:

- BLE 5.0
- RS232 for DB15(TBD)
- DB9 for Debug & Firmware upgrade
- USB-C (RS485)

Table 5 – USB-C Pin Definition

Pin	Define	Note
A1	GND	GND
A4	VBUS	DC5V 2A input
A5	CC1	CC1
A6	485-A	RS485 A+ (the same as DB9 RS485)
A7	485-B	RS485 B- (the same as DB9 RS485)
A8	SBU1	NC
A9	VBUS	DC5V 2A input
A12	GND	GND
B1	GND	GND
B4	VBUS	DC5V 2A input
B5	CC2	CC2
B6	485-A	RS485 A+ (the same as DB9 RS485)
B7	485-B	RS485 B- (the same as DB9 RS485)
B8	SBU2	NC
B9	VBUS	DC5V 2A input
B12	GND	GND

Table 6 – DB9 Pin Definition

Pin	Define	Note
1	5V	DC5V 500mA
2	RX	UART-TTL 3.3V (debug & Firmware upgrade)
3	TX	UART-TTL 3.3V (debug & Firmware upgrade)
4	ADC1	Analog input 0~20mA
5	GND	GND
6	485-A	RS485 A+
7	485-B	RS485 B-
8	GPIO1	Input (High-5V(default)/ Low-0V) (Disassemble alarm)
9	GPIO2	Input/Output (High-5V(default)/ Low-0V) It can be configured on the Firmware.

Table 7 – DB15-VGA Pin Definition

Pin	Define	Note
1	3.3V	DC3.3V 500mA
2	VREF IO (1.8V)	DC1.8V 200mA
3	I2C_CLK	Reserved
4	I2C_DATA	Reserved
5	ADC1	NTC Probe temperature sensor
6	ADC2	Analog input 0-5V
7	GPI1	Door Sensor (Input)
8	GPI2	Input (High-5V(default)/ Low-0V)
9	GPI3	Input (High-5V(default)/ Low-0V)
10	GND	GND
11	GND	GND
12	GPO4	Output (High-5V(default)/ Low-0V)
13	GPO5	Output (High-5V(default)/ Low-0V)
14	GPIO6	Configurable through Firmware- Input/Output (High-5V(default)/ Low-0V)
15	GPIO7	Configurable through Firmware- Input/Output (High-5V(default)/ Low-0V)

9.2 Communications Interfaces

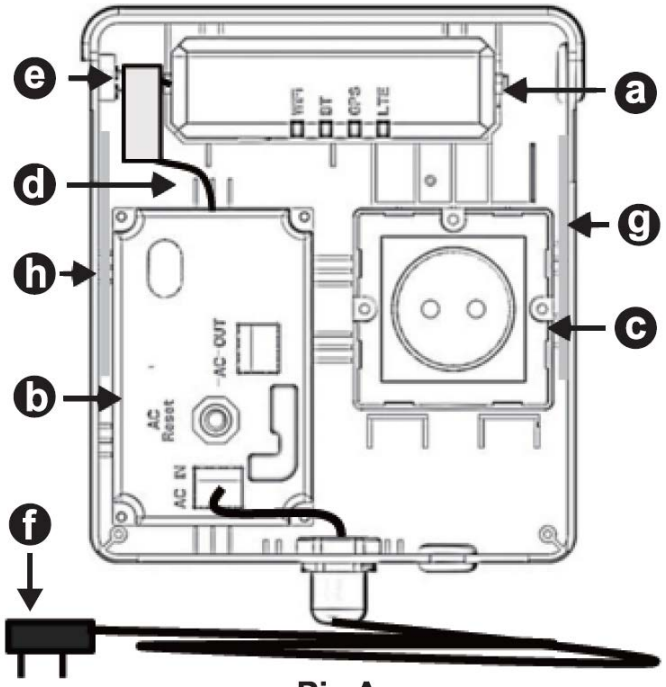
- HTTP(S) for FOTA Firmware Upgrade
- HTTP(S) for Device Configuration Downloading
- MQTT(S) Protocol for Data Communication and Management
- BLE 5.0
- Wi-Fi 2.4G
- Modbus Standard Protocol for AC Power Data Communication

10. Components Checklist

- 1 x Gateway host
- 1 x AC Power
- 1 x Power Cord
- 1 x Socket
- 1 x Enclosure
- 1 x Quick Start Guide

11. Installation

System includes – "**Pic A**"

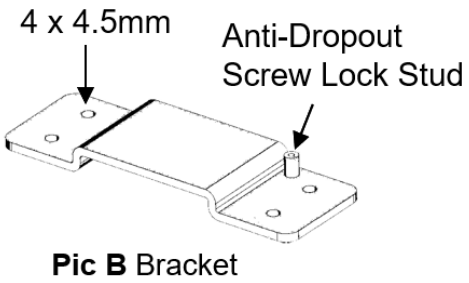


- Pic A -

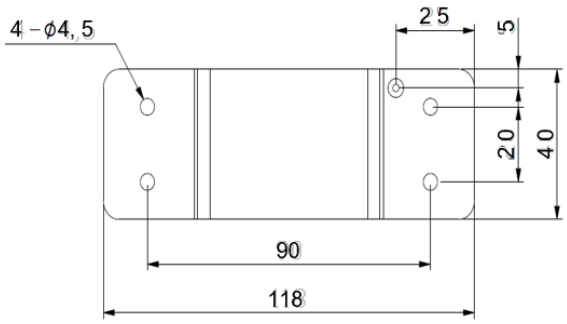
a. TMG07 Gateway x1
b. AC Power x1 (13A /16A)
c. AC Socket x1 (Type G/F/E/L)
d. USB-C Cable x1
e. Intrusion Detection Kit x1
f. AC Input Power Cord x1 (By Model)
g. Cellular FPC Antenna x1
h. GPS FPC Antenna x1
i. Bracket with Lock Screw x1 set

(Packaged separately, refer to “Pic B”)

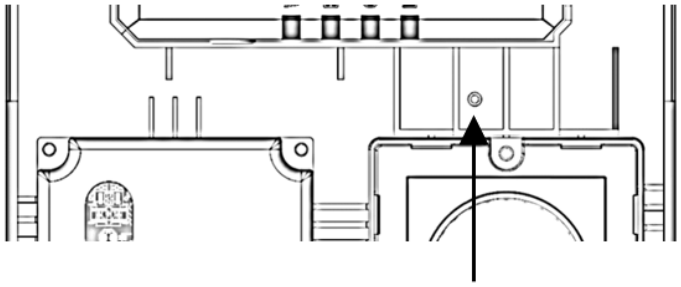
Mounting the TMG07 System - "Pic B"



Pic B Bracket

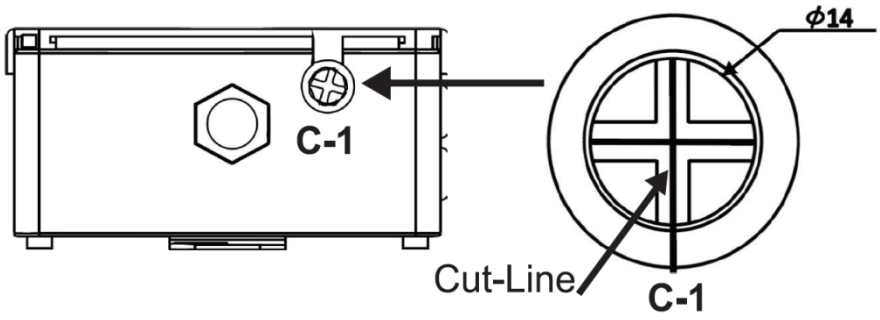


There are four 4.5mm diameter screw holes on the mounting bracket. Fasten the bracket to the installation surface with screws and nuts larger than 4.5mm in diameter, hang the TMG07 case at a precise position, and then secure the bracket to the case with the anti-dropout screw from the inside of the TMG07 to prevent it from falling off, see "**Pic C**". The anti-dropout screw is packaged with the bracket.



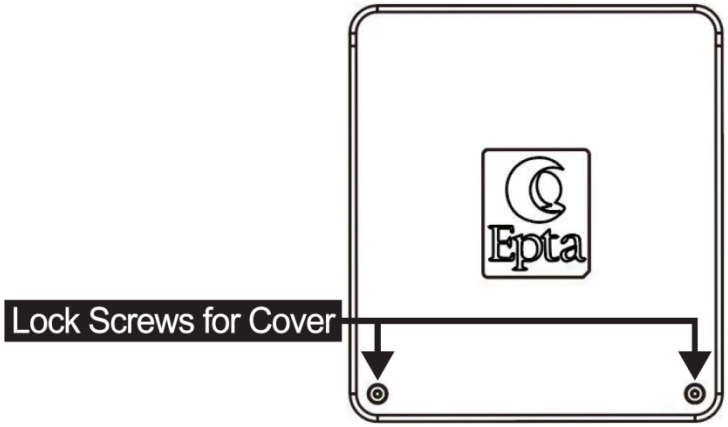
Pic C, Location of the anti-dropout screw

Install Power Plug of External Equipment



Take the AC output hole rubber plug out from the case, put the power cord into the rubber plug (**C-1**) along the cut-line, and then snap the rubber and wire into the case outlet hole. Insert the AC plug into the AC socket position **c** in the "**Pic A**".

Close the Cover of TMG07 – "Pic D"



The upper cover supports slide-in installation, please slide the upper cover into the main body, and then lock the fixing screws of the upper cover after confirming the cover is in the correct position.

WARNING: Device needs to be switched to "shutdown mode" before unplugging AC Power. Otherwise, a theft alarm will be initiated!

Notice: Device should be unplugged before being inspected. Always use appropriate insulated rubber gloves.

When unplugging from the internal socket (position c in the "Pic A") of the device, press the socket firmly with the other hand to avoid damage to the hanger of the housing.

12. Data Transmission

Table 8 – Frequency band and Power

Specification	Bands	Operation Frequency	Max. Power
GSM	900	880-915 MHz	34.5 dBm
	1800	1710-1785 MHz	31.5 dBm
WCDMA	1	1920-1980 MHz	25.5 dBm
	8	880-915 MHz	25.5 dBm
LTE	1	1920-1980 MHz	25 dBm
	3	1710-1785 MHz	25 dBm
	7	2500-2570 MHz	25 dBm
	8	880-915 MHz	25 dBm
	20	832-862 MHz	25 dBm
	28	703-748 MHz	25 dBm
	38	2570-2620MHz	25 dBm
	40	2300-2400MHz	25 dBm
Wi-Fi		2400-2483.5 MHz	19.9 dBm
Bluetooth		2400-2483.5 MHz	10 dBm
GNSS		1559-1610 MHz	-

- **GNSS Specification**

  Supported GNSS: GPS, Galileo, GLONASS, BeiDou

  Antenna Type: R-SMA

- **Wi-Fi Function**

  Frequency Range: 2412MHz-2472 MHz

  Modulation Technique: 8.02.1b/g, 8.02.11n(HT20), 802.11n(HT40)

  Antenna Type: PCBA Type on CPU Module

Table 9 – Wi-Fi Wireless Parameters

Rate
802.11b, 1 Mbps
802.11b, 11 Mbps

802.11g, 6 Mbps
802.11g, 54 Mbps
802.11n, HT20, MCS 0
802.11n, HT20, MCS 7
802.11n, HT40, MCS 0
802.11n, HT40, MCS 7

- **Bluetooth Function**

  Bluetooth Version: 5.0

  BLE Data Rate: 2 Mbps, 1 Mbps, 500 Kbps, 125 Kbps

  Antenna Type: PCBA Type on CPU Module

  Frequency Range: 2402-2480MHz

Table 10 – Bluetooth Wireless Parameters

Emitter characteristics	Gain Typical (KHz)
2 Mbps	3.00
1 Mbps	3.00
500 Kbps	3.00
125 Kbps	3.00

13. Contact

Company: ThingsX Inc.

URL: https://www.thingsx.com/

HQ Address：9442 North Capital of Texas Hwy Plaza One, Suite 500 Austin, TX 78759

TEL：+1 877-651-2988

Email: info@thingsx.com

14. CE&UKCA Statement

Declaration of Conformity

Hereby, [ThingsX Inc.] declares that the radio equipment type [TMG07] is in compliance with UK Radio Equipment Regulations 2017. The full text of the UK declaration of conformity is available at the following internet address: https://www.thingsx.com

TMG07 is in conformity with the relevant Union harmonization legislation: Radio Equipment directive 2014/53/EU with reference to the following standards applied:

Health Applied Standard(s):

EN IEC62311: 2020

Safety Applied Standard(s):

EN IEC 62368-1:2020+A11:2020

IEC 62368-1:2020

Electromagnetic compatibility Applied Standard(s):

ETSI EN 301 489-1 V2.2.3

ETSI EN 301 489-17 V3.2.4

ETSI EN 301 489-19 V2.1.1

ETSI EN 301 489-52 V1.2.1

EN 55032: 2015+A1:2020

EN 55035: 2017+A11:2020

EN IEC 61000-3-2: 2019+A1:2021

EN 61000-3-3: 2013+ A1:2019+A2:2021

Radio frequency spectrum usage Applied Standard(s):

ETSI EN 301 908-1 V15.1.1

ETSI EN 301 908-2 V13.1.1

ETSI EN 301 908-13 V13.1.1

ETSI EN 301511 V12.5.1

ETSI EN 301 413 V1.2.1

ETSI EN 300 328 V2.2.2

BATTERY WARNING:

Replacement of a battery with an incorrect type that can defeat a safeguard (for example, in the case of some lithium battery types).

Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery, that can result in an explosion.

Leaving a battery in an extremely high temperature surrounding environment that can result in an explosion or the leakage of flammable liquid or gas; And a battery subjected to extremely low air pressure that may result in an explosion or the leakage of flammable liquid or gas.

CAUTION：

Risk of fire or explosion if the battery is replaced by an incorrect type.

Excessive discharge will damage the battery. Please charge the gateway once a month. The gateway needs to be connected to an external power supply and charged for more than 2 days.

In standby mode, when the battery runs out, the device automatically shuts down. To avoid damaging the battery, please charge it within one month. Charging time is not less than 2 days. If the device is not in use, set the device to shutdown mode.

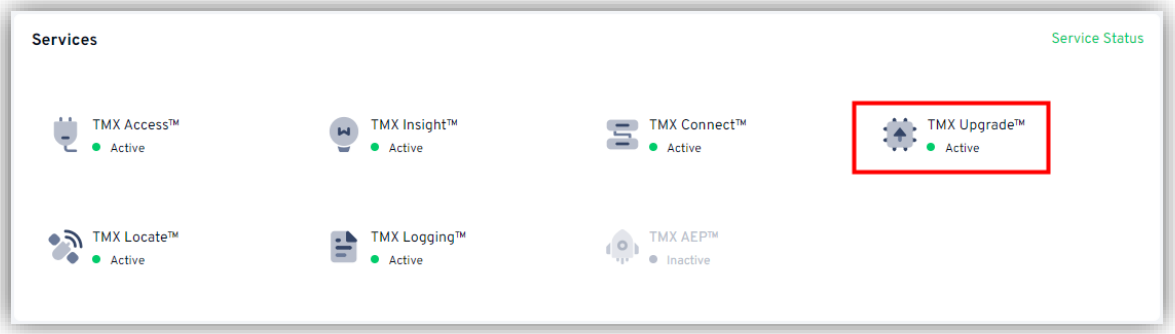
This equipment should be used indoors. Please avoid high temperature, sun exposure, soaking and falling.

Please confirm that the device is installed stably before powering on.

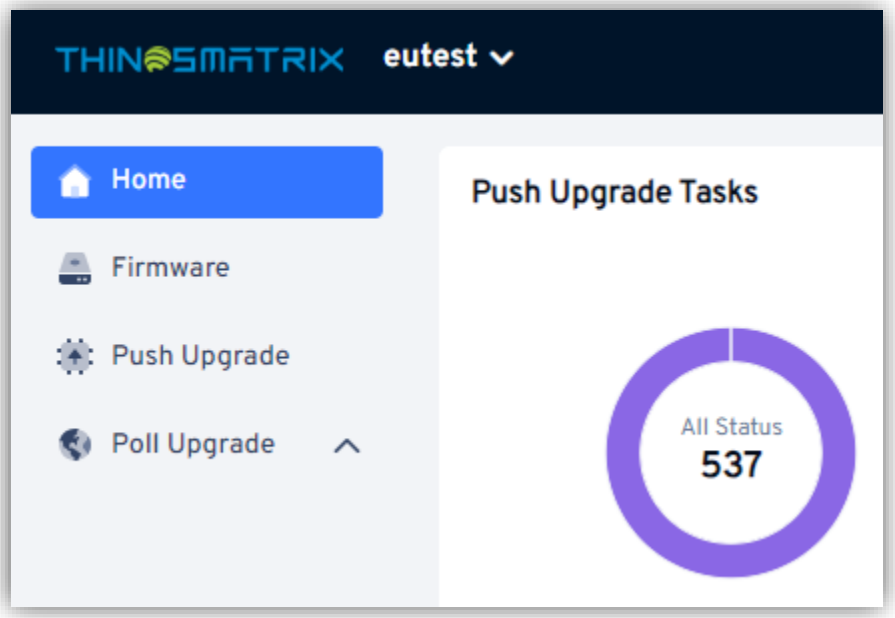
Appendix 1: FOTA Operations

Platform FOTA operation

After logging in to the “Home” page, you can click the "TMX Upgrade" option in the Service section to enter the FOTA interface.



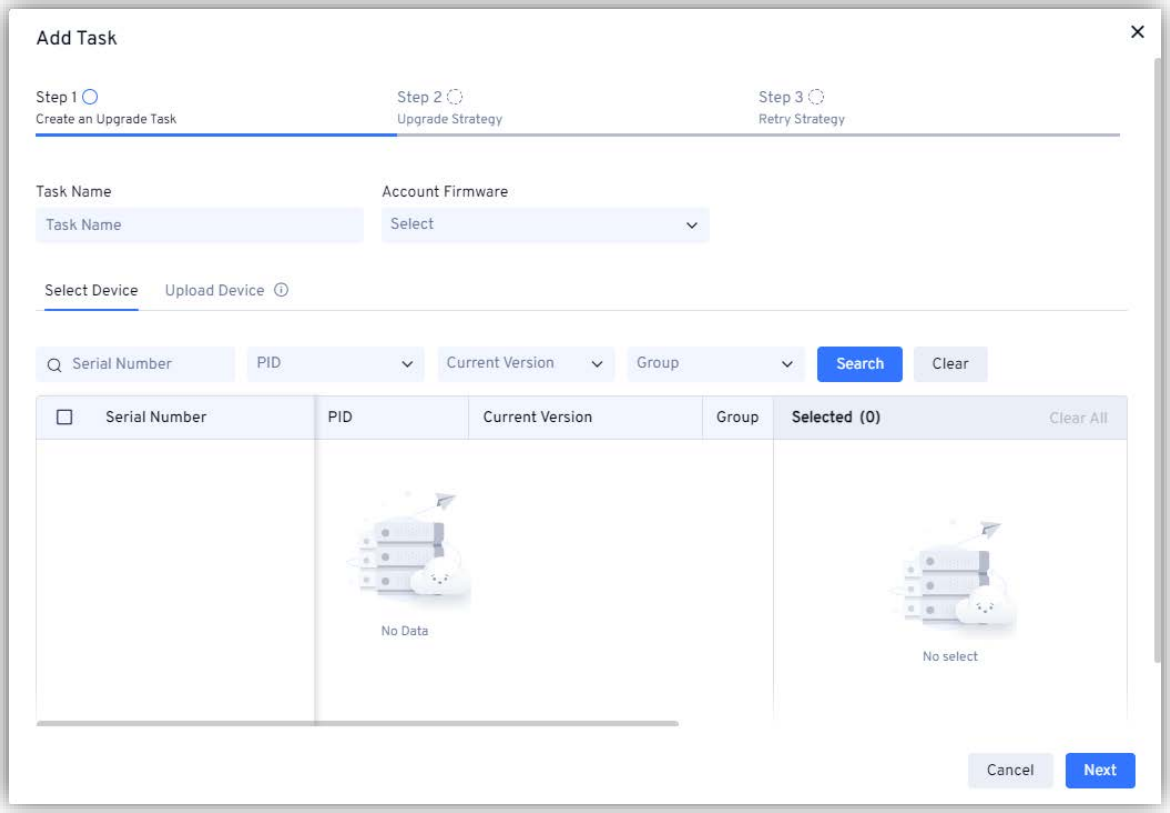
Please contact TMX in advance for the name of the firmware to be upgraded.



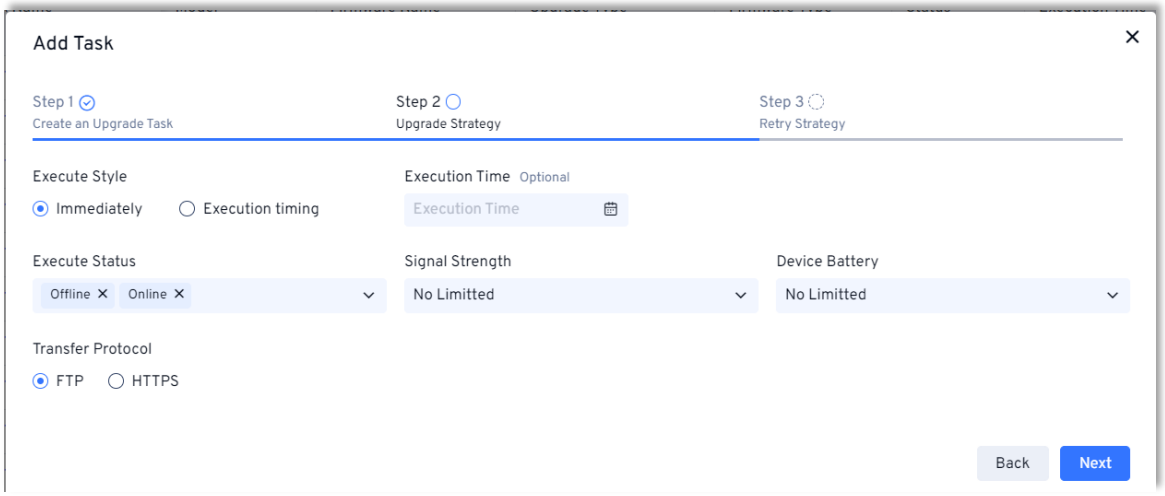
On the "Push Upgrade" page, click the "Add Task" option, which will open the Add Task window. There are three setup steps.

Step 1, create an upgrade task. Create a task name here, and then select the firmware name in the "Account Firmware" field. After selecting the "Account Firmware" option, you can choose to Upgrade the gateway or the sub-device in the new "Upgrade Type" drop-down box. When upgrading the gateway, select “Device”

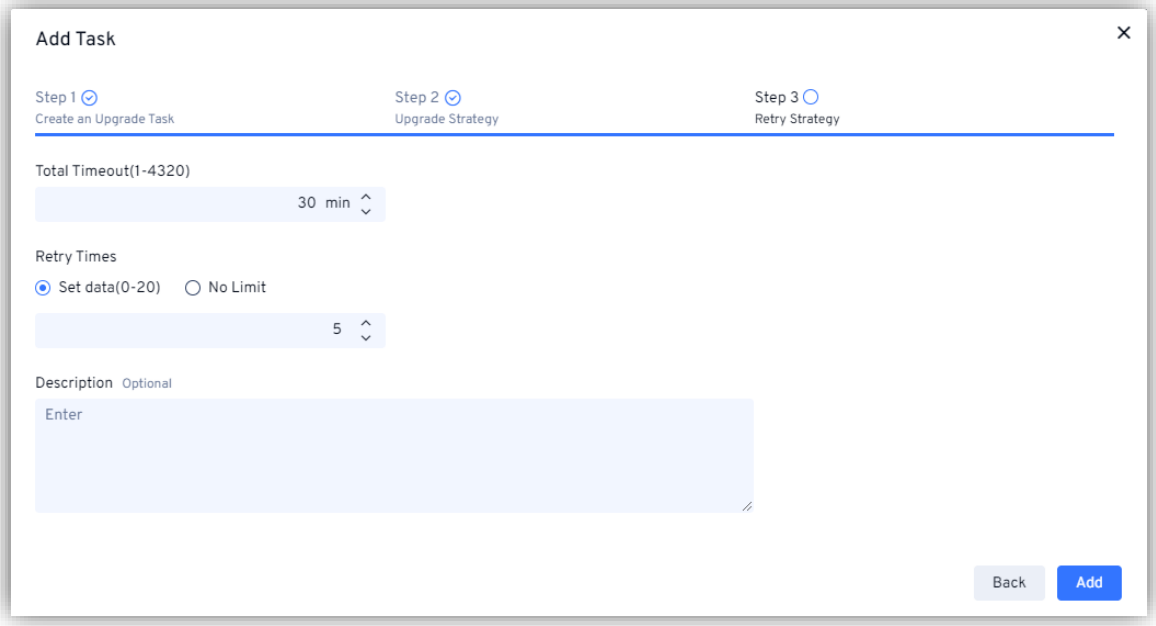
from the “Upgrade Type” option. When upgrading other sub-devices, select the corresponding device type. Use the search option below to find the SN of the device you want to upgrade and check it. You can also select a group to upgrade in bulk. Then click "Next" to proceed to the next step.



Step 2, set an upgrade strategy. **Note that the "Transfer Protocol" option must select "HTTPS"**. Set the execution time you want. Select the device status and device battery you want to upgrade, then click "Next" to proceed to the next step.



Step 3, set a retry strategy. After selecting the total timeout time and retry times, click "Add" and the upgrade task is successfully added to the platform.



Device FOTA operation

Provide external power for the gateway during the upgrade strategy period specified on the platform. After receiving the data report from the gateway, the platform automatically FOTA the gateway according to the strategy. Note that the gateway report interval in standard mode is 120 minutes. The upgrade may take 5 to 10 minutes. Ensure that the power supply is stable.

If you want to upgrade sub-devices, please complete the pairing operation in advance. For pairing operations, refer to the "Functional Operation" section.

The TH sensor starts FOTA during data reporting. By default, the TH sensor reporting interval is 120 minutes. In order to start the upgrade immediately, press the pairing button of the TH sensor eight times in a row to connect the sensor to the gateway immediately and trigger the upgrade.

The door sensor requires a human opening or closing operation to wake the sensor for FOTA. When there is no opening and closing operation, the door sensor will be connected to the gateway every 24 hours, at which time the gateway will automatically upgrade the sensor.