TMG06 USER MANUAL

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1. Preface

This guide provides the user with an overview of the features available on the TMG06 device.

2. Introduction

TMG06 is an LTE gateway. TMG06 sends the collected data from the Modbus slave device to the cloud platform. And the platform can manage TMG06 through MQTT protocol. The device is compatible with 9V to 30V DC input power.

3. Specifications

More detailed specifications are as follows:

Table 1 – TMG06 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
Indicator Green LED	x1
Indicator White LED	x1
Power Button	x1 (>5sec long press to Power on/off)
RESET	x1 (Short press to restart)
SIM Card type	Micro-SIM (3FF) (Clamshell)
Li-on Battery Capacity	18650 2200mAh (Battery life cycle greater than 500 cycles)
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 30
Interface	UART (Modbus RTU), RS485(Modbus RTU)
DB9 Connector	Pin definition in HW-Connector
DB15 Connector	Pin definition in HW-Connector
USB (Micro USB)	For upgrade Firmware / debug
Power input	12V / 1A (9V~30VDC)

| Dimensions	13.3cm x 10.4cm x 3.3cm
Weight	248g
Warranty	3 years

4. Appearance
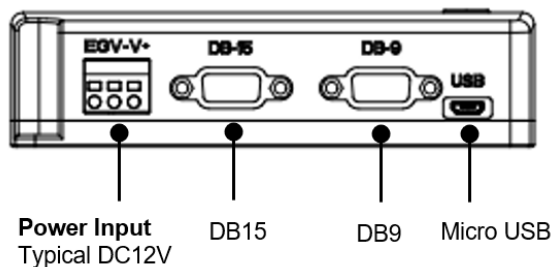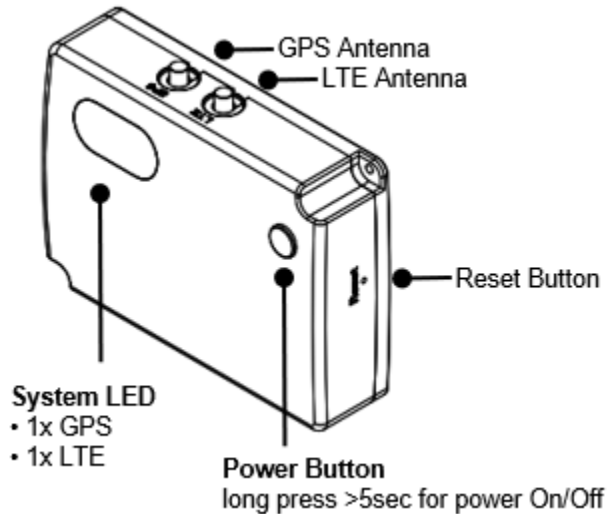
5. Functional Operation

- Install GPS antenna and LTE antenna before power up.

- Access the corresponding Modbus slave device at the DB9 and DB15 interface.

- Provide a 12V/1A power supply to the equipment.

- 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.

- 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.

6. Application Scenarios

TMG06 collects data from Modbus slave devices, and then transmits it to the remote control platform via cellular network.
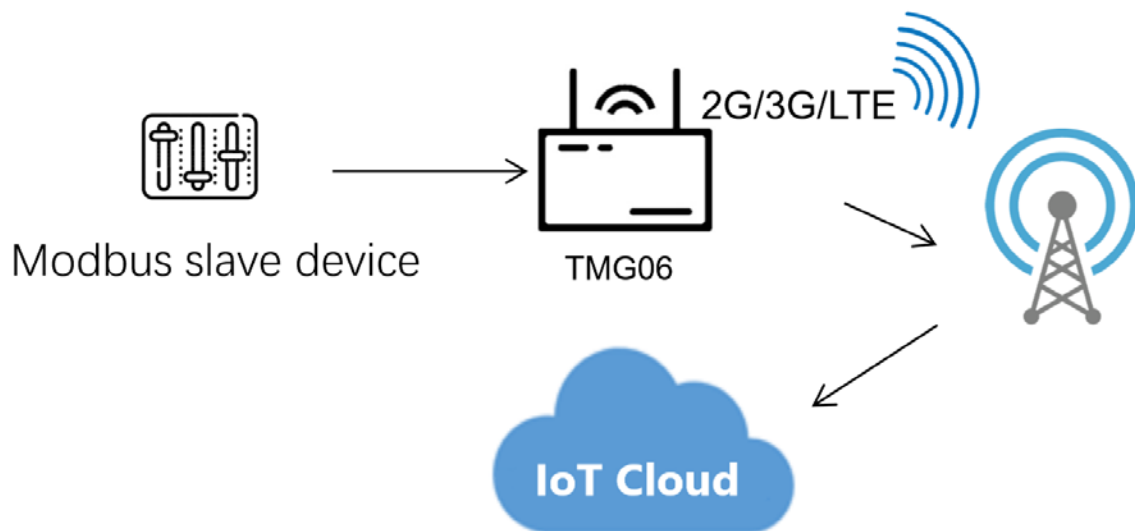

7. Work Mode

TMG06 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 automatically 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

White   Green

Amber   Blue
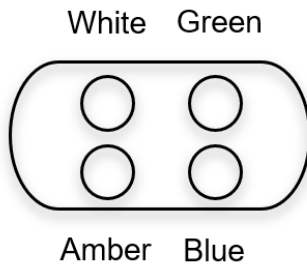
Table 2 – LED Status Description

LED	Status	Description
GPS (White)	On	GPS Fixed
	Flashing	Acquiring
	10S Flash, then Off	Standby Mode
	Off	Shutdown Mode
LTE (Green)	Slow Flashing	No SIM & Network
	Fast Flashing	Connected
	3S On, 75ms Off	Standby Mode
	Off	Shutdown Mode
LED (Amber)	--	Reserved
LED (Blue)	--	Reserved

When in Standby Mode, press the Power Button, then Amber/Blue/White LED will flash for 10 seconds.

9. Interfaces

9.1 Hardware Interfaces

TMG06 hardware interface type:

- Modbus over UART-TTL

- Modbus over RS485

- Micro USB for Debug & Firmware upgrade
- Input/Output GPIO

Table 3 – DB9 Pin Definition

Pin	Definition	Note
1	5V	DC5V 500mA
2	RX	UART-TTL 3.3V(shared UART with pin 6 and 7)
3	TX	UART-TTL 3.3V(shared UART with pin 6 and 7)
4	ADC1	Analog input 4~20mA
5	GND	GND
6	485-A	RS485 A+ (shared UART with pin 2 and 3)
7	485-B	RS485 B- (shared UART with pin 2 and 3)
8	GPI1	Input (High-5V(default)/ Low-0V)
9	GPI2	Input (High-5V(default)/ Low-0V)

Table 4 – DB15 Pin Definition

Pin	Definition	Note
1	3.3V	DC3.3V 500mA
2	VREFIO (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	GPI6	Input (High-5V(default)/ Low-0V)
15	GPI7	Input (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.

- Modbus Standard Protocol.
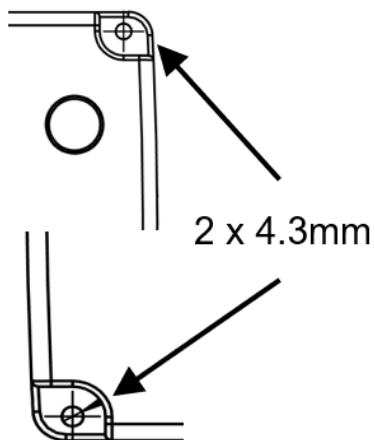
10. Accessories Checklist

- 1 x Device

- 1 x LTE Antenna

- 1 x GPS Antenna

- 1 x Quick Installation Guide

- 1 x SN Labeling

11. Installation

- **Installation steps**

1) Make a hole with a diameter of 4.3mm.

2) Fix the device to the precise position with thread diameter smaller than 4.3mm and nut larger than 4.3mm in diameter.


2 x 4.3mm

- **Wiring the Power Input (DC12V)**

1) Before turning on, insert a stick-shaped tool into the corresponding square hole, put the positive wire into V+ contact, and the negative wire into the V- contact in the round hole of terminal connector, then take the tool out of the square hole, and the power cable will be fixed.

2) Connect the power wires to DC power supply. Note: the input voltage should be DC 12V.
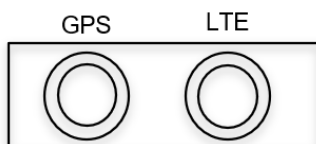
3) EG: Connect to Earth Ground for EMC protection.

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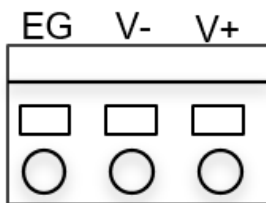
- **Antenna Installation**

1) Identify GPS antenna and LTE antenna, and align their corresponding port.

2) Screw the antenna ports respectively.

12. Data Transmission

GNSS Specification

Supported GNSS: GPS, Galileo, GLONASS, BeiDou

Antenna Type: R-SMA

Table 5 – Frequency band and Power

Specification	Bands	Operation Frequency	Max. Power	Note
GSM	900	880-915 MHz	34.5 dBm	GPRS 1Rx/1Tx
	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	10Mbps DL/5Mbps UL, 1 RB
	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	
GNSS		1559-1610 MHz	--	--

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 [TMG06] 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

TMG06 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 IEC 62311: 2020

Safety Applied Standard(s):

EN IEC 62368-1:2020+A11:2020

IEC 62368-1:2018

Electromagnetic compatibility Applied Standard(s):

ETSI EN 301 489-1 V2.2.3

ETSI EN 301 489-19 V2.1.1

ETSI EN 301 489-52 V1.2.1

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

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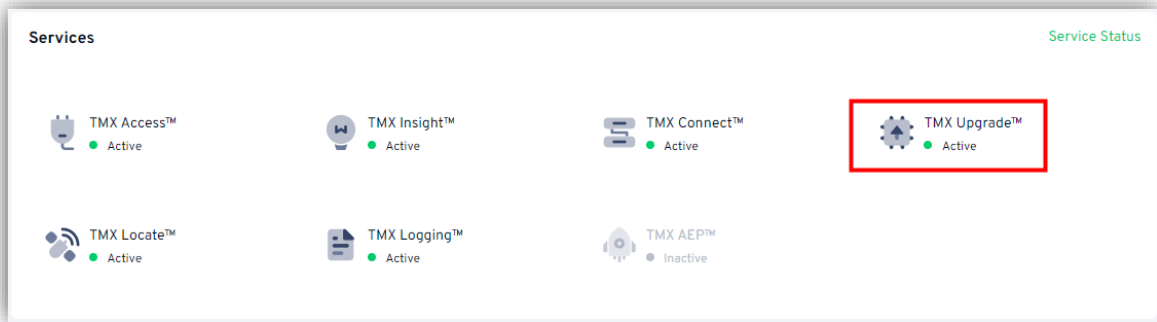
This equipment should be used indoors. Please avoid high temperature, sun exposure, soaking and falling.

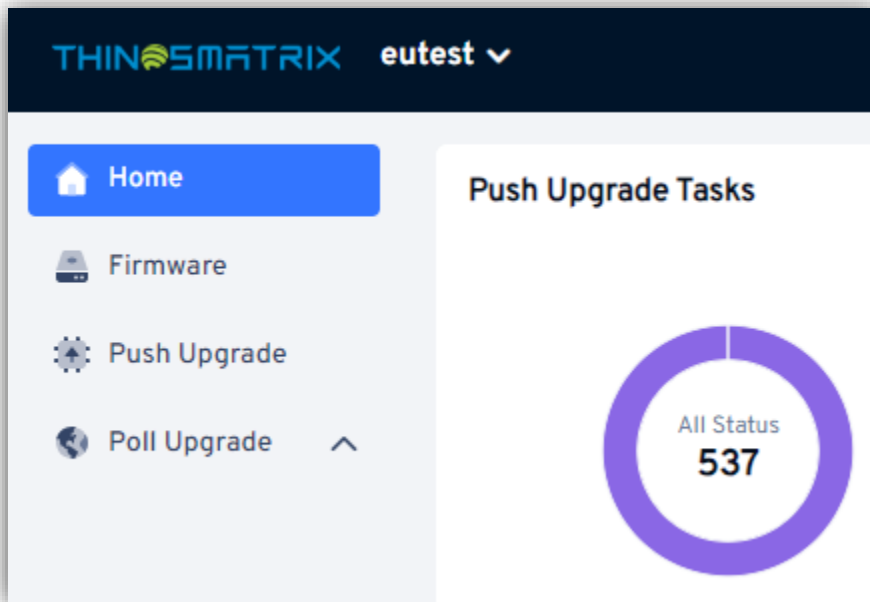Please confirm that the device is installed stably before powering on.

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.
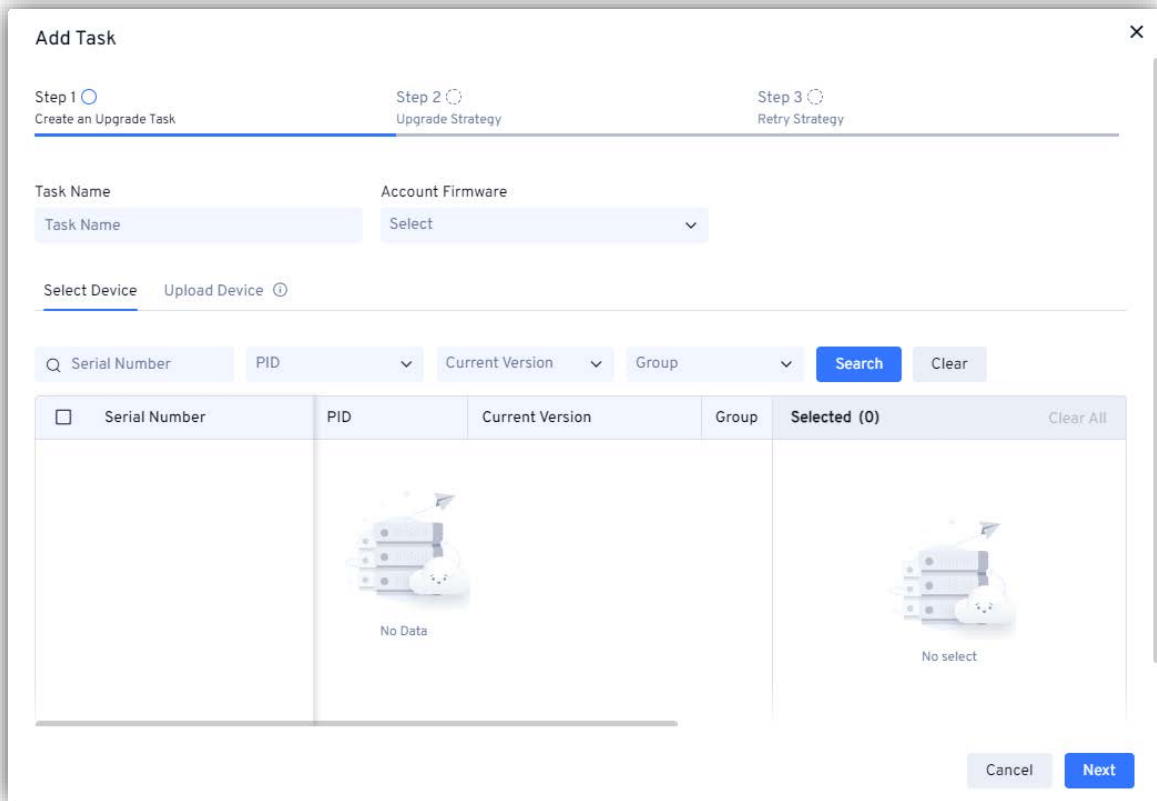

Please contact TMX in advance for the name of the firmware to be upgraded.

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.