TOPFLYtech TLP1-SF Asset/Animal GPS Tracker

User Manual

20200908

Thanks for your purchasing of the high-quality GPS tracker from TOPFLYtech. Please read this user manual carefully before installation and operation. Information in this manual is the property of TOPFLYtech. Changes to the specifications and features in this manual may be made by TOPFLYtech without prior notice. No part of this manual could be reproduced, copied, translated, transmitted, or published in any form or by any means without TOPFLYtech's prior written permission.

TLP1-SF

The tracker is using GNSS & LTE technologies and could collect device coordinates then transfer them via LTE network to the server. It provides customer with cost-effective, efficient and safety management. It has been widely used in commercial transportation, company vehicle fleet management, intelligent transportation, logistics, car rental, engineering machinery, marine transportation, animal/pet tracking and other segments.

Contents

1. Quick Reference

TLP1-SF

Attention

i. TLP1-SF obtains power through sunlight to extend the battery life.

ii. Please make sure that the device is exposed to direct sunlight every day. This will be very useful to extend the battery life. If the device is not charged for more than three months, it may cause permanent damage to the internal battery.

iii. Please give the device a fully charging before installation.

iv. Only when the solar panel output voltage value is 0.3V higher than device battery voltage value, the solar panel will start to charge the battery. Otherwise the solar charging will stop.

v. To ensure the battery life for longer period, please be careful to set the reporting intervals. Lower reporting rates will maintain the balance between the power consumption and gaining (from solar panel). We usually recommend set the tracker reporting ⩾every 5 mins when moving, and ⩾every 1 hour when standstill. Customer may also contact with TOPFLYtech for further advice.

Equipment power consumption and solar panel charging current

i. The normal device power consumption is around 50 mAh when the device is in working mode without sleep.

ii. The typical charging rate of the solar panel under direct sunlight at noon(in summer) is about 110mAh (different sunlight illumination, different charging current).

Disclaimer: Before using this device, customers should fully understand their usage scenarios

and installation environment. TOPFLYtech will not be responsible for any lost caused by using the device in a wrong scenario or reporting rate. It is highly recommended that customers should contact with TOPFLYtech before deployment. We are glad to give suggestions.

Intelligent Power Management

To extend the battery life, we designed an intelligent power management algorithm. This algorithm allows the tracker working under a lower reporting rate when battery is low. Once the battery is charged back, the tracker will report as normal. This function is enabled in default. Customer can disable it by command. The detail working logic is:

- When the battery voltage value is down to 3.55V (around 20%), then the tracker will report at every 15 minutes when moving and every 60 minutes when standstill
  (only when customer set the moving and standstill upload interval lower than 15 minutes when moving and 60 minutes when standstill)
- When the battery is charged back to 3.65V (around 30%), the device will report as what are set by customer.

FOTA (firmware over the air) Notification

TOPFLYtech is committed to providing clients with the best user experience. We are offering automatic firmware update feature for every device. This feature allows devices always having the latest version firmware. It can save clients the time and effort of updating firmware manually. Please note that this feature is enabled in default. If you want to turn it off, please contact with TOPFLYtech. If this feature is disabled, the fw update only can be done by sending upgrade command manually.

2. Product Specifications

Network Specifications	
Operating Band	FDD: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/ B20/B25/B28 TDD: B39 (Cat M1 only) EGPRS: 850/900/1800/1900MHz
Certification	FCC: B2/B4/B5/B12/B13/B25 (Cat M and NB-IoT)
Data Transmission	eMTC: Max. 300Kbps (DL), Max. 375Kbps (UL) NB1: Max. 32Kbps (DL), Max. 70Kbps (UL) EDGE: Max. 296Kbps (DL), Max. 236.8Kbps (UL) GPRS: Max. 107Kbps (DL), Max. 85.6Kbps (UL)
GNSS Specifications	
GNSS Chipset	Qualcomm Gen 8C GNSS receiver
GNSS System	GPS+Glonass+Galileo+Beidou
Receiver type:	33 tracking / 99 acquisitions- channel GNSS receiver

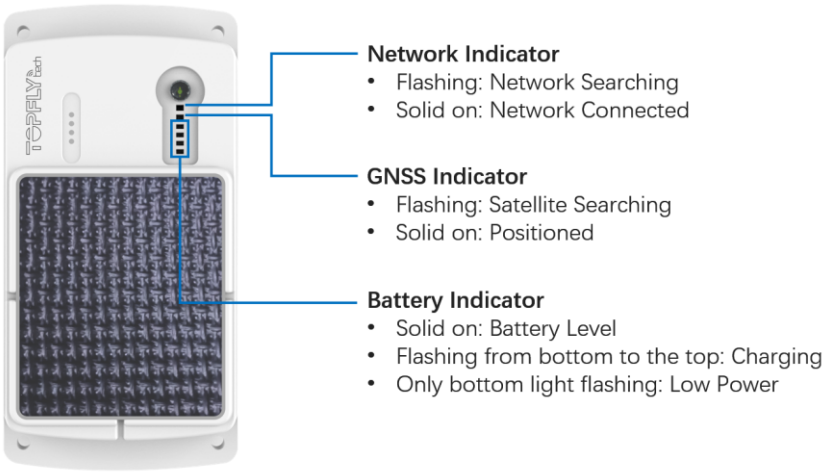
Sensitivity	Cold start: -149 dBm Tracking: -163 dBm
Position Accuracy in open sky (CEP-50)	< 2m
Standalone TTFF	Cold start: < 29s Warm start: < 27s Hot start: < 1s
Interfaces	
Charging and Data Transmission	4 Pin port with magnet
Network, GNSS Antenna	Internal only
Indicator LED	Network, GNSS and Battery level
FOTA	Yes
Physical Power Switch	1
Light Sensor	2 light sensors (front and back)
Temperature Sensor	1 temperature sensor
General Specifications	
Waterproof	IP67
Dimensions	69.3mm*143mm*24.8mm
Weight	225g
Battery	Rechargeable Li-Polymer 4800 mAh/ 3.7V
Standby Time (without considering solar charging 2 hours active tracking per day)	10 minutes reporting: 170 days 5 minutes reporting: 90 Days 1 minute reporting: 35 Days
Charging & Data Communication	Magnetic USB cable (recommend using 5V 1A adaptor, 10 hours charging)
Solar Panel	For charging the tracker battery
Operating Temperature	-20℃ ~ +60℃ (-4°F ~ 140°F)
Mounting	Magnet/Screw
Air Interface Protocol	
Transmit Protocol	TCP, UDP, MQTT, SMS
Data Security & Encryption Option	MD5/ AES256
Scheduled Timing/angle/distance Report	Report position and status at preset intervals
Geo-fence	Support up to 64 internal geo-fence regions
Alarms	Support up to 31 types of alarm (refer **7. Alarm Configuration**)

3. Standard Accessories Introduction

USB Cable

Screwdriver

4. LED indicator



Note: Indicator lights will go out automatically after the tracker turns on for 70 seconds without connecting to the external power via USB cable.

5. Installation Guide

5.1 SIM card pre-installation note

5.1.1 SIM card data service should be enabled.

5.1.2 If SIM card is locked via PIN, please unlock it first.

5.1.3 Ensure there is sufficient balance in the SIM card.

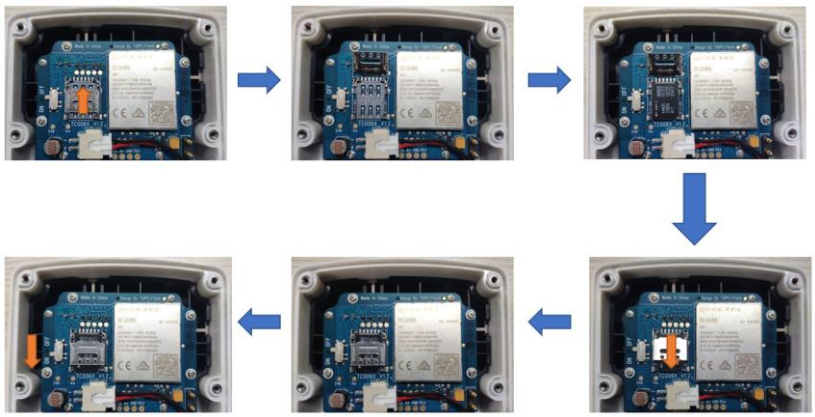
5.2 SIM card installation and tracker power switch

5.2.1 Open the tracker with the screwdriver.

5.2.2 Open the SIM card slot

5.2.3 Insert and fix the SIM card.

5.2.4 Turn the power switch to on position before using.



5.3 Installation

5.3.1 Away from emission source such as all kinds of sensors, burglar alarm and other communication devices.

5.3.2 If you want to use it for the pet/animal tracking, please contact TOPFLYtech for the corresponding belt or buy them locally.

6. Tracker Operation

6.1 Physical power on or off

6.1.1 Turn the power switch to on or off position.

6.1.2 Physical power off is recommended when the tracker is stored in the warehouse.

6.2 Motion operations

Device uses motion to detect different operations. Hold the tracker and keep the brand label side towards the sky. Use normal speed to turn it over 180°(the brand label side towards the ground) then recover. This can be called one-time standard turning. By repeating the standard turning different times, the tracker will execute different operations:

6.2.1 Check the battery status

(1) It only works when physical power switch at on position

(2) Repeat the standard turning 3 times

6.2.2 Check the GNSS and network status

(1) It only works when physical power switch at on position

(2) Repeat the standard turning 4 times

6.2.3 Send SOS alarm

(1) It only works when physical power switch at on position.

(2) Customer has to enable the alarm first (alarm_set,0000,3,1,0,0,#)

(3) Repeat the standard turning 5 times

(4) If customer wants to disable the alarm, command is (alarm_set,0000,3,0,0,0,#)

6.2.4 Quick set/cancel the geofence

(1) It only works when physical power switch at on position.

(2) Customer has to enable the function by command gfence_en first

(3) gfence_en,0000,a,b# (a=0, disable; a=1, enable; b=1~65535, unit is meter)

(4) Set geofence: repeat the standard turning for 6 times then the GNSS light will slowly flash at the beginning. Once the geofence is set successfully, the GNSS light will stay on without flashing then goes out shortly

(5) Cancel geofence: after the geofence is set, repeat the standard turning for 6 times. The tracker GNSS light will fast flash at the beginning. Once the geofence is cancelled successfully, the GNSS light will stay on without flashing then goes out shortly.

6.2.5 Motion controlled power on or off

(1) It only works when physical power switch at on position.

(2) Motion controlled power off: Repeat the standard turning 7 times. The tracker will power off. Customer can repeat other motion operation to verify.

(3) Repeat the standard turning 5 times

(4) Motion controlled power on: after power off, repeat the standard turning 7 times, then all the LED will be flashing. The tracker will power on.

6.3 The battery

6.3.1 Recommend connecting the device to a 5V 1A (cellphone) adaptor through magnet USB cable for 10 hours charging to make sure the battery is fully charged.

6.3.2 Customer also can connect the tracker to other USB connectors. But lower current output will cause longer charging time.

6.3.3 When the battery voltage value drops to 3.4V, usually a battery charging is needed to avoid unexpected shutdown due to low power. If the battery runs out completely, only when the battery is charged to 3.4V, the device will power on again.

6.4 Get Current Position

6.4.1 SMS Query (only when the device in working mode and registered on the network)
Device default PIN is 0000. Send a location inquiry SMS command (google,0000#) to the tracker. The location information will be sent back through SMS (the tracker SIM card must support receiving and sending SMS first).

6.4.2 Platform Query
Connect your tracker to the tracking platform then check the real-time position online. (Additional tracking service charge may happen. Contact with your service provider to get more details)

7. Alarm Configuration

7.1 Alarm sent through network

7.1.1 alarm_set,0000,a,b,0,0,#

7.1.2 0000 is device default PIN

7.1.3 a=alarm code, value from 1 to 31

Alarm Code	Description	Alarm Code	Description
1	Device removal (VS alarm 21)	17	Stop moving
2	Rear cover open (VS alarm 22)	18	Idle start (VS alarm 19)
3	SOS	19	Idle stop
4	Front light detected (VS alarm 23)	20	Power on (via function button)
5	Start falling (VS alarm 24)	21	Device mounted
6	Low battery (Vs alarm 7)	22	Rear cover close
7	Battery recover	23	Front light disappear
8	Device high temperature (VS alarm 25)	24	Stop falling
9	Vibration start (VS alarm 26)	25	Device high temperature disappear
10	Collision (VS alarm 27)	26	Vibration stop
11	Tilt start (VS alarm 28)	27	Collision stop
12	USB cable connected (VS alarm 13)	28	Tilt stop

13	USB cable disconnected	29	Power off (via function button)
14	Enter geofence (VS alarm 15)	30	Device low temperature (VS alarm 31)
15	Leave geofence	31	Device low temperature disappear
16	Start moving (VS alarm 17)		

7.1.4 b=enable or disable, value is 0 (disable) or 1 (enable)

7.2 Alarm sent through SMS

Alarm also can be sent through SMS. But the tracker SIM card must support SMS function first. Then it needs customer set manager cellphone number. Please refer the frequently used commands part to get further information. Related commands: managera, managerd, manager.

8. Quick Trouble Shooting

8.1 Unable to Connect to the Tracking Platform

8.1.1 Check the APN and IP settings.

8.1.2 Check the SIM card data service whether enabled.

8.1.3 Make sure there is no limitation or already added server IP to the SIM card IP white list when using a M2M SIM card.

8.1.4 Check the balance/data of the SIM card.

8.2 Tracker Shows Offline

8.2.1 Check the battery remaining power

8.2.2 Check if the device entered into network blind area.

8.2.3 Check the SIM card balance.

8.2.4 If the connection lost happens on the last several days of the month, check whether the network service is terminated by carrier because of exceeding the max data usage volume.

8.3 Unable to Locate

8.3.1 The device may shield by metallic things.

8.3.2 The device may enter into an area with no satellite signal coverage. (underground, building, etc)

8.4 Position Drift

In an area with poor GNSS signal (like the areas with lots of high buildings), position drift may happen. When the device moves to open area, the drift will no longer exist.

8.5 No Command Reply

8.5.1 Check the command format. Make sure it's correct.

8.5.2 The device may be in network blind area.

8.5.3 Ensure the SIM card is properly inserted.

9. Warranty and Stock

The device standard warranty period is 12 months starting from the date of purchasing. If the device will be stored for a long time, please connect it to the external power and recharge the internal battery (10 hours) every 3 months. It will be helpful to extend the internal battery life.

10. Frequently Used Commands

Commands are not case-sensitive and can be sent via mobile phone. The content is separated by comma and ends with #. When set successfully, the tracker will return OK and execute it. Otherwise there will be no message returned.

Function	Command Format
APN Setting	**APN,***Current PIN*,*APN Name*,*Username*,*Password*#
Server Setting	**IP,***Current PIN*,*Server Domain Name or IP*,*Port Number*#
Upload Interval Setting	**TIMER,***Current PIN*,*Upload Time(ACC on)*:*Upload Time(ACC off)*:*Angle Compensation*:*Distance Compensation*#
Heartbeat Setting	**HBT,***Current PIN*,*Heartbeat Interval*#
PIN Setting	**PASSWORD,***Current PIN*,*New PIN*#
Add Manager Phone Number	**MANAGERA,***Current PIN*,*Manager Code*:*Manager Phone Number*#
Delete Manager Phone Number	**MANAGERD,***Current PIN*,*Manager Code*#
List Manager Phone Number	**MANAGERL,***Current PIN*#
Google Map Search	**GOOGLE,***Current PIN*#
Forgot the PIN	**MYSELF#**

10.1 APN Setting

APN,*Current PIN,APN Name,Username,Password#*

APN Name:

Range: APN of service provider

Length Limit: 1~32

Username:

Range: Letters and Numerals

Length Limit: 0~32

Password:

Range: Letters and Numerals

Length Limit: 0~32

Note:

1) Tracker will return “SET APN OK” when received this command.
2) If there is no Username and Password, the SMS setting is:
   APN,Current PIN,APN Name,,#
3) If there is no APN PIN, the SMS setting is:
   APN,Current PIN,APN Name,Username,#

10.2 Server Setting

IP,*Current PIN,Server Domain Name or IP,Port Number#*

Server Domain Name or IP:

Range: Letters, Numerals and Symbols

Length Limit: 1~128

Port Number:

Range: Positive Integer

Length Limit: 0~65535

Note: Tracker will return “SET IP OK” when received this command.

10.3 Upload Interval Setting

TIMER,*Current PIN,Upload Time(ACC on):Upload Time(ACC off):Angle Compensation:Distance Compensation#*

Upload Time (ACC on):

Range: Positive Integer

Range Limit: 0, 3~65535 second

Default: 60

Upload Time (ACC off):

Range: Positive Integer

Range Limit: 0, 3~ 4294967295 second

Default: 240

Angle Compensation:

Range: Positive Integer

Range Limit: 0~90 degrees

Default: 30 degrees

Distance Compensation:

Range: Positive Integer

Range Limit: 0 ~ 65535 meters

Default: 0 meters

Note: Tracker will return “SET TIMER OK” when received this command.

10.4 Heartbeat Setting

HBT,*Current PIN,Heartbeat Interval#*

Heartbeat Interval:

Range: Positive Integer

Range Limit: 1 ~ 255 minutes

Default: 30 minutes

Note: Tracker will return “SET HBT OK” when received this command.

10.5 PIN Setting

PASSWORD,*Current PIN,New PIN#*

PIN:

Range: Letters and Numerals

Length Limit: 1 ~ 10

Default: 0000

Note: Tracker will return “SET PASSWORD OK” when received this command.

10.6 Add Manager Phone Number

MANAGERA,*Current PIN,Manager Code:Manager Phone Number#*

Manager Code:

Range: Positive Integer

Range limit: 1~4

Manager Phone Number:

Range: Phone number

Length Limit: 0~40

Default: <Null>

Note:

1) Tracker will return “SET MANAGERA OK” when received this command.
2) The max manager number is 4

10.7 Delete Manager Phone Number

MANAGERD,*Current PIN,Manager Code#*

Manager Code:

Range: Positive Integer

Range limit: 1~4

Note: Tracker will return “SET MANAGERD OK” when received this command.

10.8 List Manager Phone Number

MANAGERL,*Current PIN#*

Note:

1) Tracker will return “SET MANAGERL OK” when received this command.
2) All the manager phone numbers will be listed.

10.9 Google Map Search

GOOGLE,*Current PIN#*

Note: Tracker will return below message when received this command.

http://maps.google.com/maps?q=<Latitude>, <Longitude>

10.10 Forgot the PIN

MYSELF#

Note:

1) If the manager phone number has been set, only the manager can use “MYSELF#”. If no manager setting, the tracker will return the IMEI and current PIN when it received “MYSELF#” from any mobile phone.
2) This command can be used to retrieve password.

11. Optional Accessories List

Product Sku	Description	Photo for Reference
TA39	Magnet Set (4 units)	

12. FCC Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver

is connected.
—Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation

Caution!
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

IMPORTANT NOTICE:
FCC Radiation Exposure Statement
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

