User Manual

SOLAR-POWERED ASSET TRACKER

TLP2-SFB

LTE Cat-M1 (eMTC)/Cat-NB1 (NB-IoT) asset tracking devices for wide ranging applications

precisemrm.com

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Contents

Introduction

The TLP2-SFB is a solar-powered asset tracking device that uses GNSS & LTE technologies to collect device coordinates and transfer them via LTE network to the PreCise cloud-based datacenter. It provides cost-effective, efficient, and secure tracking of your assets. It has been widely used in commercial transportation, vehicle fleet management, intelligent transportation, logistics, and car rentals.

Attention

Prior to installing the TLP2-SFB, read this user manual carefully, and familiarize yourself with the installation instructions, theory of operation, and system specifications and components. Before using this device, you should fully understand the usage scenarios and installation environment. PreCise will not be responsible for any loss caused by using the device incorrectly.

Warnings and Cautions

Read and follow all safety rules and instructions before installing or operating this equipment.

- Never operate a vehicle within a closed area. Always ensure proper ventilation before starting the engine.
- Always use eye protection. Use goggles that are ANSI approved against impacts and shattering.
- Do not damage pipes or wiring when drilling holes. When drilling holes in the chassis for installation, take precautions so as not to contact, damage, or obstruct pipes, fuel lines, tanks, or electrical wiring. Failure to take such precautions may result in fire.
- To avoid property damage, personal injury, or death, park the vehicle on a flat level surface, set the parking brake, turn the engine off, and chock the wheels before beginning installation.

General

- TLP2-SFB devices obtain power through sunlight to extend their battery life.
- Ensure the device is installed in a location where it is exposed to direct sunlight as much as possible. This is essential to extending the battery life while in ‘power on’ mode.
- Prior to shipment, PreCise fully charges all devices and activates ‘hibernate’ mode. If you plan to store the device for six months or more before installation, it may need to be recharged prior to installation (see the Troubleshooting Power Issues section below for more information). If you plan to store the device longer than three months while it is in ‘power on’ mode, be sure to charge it with a USB C cable for 20 hours once every three months or contact PreCise Support to activate ‘hibernate’ mode.
- The default report settings include movement start, movement stop, every six hours when the device is not moving (ignition/motion off), and every two minutes when the device is moving (ignition/motion on). To customize reporting frequency, contact PreCise Support.

Equipment Power Consumption & Solar Panel Charging Current

The TLP2-SFB's power consumption is around 50mAh when the device is in 'power on' mode without sleep. The typical charging rate of the solar panel under direct sunlight at noon (in summer) is about 250mAh (different sunlight illumination will result in a different charging current).

Intelligent Power Management

To extend the battery life, the TLP2-SFB has an intelligent power management algorithm. This algorithm allows the tracker to work under a lower reporting rate when the battery is low. Once the battery is recharged, the tracker will report normally. This function is enabled by default. The following is the working logic:

- When the battery voltage value is ≤3.5V, the tracker will send a position message every 24 hours regardless of ignition (motion) status (on or off). The device removal alarm (event) message will not be affected and will be sent out immediately.
- When the battery is recharged to 3.6V, the device will report at its default power on settings.

Battery Protection

To prevent the battery from overcharging, there is a charging threshold. When the battery voltage is ≤3.95V, the battery charging will only start once the sunlight condition is met, or the tracker is connected to external power through a USB C cable. The charging will stop when the battery voltage reaches 4.05V, the sunlight condition is not met, or it is disconnected from the external power—whichever criteria is met first.

Product Specifications

The following tables include the specifications for the TLP2-SFB Asset GPS Tracker.

General Specifications

Item	Specification
Waterproof	IP67
Dimensions	3.35" L 7.28" H 1.22" D (85mm 185mm 31mm)
Weight	370g (13 oz)
Battery	Rechargeable Li-polymer 9600 mAh/ 3.6V
Standby Time (without solar charging,	10 min reporting: 320 days
Charging & Data Communication	USB C cable (5V 1A adaptor recommended, 20 hrs charging)
Operating Temperature	-25°C ~ +80°C (-13°F ~ 176°F)
Mounting	Magnet/Screw/Zip tie

Network Specifications

Item	Specification
Operating Band	FDD: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B28 TDD: B39 (Cat M1 only) EGPRS: 850/900/1800/1900MHz
Data Transmission	eMTC: Max. 300Kbps (DL), Max. 375Kbps (UL)

GNSS Specifications

Item	Specification
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
Position Accuracy in Open Sky	Tracking: -163 dBm
Standalone TTFF	< 2m

Interfaces

Interface	Specification
Charging and Data Transmission	USB C
Network, GNSS Antenna	Internal only
Indicator LED	Network, GNSS and Battery
FOTA	Yes
Physical Power Switch	1 back light sensor
Temperature Sensor	1 temperature sensor
BLE 5.0	Yes

Air Interface Protocol

Protocol	Specification
Transmit Protocol	TCP, UDP, MQTT, SMS
Data Security & Encryption Option	MDS / AES128
BLE Accessory Support	Yes
Scheduled Timing/angle/distance Report	Report position and status at preset intervals
Geo-fence	Up to 64 internal geo-fence regions
Alarms	Up to 31 types of alarms

Standard Accessories Introduction

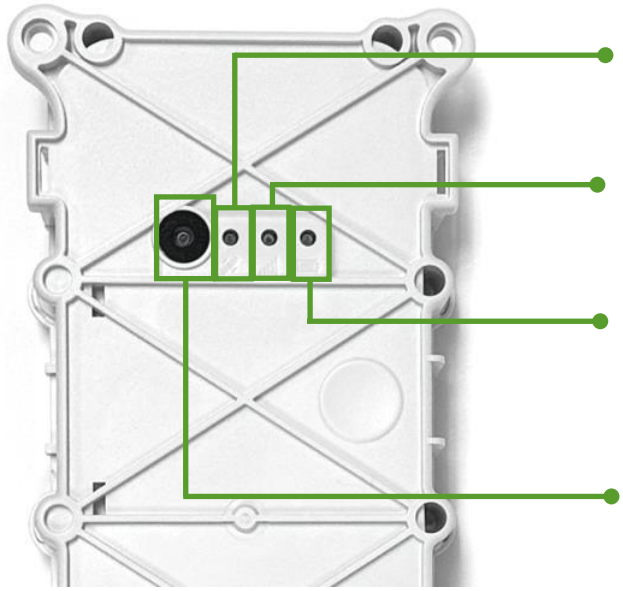
The most used accessory for the TLP2-SFB is a USB C cable, as pictured below.

USB C

USB input

LED Indicators

The following image demonstrates where the LED indicator lights are located on the TLP2-SFB Asset GPS Tracker, and details what each indicator means.



Back of device and indicators

GNSS Indicator

- Flashing: Satellite Search
- Solid on: Positioned

Network Indicator

- Flashing: Network Searching
- Solid on: Network Selected

Battery Level Indicator

- Solid on: ≥90%
- 1s on and 1s off: 10%≤battery<90%
- .5s on and .5s off: <10%

Light Sensor

- Allows for device removal alert

Installation Instructions

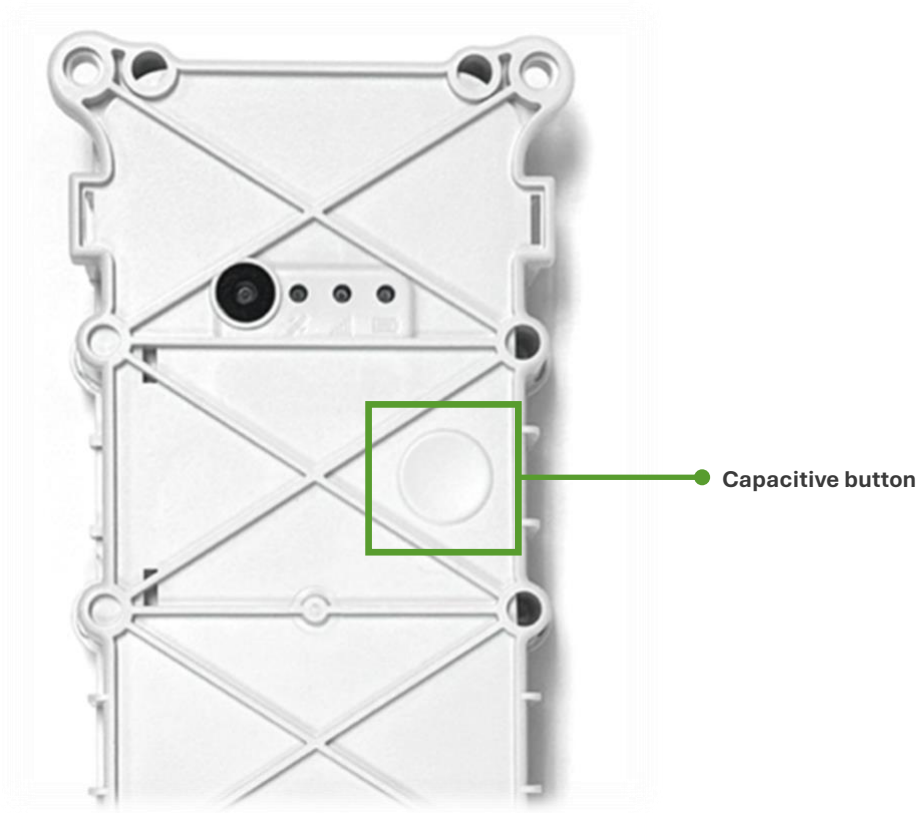
Once familiarized with your TLP2-SFB Asset GPS Tracker and how it functions, you are ready to install your device.

Activating ‘Power On’ Mode

Before mounting the device, activate ‘Power on’ mode. The instructions for powering the device on are as follows:

- Locate the raised capacitive button on the back of the device (indicated in the image below).
- With your finger, put pressure on the raised capacitive button (similar to a touchscreen) for about 10 seconds.
- The LEDs will initially turn on when the device is successfully powered on. After a few seconds, they will turn off. This is normal and indicates the device is functioning correctly.

If your device does not power on, please see the Trouble Shooting Power Issues section.



Back of device

Mounting Instructions

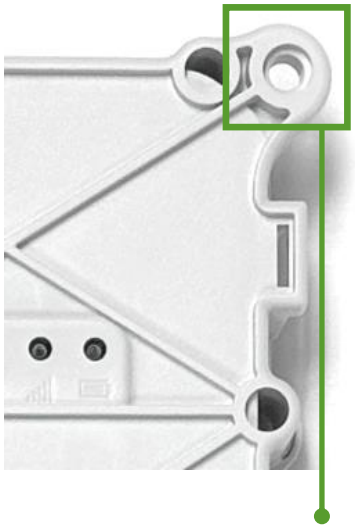
Selecting a good mounting location is important for proper device functions. You should consider the following points when selecting a mounting location:

- Ensure the position is away from emissions sources, such as sensors, burglar alarms, and other communication devices.
- Ensure the device is mounted where it will have direct exposure to the sunlight.

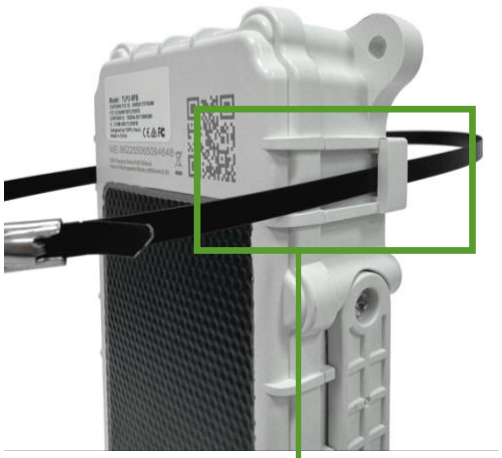
Once you have located an ideal mounting location for your device, you can use one of the following mounting methods to secure it:

- Using four Phillips-head screws, mount your device onto a safe location away from any moving parts.
- Using two or four metal zip ties, run the tail of the zip tie through the slots on the side of the device. Wrap each zip tie around a secure location on the asset and tighten it fully.
- Attach four magnets to each corner mounting location on the device. Then, secure your device onto a metal location on your asset.

Optimal mounting methods and positions vary depending on the asset the tracker will be mounted to.



Place Phillips-head screw through each device hole.



Run metal zip tie through the device slot.

Attach Magnets to each corner.

Troubleshooting Power Issues

If the device LEDs do not turn on, or if the device sits unused for more than six months, the capacitive button may no longer work. In this scenario, use the following steps to power your device on:

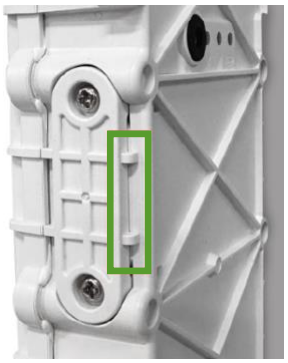
- On the side of the device, remove the SIM card cover screws with a Phillips screwdriver.
- Connect to a USB C and charge for 24 hours.
- Replace the cover, ensuring that the red rubber gasket is fully seated and the screws are fully tightened to prevent water from leaking into the device.

Side of device

Phillips screws

SIM card cover

SIM card cover off



SIM card cover notches

Gasket located inside SIM card cover

Tracker Operation

Follow the instructions outlined for each section below to properly operate your device.

Battery

- The device's battery will be fully charged when you receive it. If you store the device for an extended period, be sure to connect it to external power and recharge the internal battery for 20 hours every six months. This will help extend the internal battery life.
- When the battery voltage value drops to 3.5V, the device needs to be charged to avoid unexpected shutdown due to low power. If the battery runs out completely, keep the tracker charging for 24 hours. The device will only power on once the battery is charged to 3.5V.

Warranty

The standard warranty period for the TLP2-SFB Asset GPS Tracker is 12 months from the purchase date.

FCC Warning

This equipment has been assessed 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 a 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 tuning 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.

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 a minimum distance of 20 cm (about 7.87 in) between the radiator and your body.

ISEDC Warning

This device complies with Innovation, Science, and Econiomic Development Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

The device is compliant with RF exposure guidelines, users can obtain Canadian information on RF exposure and compliance. The minimum distance from user's body to use the device is 20 cm (about 7.87 in).