# VL101G

Dual band & INS high-precision

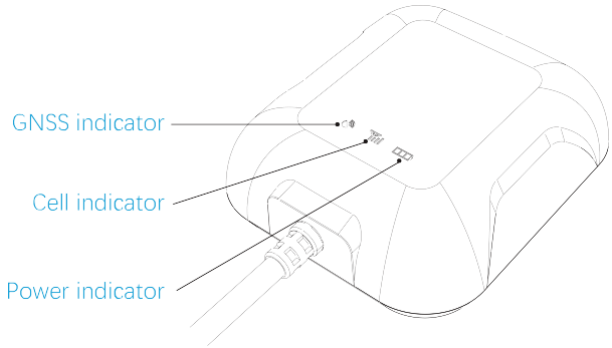
LTE GNSS Terminal

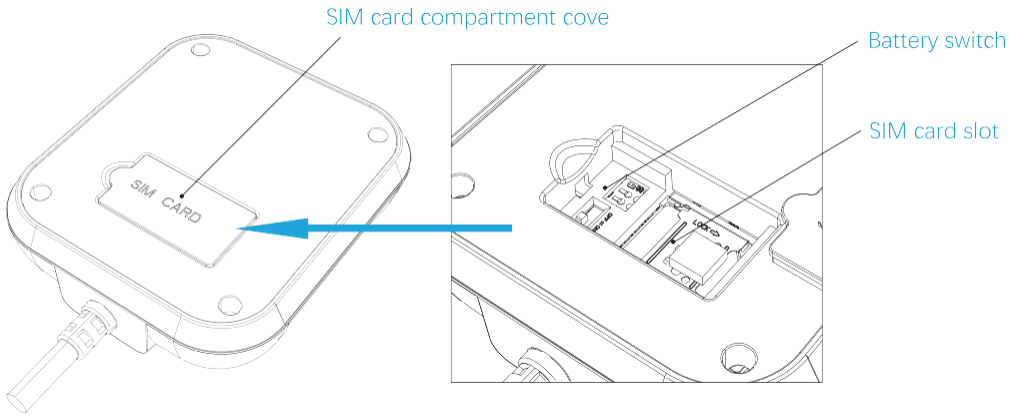
USER MANUAL

*V1.0*

# Product overview

1. GNSS indicator
2. Cell indicator
3. Power indicator
4. SIM card compartment cover
5. Battery switch
6. SIM card slot




# Function

- Dual-band high-precision GNSS positioning
- INS(Inertial Navigation System,INS can be used as a fallback in weak or unavailable GPS signal area, e.g. underpass,tunnel,downtown)
- Driving behavior analysis (4 types)
  - Harsh accelera**?**on alert
  - Harsh brake alert
  - Sharp turn alert
  - Crash alert
- Serial port

  Can provide high-precision positioning data for external devices
- Vehicle ignition detection
- Remote control to cut off oil or electricity
- Multi-geofence alert
- Mileage statistics
- Speed Alarm

# Standard Parts List

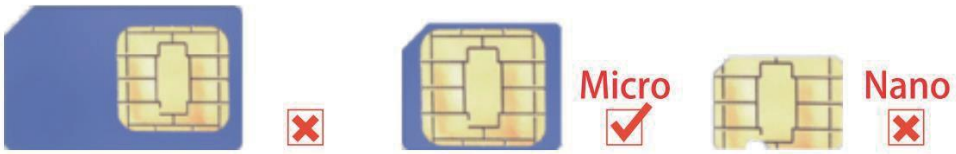
| Item | Quantity |
|---|---|
| VL101G | 1 |
| Power cable | 1 |
| 3M Adhesive sticker | 1 |

# Specification

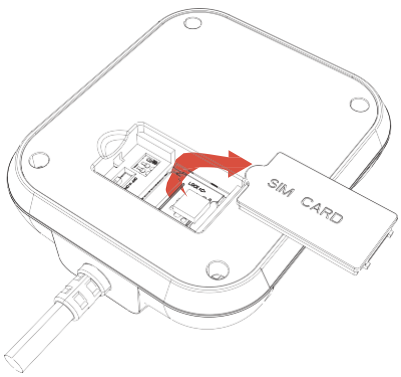
| | |
|---|---|
| Network | 4G & 2G |
| Frequency | VL101G(E)<br>LTE-FDD: B1/B3/B7/B8/B20/B28<br>LTE-TDD: B34/B38/B39/B40/B41 GSM: B2/B3/B5/B8<br>VL101G(L):<br>LTE-FDD: B1/B2/B3/B4/B5/B7/B8/B28<br>GSM: B2/B3/B5/B8<br>VL101G(NA):<br>LTE-FDD: B2/B4/B5/B7/B12/B14/B |
| Positioning system | Dual-band ,GPS/BDS/GLONASS/Galileo+INS |
| Location accuracy | <1.5 meters CEP (Open sky) |
| Relay | Optional |
| TTFF (open sky) | Avg. hot start≤1sec; Avg. cold start≤24sec |
| Indication | GPS (Blue), Cellular (Green), Power (Red) |
| Battery | 450 mAh, 3.7V Li-Polymer battery |
| Operating voltage | 9-30VDC |
| Operating temperature | 0-45°C for charging，-20°C to+70°C for discharging |
| Device weight | 111 g |
| Device dimension | 79 mm*69 mm*23 mm |

# Product Setup

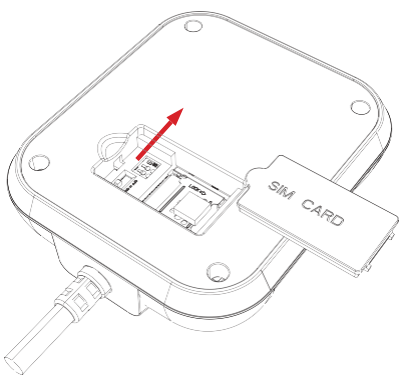
1. Prepare a micro-SIM card that supports the same network with this device.




2. Remove the SIM card compartment cover and then open the SIM card holder cover




3. Insert SIM card into the slot and toggle the switch to ON.




4. Lock the SIM card holder cover and secure the SIM card compartment cover.

# LED Indication

## Power Status (Red)

| | |
|---|---|
| On for 0.3s and off for 0.3s | Low power |
| On for 1s and off for 3s | Fully charged |
| On for 0.1s and off for 3s | Working normally |
| Solid on | Charging (Higher priority than the status of low power) |
| Off | Battery is exhausted/Internal failure |

## GNSS Status (Blue)

| | |
|---|---|
| On for 0.3s and off for 0.3s | Searching GNSS signal |
| Solid on | Positioned |
| Off | GNSS module is in sleep mode or not working |

## Cellular Status (Green)

| | |
|---|---|
| On for 0.3s and off for 0.3s | Network initializing |
| On for 1s and off for 3s | Receiving signal normally |
| On for 0.1s and off for 3s | Network connected |
| Solid on | Calling |
| Off | No signal received/No SIM card detected |

## Power supply Status (Red, Blue, Green)

| | |
|---|---|
| Red, Blue and Green on for 3s | Connected/disconnected power supply |

# Interfaces

| Interface | Color | Description |
|---|---|---|
| **V+** | Red | Power + (9-30V) |
| **V-** | Black | Power - Ground pin |
| **ACC** | Orange | Vehicle ignition detection |
| **Relay** | Yellow | Cut-off vehicle fuel supply |
| **TTL RX** | Blue | Data RX |
| **TTL TX** | Green | Data TX |

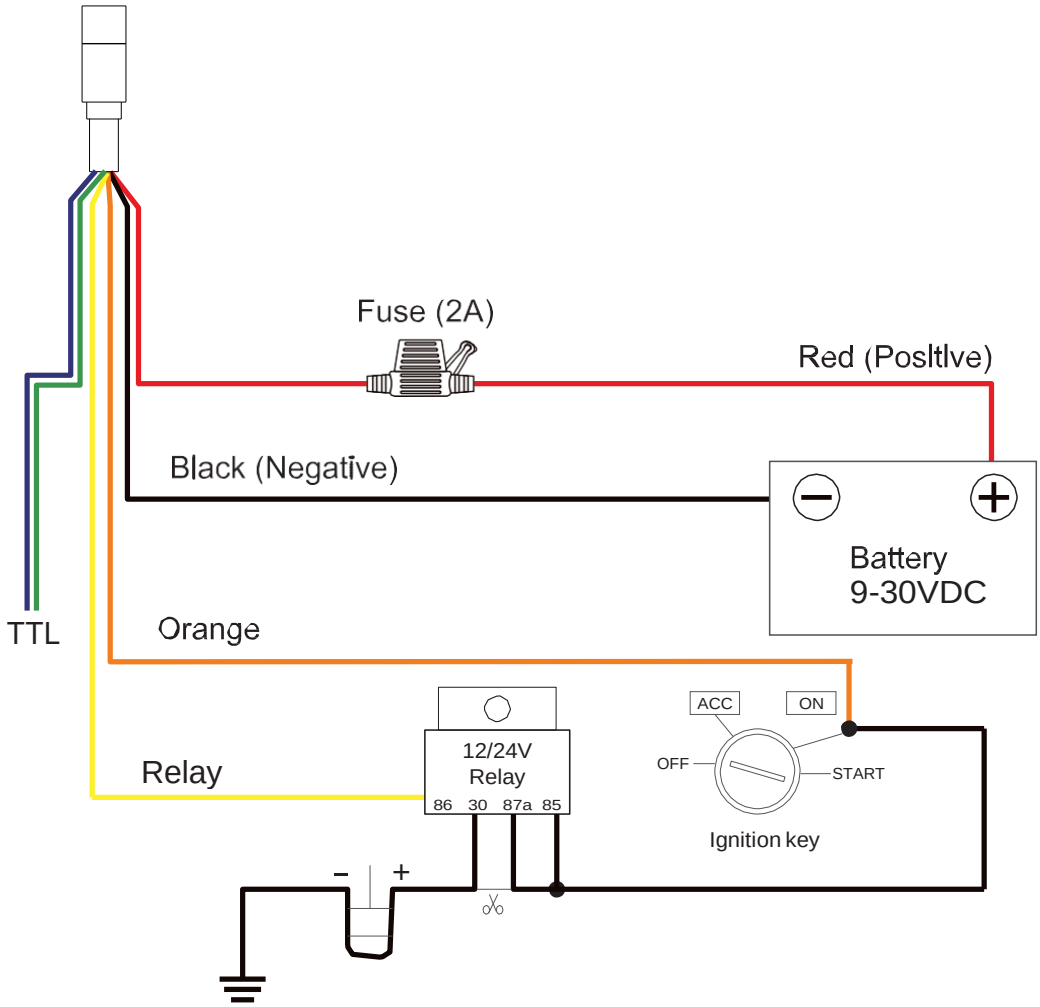
# Wiring of Standard Version

Tips for finding right wires:

Use multimeter to find out the positive and negative sides of vehicle battery.
Note: No matter the ignition key is switched to ON or OFF, current battery voltage can be shown in the multimeter.

The way to find ACC wire: Connect multimeter's black probe to negative side, and connect red probe to a random wire, at this moment, the voltage shown in multimeter is 0V; turn the key to ON, if the supply voltage is shown, that's the correct ACC wire.

Connect the two connectors together, if the vehicle has no connector, please connect device's wires to corresponding vehicle wires.




## Power connection

The standard power supply ranges from 9V to 30VDC.

During installation, negative side should connect to the ground.

Do not connect with other ground wires simultaneously.

## Ignition wire

ACC line(orange) connects to vehicle's ACC, detecting ignition.

Be sure to check if it's a real ignition wire i.e. power does not disappear after starting the engine.

## Relay wiring

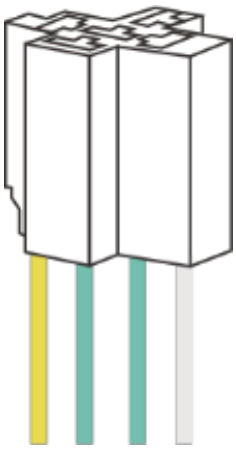
Relay's white line connects to the positive side of battery(12V)

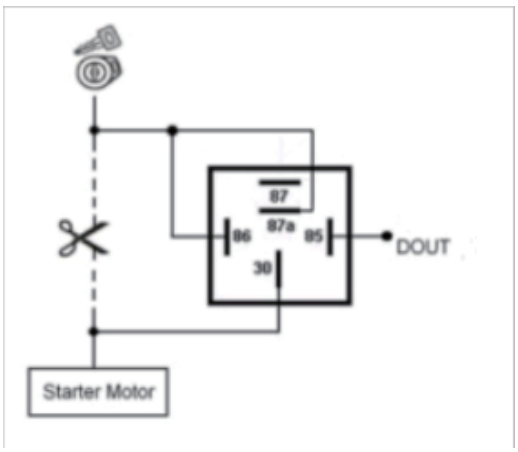
while the yellow line connects to the device's relay control

(yellow line on power cord).

Find the fuel pump of the vehicle and cutoff its positive power line.

The positive side of fuel pump connects to the green line(87a) while the side closing to starter motor connects to green line(30), as the below chart. Switch of the two green lines have the same effect.





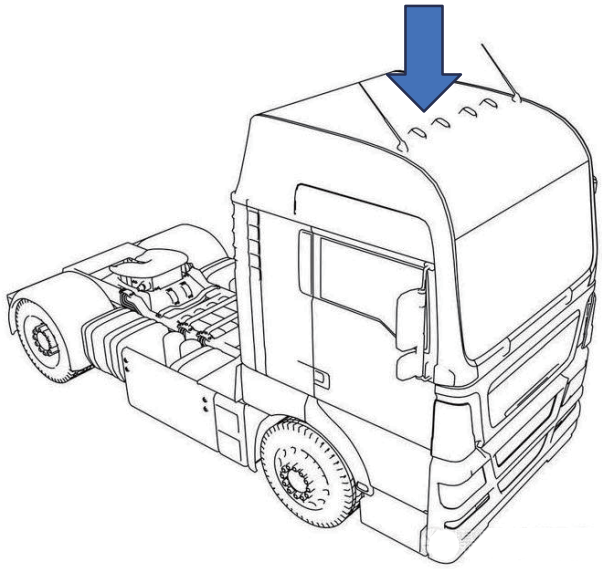

12V relay is standard. The device is suitable for vehicles with 12V supply. If the vehicle power supply is 24V, use 24V relay.

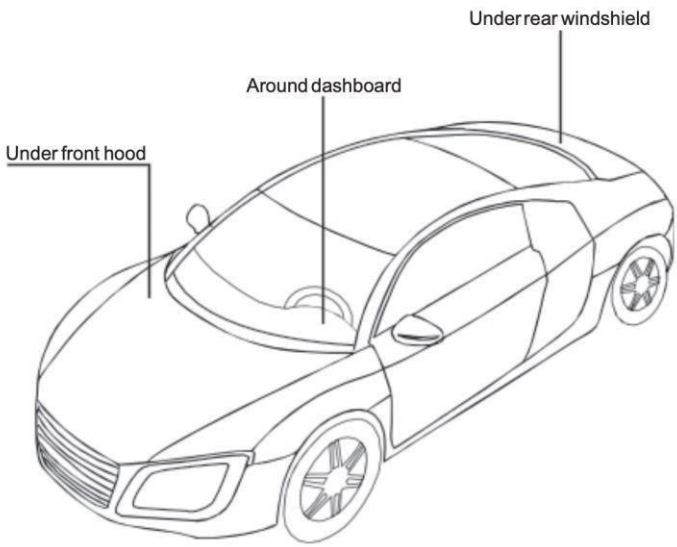
## Installation recommendation

Please install the device under the guidance of professional personnel.

**Note: ( The device should be fixed on the vehicle stably, it's very important!)**

1. The device should face up to sky.
2. Metal thermal barrier or heating layer, which are always installed on windshield, may affect the signal, please avoid installing the device under these objects.
3. The GNSS tracker is equipped with the inertial navigation system (INS) , which can be used as a short-term fallback while GNSS signals are unavailable, for example when a vehicle passes through a tunnel. To ensure GNSS & INS tracking , driver behavior monitoring and to avoid GPS drift, please fix the device with the Velcro provided!
4. It is best to install the equipment on the exterior roof of the vehicle for better positioning accuracy:






# Platform & APP

1. Login service platform
   Please login the designated service platform to set and operate the device.
2. Download APP
   Please download and install the APP in designated website, APP store or Google Play store.

# Commands

| Command | Description | Example |
| --- | --- | --- |
| STATUS | Check the statuses. | STATUS#<br>Battery:3.85V,NORMAL; GPRS:Link Up GSM Signal Level:Low; GPS:OFF; ACC:OFF; Defense:ON; |
| CHECK | Enable self-check. | CHECK#<br>IMEI:;<br>VERSION:ET310_TEST_V01_20200520_1425;<br>SERVER:1,test.topstargps.com,11139;<br>BSERVER:0,0.0.0.0,0;<br>GET IP:120.234.211.126;<br>APN:CMnet,,;<br>CSQ: [4G]13;<br>GPRS:1;<br>GPS:OFF;<br>BDS:OFF;<br>BAT:3.79;<br>POWER:0.00;<br>TIMER:10,10;<br>SOS NUM:,,;<br>CENTER:,,;<br>CELL:NB-Iot,searching(1);<br>IMSI:460044335609859;<br>ICCID:898604231919C2690159;<br>EURL:http://maps.google.com/maps?q=; |
| WHERE | Query the latitude and longitude of the device. | WHERE#<br>The device is already networked and fixed a position: Current position! Lat:N23.111507,Lon:E114.409004,Course:255.68, Speed:O.OOKm/h,DateTime:2020-05-22 10:28:04<br>The device is not networked but already fixed a position: Current position! Lat:N23.111507,Lon:E114.409004,Course:255. 68,Speed:O.O0Km/h,DateTime:2020-05-22 10:56:46<br>The device is neither networked nor fixed a position: NO DATA! |

| | | |
|---|---|---|
| URL | Request for a location link. | URL#<br>The device is already networked and fixed a position: <05--22 10:53><br>http://maps.google.com/maps?q=N23.11 1712,E114.409264<br>The device is not networked but already fixed a position: <05- -2210:53><br>http://maps.google.com/maps?q=N23.11 1712,E114.409264<br>The device is neither networked nor fixed a position: NO DATA! |
| FACTORY | Restore the device to factory settings (for customer).<br>Restore all command parameters except domain name, APN, locked domain name, and ACC status to factory defaults. | FACTORY#<br>FACTORY set OK! The terminal will restart after 30s! |
| RESET | The device restarts 20 seconds later after receiving this command. | RESET#<br>The terminal will restart after 20 seconds! |
| PASSWORD | Modify the command password. | PASSWORD,666666,888888#<br>PASSWORD set OK! |
| GPSON | Enable the BeiDou module of the device. | GPSON#<br>GPSON set OK<br>GPSON,10#<br>GPSON set OK! GPS work:IO min |
| ICCID# | Query the ICCID by roll call. | ICCID#<br>ICCID:898604231919C2690159 |
| IMSI | Request for the IMSI of the SIM card of the device. | IMSI#<br>IMSI:460044335609859 |

| | | |
|---|---|---|
| APN | APN Settings | APN,CMnet#<br>APN set OK! for the newly-set APN to take effect, the device will reboot after 10s.<br>APN#<br>Currently use APN:CMnet,,<br>APN Auto set:OFF |
| ASETAPN | Whether to enable APN self-adaptation. | ASETAPN,OFF#<br>ASETAPN set OK!<br>ASETAPN#<br>ASETAPN:ON<br>Currently use APN:CMnet,, |
| GMT | Set the time zone. | GMT,E,8,15#<br>GMT set OK!<br>GMT#<br>GMT:E,8,0 (AUTO) |
| ASETGMT | Set whether to enable time zone adaptation and check the setting. | ASETGMT,ON#<br>ASETGMT set OK!<br>ASETGMT#<br>ASETGMT: ON; Current Timezone(GMT):E, 8,0 |
| SERVER | Set the parameters of the monitoring server and check the setting. | SERVER,0,120.234.211.126,11139#<br>SERVER set OK!<br>SERVER#<br>SERVER, 1,gpsdev.jimicloud.com,21102 |
| GPRSON | Whether to enable GPRS. | GPRSON,1#<br>GPRSON set OK!<br>GPRSON#<br>GPRSON:I(l=ON, O=OFF) |
| TIMER | Set the time interval to upload BDS-based data and check the setting. | TIMER,10,60#<br>TIMER set OK!<br>TIMER#<br>TIMER:(OFF)l0 ,10 If the device runs in fixed-distance upload mode, the data packet will carry the (OFF) information. |

| | | |
|---|---|---|
| GPSDUP | Set whether to upload location data and check the setting. | GPSDUP,OFF#<br>GPSDUP set OK!<br>GPSDUP#<br>GPSDUP:OFF |
| SF | Set the parameters of the static data filter feature and check the setting. | SF,ON,200#<br>SF set OK!<br>SF#<br>SF:OFF,1000 |
| MILEAGE | Mileage statistics | MILEAGE,ON,8888#<br>MILEAGE set OK!<br>MILEAGE#<br>MILEAGE:OFF, Total Mileage:Okm,K:lOOO |
| SENDS | Set the time and condition for the sensor to activate the BOS module and check the setting. | |
| ACC | Set the ACC detection method. | |
| Relay | Set the fuel and power control parameters. | RELAY,1#<br>Cut off the fuel supply: Success!<br>RELAY#<br>RELAY:O |
| 111 | Manually enable defense via SMS. | 111#<br>Succeeded to remotely enable the defense. |
| 000 | Manually disable defense via SMS. | 000#<br>succeeded to remotely disable the defense. |
| ACCALM | Set whether to enable ACC alert and check the setting. | ACCALM,ON,0,10,1#<br>ACCALM set OK!<br>ACCALM#<br>ACCALM: OFF,1,10,0 |

| | | |
|---|---|---|
| LEVEL | Set the sensitivity level of the SENSOR. | LEVEL,1#<br>LEVEL set OK!<br>LEVEL#<br>LEVEL:2 |
| STATICREP | Whether to enable last location report when SENSOR detects stillness. | STATICREP,ON, 30,30,10#<br>STATICREP set OK!<br>STATICREP#<br>STATICREP:ON,20, 6,3 |
| BATALM | Low internal battery alert | BATALM,ON,0#<br>BATALM set OK!<br>BATALM#<br>BATALM: ON, 0 |
| EXBATALM | Set the parameters of the low external power alert. | EXBATALM,ON,0, 128,138,20#<br>EXBATALM set OK!<br>EXBATALM#<br>EXBATALM:OFF,0,128,138,10 |
| EXBATCUT | Set the parameters for the low voltage protection reminder of the external power source. | EXBATCUT,ON,0, 115,125,20#<br>EXBATCUT set OK!<br>EXBATCUT#<br>EXBATCUT:OFF, 0,115,120,10 |
| MOVING | Set the parameters of the vehicle towing alert. | MOVING,ON,500,0#<br>MOVING set OK!<br>MOVING#<br>MOVING:OFF, 0,300 |
| SPEED | Set the parameters of the speed alert. | SPEED,O,ON,20,5#<br>SPEED set OK!<br>SPEED#<br>SPEED:OFF,0,20,50 |
| GFENCE | Set the parameters of the multi-geofence alert. | GFENCE,I,ON,O,N22.277120,E113.516763,5,IN,1#<br>GFENCE set OK!<br>GFENCE,1,0N,1,N22.277120,E113.516763,N22.377120,E11 |

| | | |
|---|---|---|
| | | 3.416763,IN,1#<br>GFENCE set OK!<br>GFENCE#<br>fence1:0N,fence2:0FF,fence3:0FF,fence4:0FF,<br>fence5:0FF |
| SPEEDCHECK | Set the parameters of the abrupt speed change alert. | SPEEDCHECK,ON,0,5,50,50#<br>SPEEDCHECK set OK!<br>SPEEDCHECK#<br>SPEEDCHECK:OFF,0,4,30,50 |
| SWERVE | Set the parameters of the sharp cornering alert. | SWERVE,ON,0,60,50,5#<br>SWERVE set OK!<br>SWERVE#<br>SWERVE:OFF,0,30,60,3 |
| PERMIT | Set permissions scheme for numbers. | PERMIT,0#<br>PERMIT set OK!<br>PERMIT#<br>PERMIT:O |
| SOSPERMIT | Set permissions of SOS numbers on querying and setting parameters. | SOSPERMIT,0,1#<br>SOSPERMIT set OK!<br>SOSPERMIT#<br>SOSPERMIT: 0,1 |
| SOS | SOS settings | SOS,A,5656565,8988,13672436152#<br>SOS set OK!<br>SOS1:5656565 SOS2:8988 SOS3:13672436152<br>SOS,D,13672436152#<br>SOS set OK!<br>SOS1:5656565 SOS2:8988 SOS3:<br>SOS,D,1#<br>SOS set OK!<br>SOSl: SOS2:8988 SOS3:<br>SOS# |

| | | |
|---|---|---|
| | | SOS1:123 SOS2: SOS3: |
| CENTER | Set the center number. | CENTER,A,13672436152#<br>CENTER set OK!<br>Center Number:13672436152<br>CENTER,D#<br>CENTER set OK!<br>Center Number:<br>CENTER#<br>CENTER: 13672436152 |
| PWDSW | Set whether to enable the command password feature and check the setting. | PWDSW,ON#<br>PWDSW set OK!<br>PWDSW#<br>PWDSW:OFF |
| SMSTC | Set the SMS transparent transmission server. | SMSTC,0#<br>SMSTC set OK!<br>SMSTC#<br>SMSTC:O(l=ON, O=OFF) |
| FW | Forward via SMS. | FW, 13794562921,5201314#<br>The number 13794562921 receives: 5201314 |
| FLYCUT | Set whether to enable the device to enter airplane mode when the low voltage protection alert is triggered. | FLYCUT,ON#<br>FLYCUT set OK!<br>FLYCUT#<br>FLYCUT:OFF |

# Troubleshooting

| Type | Use |
| --- | --- |
| Unable to connect to tracking platform | Check the APN and IP settings.<br>Check whether the data service of SIM card is enabled.<br>Check the balance of SIM card. |
| Tracker shows offline | Check whether external power is still connected.<br>Check if the vehicle entered network blind area.<br>Check the balance of SIM card. |
| Unable to locate | Make sure the top side facing upward without metallic things shielded.<br>Make sure it's not in area with no satellite coverage. |
| Location drift | In area with poor GNSS signal (tall building around or basement), drifting may happen.<br>Check whether vibration happens around to trigger the accelerator.<br>Please check if the device is securely installed, as sliding may cause positioning drift. |
| No command reply | Make sure command format is correct.<br>Vehicle may be in network blind area.<br>Make sure SIM card is well inserted and has SMS service. |

# Warranty instructions

1. The warranty is valid only when the warranty card is properly completed, and upon presentation of the proof of purchase consisting of original invoice indicating the date of purchase, model and serial No.of the product. We reserve the right to refuse warranty if this information has been removed or changed after the original purchase of the product from the dealer.
2. Our obligations are limited to repair of the defect or replacement the defective part or at its discretion replacement of the product itself.
3. Warranty repairs must be carried out by our Authorized Service Centre. Warranty cover will be void, even if a repair has been attempted by any unauthorized service centre.
4. Repair or replacement under the terms of this warranty does not provide right to extension or renewal of the warranty period.
5. The warranty is not applicable to cases other than defects in material, design and workmanship.

# Maintenance Record

| | |
|---|---|
| **Date：** | |
| **Service by：** | |
| **Product Model：** | |
| | |
| **IMEI Number：** | |
| **Failure Description：** | |
| | |

**Comments：**

**FCC Compliance Statements**

**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: Changes or modifications not expressly approved by the party responsible for compliance could void the user’ s authority to operate the equipment.**

**Note: 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.**

**RF Exposure Compliance**

**This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.**
**This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.**