

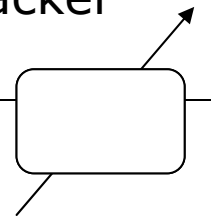
Version Number	Modified by	Change Content Type	Date
V1.0	Amy	create	2014.06.23

GPS Multi-function Tracker User Manual

# GPS Multi-function Vehicle Positioning Tracker

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User manual



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## 1. Products overview

Thanks for purchasing our products!

Tracker is a GPS/ GPRS based tracking device designed for heavy motorbike, intercity bus, school bus and fleet management.

It has built-in terminals of GPS module and GSM communication module, which are used for getting the location data and send it to authorized phone number via SMS, and tracking through free maps Google Earth or Google Map; at the same time, the GPRS data can be sent to the internet server, which can realize the checking, monitoring and managing of the device on computer.

### Tracker has the following features and functions:

- ◆Collision alarm
- ◆3G accelerometer
- ◆Tracking regularly
- ◆Geo-fence alarm
- ◆Over speed alarm
- ◆Low battery alarm
- ◆SOS emergency calling
- ◆Low battery alarm
- ◆No GPS signal alarm
- ◆Build in 1GB memory IC
- ◆Internal battery 750mAh
- ◆Tracking by distance
- ◆Build in 8MB flash memory
- ◆GPS antenna cut off alarm
- ◆External power cut off alarm
- ◆Fuel/engine cut off remotely
- ◆Camera for taking photograph (optional)
- ◆Navigation LCD panel (optional)
- ◆RFID card reader (optional)
- ◆Tracking by SMS/GPRS (TCP/UDP)
- ◆Remotely monitoring or two-way communication
- ◆Two ways (DS18B20) temperature measurement (optional)
- ◆Three digital outputs, three digital inputs and two analog inputs, four RS232 ports, one RS485 port



## 2. Safety instruction

Read these simple guidelines. Not following them may damage the tracker or not perform proper function of application.

Correct Connection	When connect to other devices, please read its manual carefully
Chosen Accessories	Use our accessories, battery and external module to avoid damage to our device
Installation in a Hidden Place	In order to avoid damage by external force intentionally, please install our device in a hidden place
Power off in Blasting Site	Follow related restrictions. Do not use our device in blasting site
Repair and Service	Only qualified engineer with technical support can repair our device
Not Fully Water Resistance	The device is not fully water resistant. Keep it dry

## 3. Specification and parameter

Items	Specification
Power supply	DC 9-33V/1.5A
Backup battery	Rechargeable battery 750mAh (3.7V)
Normal Power Consumption	70mA
Size	84 mm*66 mm*30 mm
Weight	135g
Operating Temperature	-20 ~ +55 °C
Humidity	5% ~ 95% (Non-condensing )
GSM Module	Quad band GSM 850/900/1800/1900 MHz
GPS IC	UBLOX GPS IC
GPS sensitivity	-161dB
GPS frequency	L1, 1575.42 MHz
C/A code	1.023 MHz
Channel	50 channels
Positional accuracy	<10 M, 2D RMS
Speed accuracy	0.1 M/S
Time accuracy	Satellite Time: 1 microsecond time synchronization
Turnover time	Average 0.1s
Hot start	Average 1s
Warm start	Average 3s
Cold start	Average 37s
Maximum altitude	18,000M (maximum 60,000 feet).
Maximum speed	500 m/s (maximum 1000 knots).
Maximum acceleration	Less than 4g
Working time	About 7 hours
LED	3 LED lights to show Power, GPS and GSM status
Button	SOS button for making phone calls, sending position and giving a warning SMS
Port	3 digital outputs 3 digital inputs 2 analog inputs 4 RS232 ports 1 RS485 port

## 4. Getting Started

This section will describe how to set the tracker.

### 4.1. Hardware and accessories

Standard accessories:



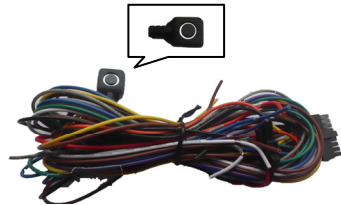
Terminal  
(Battery included)



GSM antenna



GPS antenna



I/O connecting wires



USB cable



CD

Optional accessories:



Navigation LCD panel (PND)



Two-wires temperature sensor



Camera  
(At most support three-wires)

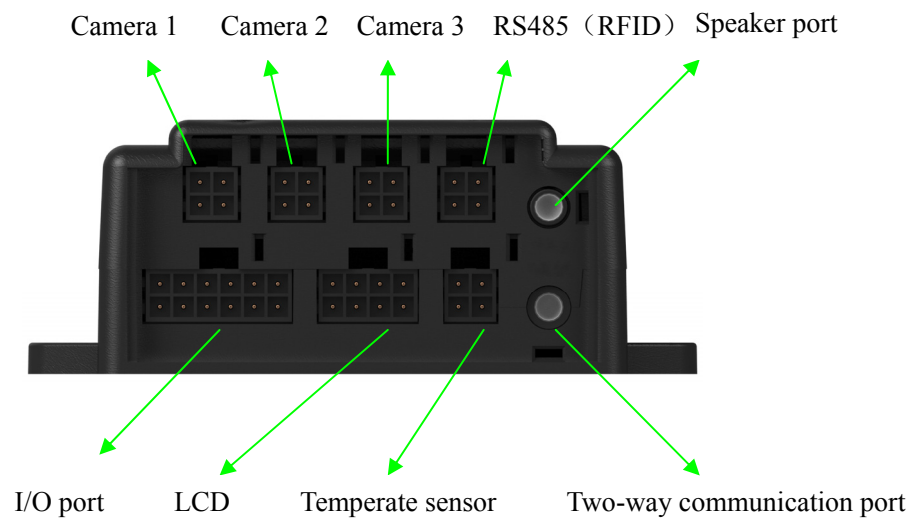
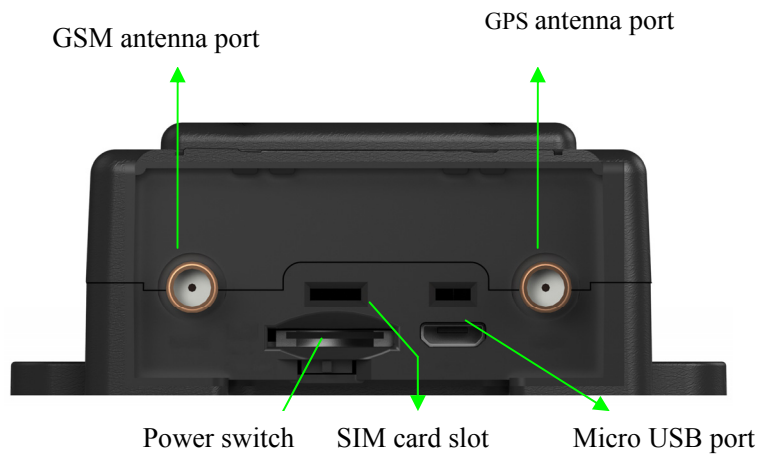


RFID card reader



Headset with microphone

## 4.2. View and port



## 4.3. First use

Please read this manual before using tracker and check if all parts are included in the packaging box.

4.3.1 Ensure that your tracker has a working SIM card installed and turn the power switch on.



SIMCARD



microSIM



nanoSIM

- Our device only supports micro SIM card, if it is large, please go to the local operator and cut it become the micro SIM card (do not cut to the nano SIM card)
- Check the SIM card has not run out of credit money (please test the SIM card in a phone to make sure it can send and receive SMS)
- Make sure that lock code of the SIM card is turned off
- If you need the function of sending an SMS location report to the authorized phone number when it makes a call to the tracker, please make sure the SIM card installed supports displaying caller ID

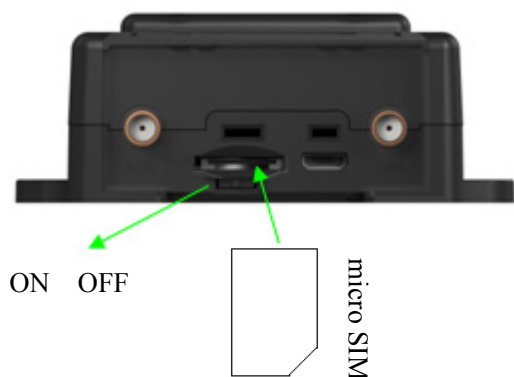
### Insert the SIM card:

--Unscrew the front cover of the tracker, as follow:



Attention: The device must be turned off when you insert the SIM card

Please make sure the bevel edge of the SIM card is outward and its metal surface facing down when you find the SIM card slot and insert it, then slide the power switch to left and turn it on. As follow:



#### 4.3.2 Connect the antenna

- connect the GSM antenna to the golden port

**Attention:** the GSM antenna is omni-directional antenna so that it can be installed far away from the power source and anywhere hidden in the car.

- connect the GPS antenna to the white gold port

**Attention:** GPS antenna is directional antenna. It is better to fix it to face the sky directly and flat side down, black side up, and use double-side tape keep it fixed, otherwise the GPS signal will be affected.

## 4.4 LED indication



<b>Red</b> – Power indication	
Always On	Power charging
Always OFF	Power charging completed or no power
<b>Blue</b> – GSM indication	
0.3S On and 0.3S Off	GSM module is initializing or calling in
Always On	GSM network is not registered
1S On and 3S Off	GSM network is registered
0.1S On and 3 S Off	GSM network is registered network and GPRS function works well
<b>Yellow</b> – GPS indication	
0.3S On and 0.3S Off	GPS module is initializing
1S On and 3S Off	GPS module is working normally but hasn't fixed position
0.1S On and 3S Off	GPS module is working normally and has fixed position

## 5. Parameter setting by SMS

### 5.1 Change the password

SMS Command: `$SMS,000000;W001,123456;!`

Describe: change user password

Explain:

All the SMS commands must be capitalized and please switch to English input method when you edit.

- '000000' is user's password, the default password is '000000'. Device will only accept commands from a user with the correct password. Otherwise command will be ignored
- '123456' is the new password, password must be 6 digits

For example:

`$SMS,000000;W001,123456;!`



## 5.2 Authorized number

SMS Command: `$SMS,000000;W010,NO., Phone Number,ABCDEFGHIJKLMNQP;!`

Describe: set the authorized phone numbers to receive SMS alarms

Explain:

NO.: serial number, must be 1 or 2 or 3

Phone Number: authorized phone numbers, Max. 16 digits

A SOS

B IN1

C IN2

D IN3 (ACC)

E Cut external power off alarm

F Low battery alarm

G Car battery is low alarm

H Geo-fence alarm

I Receive GPS signal alarm

J Lost GPS signal alarm

K Cut GPS antenna off alarm

L Over speed alarm

M Hitting alarm

N Tracking by calling

O Answer the phone automatically

P Fatigue driving warning; (1: enable; 0: disable)

For example:

Set the first authorized phone number is 13800000000, and just enable SOS alarm function.

`$SMS,000000;W010,1, 13800000000,10000000000000000;!`

## 5.3 Tracking by preset time interval

SMS command: `$SMS,000000;W013, Phone Number,X,Y;!`

Describe: set the time interval and the number of times of sending SMS

Explain:

1. X: stand for time interval(Max. is 65535), unit is minute
2. X=0 means disable this function
3. Y means the number of times of sending SMS
4. Y=0 means device will send unlimited SMS

For example:

`$SMS,000000;W013,13800000000,30,0;!`

**When enable it, tracker will send location SMS to every authorized phone number.**

## 5.4 SOS emergency calling

SMS command: `$SMS,000000;W011, Num;!`

Describe: if press SOS button for 3 seconds, the tracker will call the SOS phone number

Explain:

Num: phone number (Max. 16 digitals )

For example:

`$SMS,000000;W011, 13500000000;!`

Set the SOS number is 13500000000

## 5.5 Tracking by GPRS

SMS Command:

`$SMS,000000;W002,APN,Username,Password;W003,IP,Port;W004,ID;W005,X;W009,Y;!`

Description: enable GPRS tracking function.

Explain:

1. APN: access point name of network
2. Username and Password are optional. If you don't know what they are, please just input APN only
3. APN + Username + Password should not be over 64 characters
4. IP: server' IP address or domain name
5. Port: Max. 65535
6. ID: device ID
7. X: GPRS upload interval, unit is seconds
8. Y: GPRS upload mode, range of: 0~2  
0 means disable GPRS function, 1 means upload by TCP, 2 means upload by UDP

Example:

`$SMS,000000;W002, cmnet,,;W003,192.168.1.1,8088;W005,60;W009,1;!`

## 5.6 Geo-fence

SMS command: `$SMS,000000;W018, NO.,name,lat,lng,radius;!`

Describe: enable Geo-fence alarm. When the tracker moves in/out the preset geo-fence, tracker will send an alarm by SMS to the authorized number and send this data to server if GPRS is connected.

Explain:

NO.: serial number for geo-fence must be 1 to 5

name: max. 10 characters

lat: Latitude, format is dd.dddddd, the unit is degree, if it is northern latitude, minus is needed.  
Otherwise, omit it

lng: Longitude, format is ddd.dddddd, the unit is degree, if it is east longitude, minus is needed. Otherwise, omit it

radius: Max. 99999.00, the unit is Km

Based on preset longitude and latitude as the center of the circle, and the preset radius, a circle is defined.

For example:

```
$SMS,000000;W018,1,school,22.12345,114.12345,10.50;!
```

```
$SMS,000000;W018,2,office,12.12345,-45.12354,10.75;!
```

## 5.7 Set the time zone

Set the time zone of SMS

SMS command: `$SMS,000000;W020,X;!`

Describe: Choose time zone of SMS, time zone default is GMT 0.

Explain:

X=time zone value, please plus " - " in front if it is a negative, otherwise, ignore it. Unit is minutes (New York's time zone is -300minutes)

For example:

```
$SMS,000000;W020,480;!
```

## 5.8 Tracking by distance or angle

SMS Command: `$SMS,000000;W006,X;W007,Y;!`

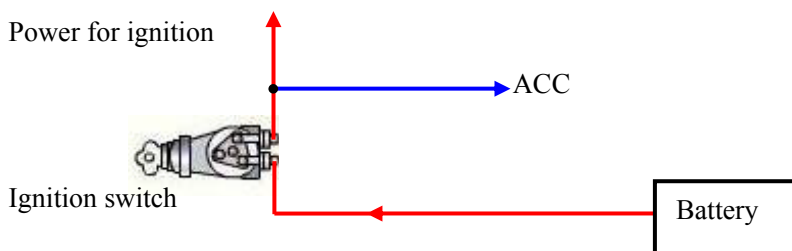
Describe: this command used for enable this function.

X is distance value, unit is meter; Y is angle value, unit is degree (Suggest X=100 Y=15)

For example:

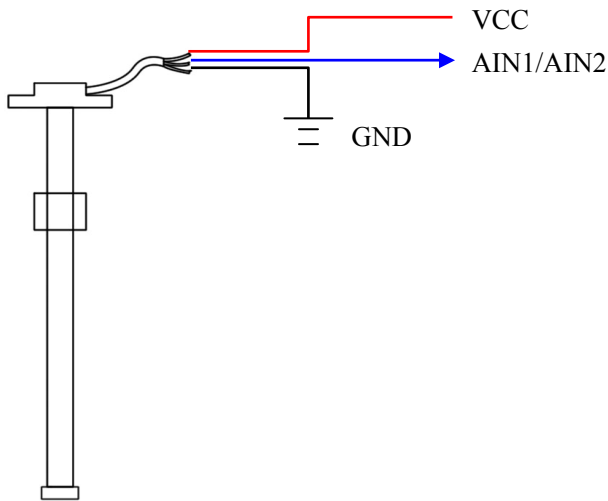
```
$SMS,000000;W006,100;W007,15;!
```

## 5.9 Input application/Ignition detector



Digital input 3 (ACC) used for ignition detection. The detection flag and alarm will be sent to the server through GPRS when flag changes. Please refer to <GPRS Communication Protocol> for more information.

## 5.10 Fuel detector



Analog input (AIN1) used for oil detection, range 0-3V. If there is other sensor you want to use, please make sure its voltage is suitable. Oil value is the one with highest precision, Max.  $2^{12}$ . The remaining-oil-percent will be sent to the server via GPRS.

The remaining-oil-percent =  $(AIN1/4096)*100\%$

AIN1 value is the data to be uploaded to server by GPRS.

Please refer to <GPRS Communication Protocol> for more information.

## 5.11 Output control command

SMS command: `$SMS,000000;W022,NO.,X;!`

Describe: enable/disable this output

Explain:

NO.: 0~4 (1 refer to digital output 1, 2 refer to digital output 2, 3 refer to digital output 3, 4 refer to digital output 4)

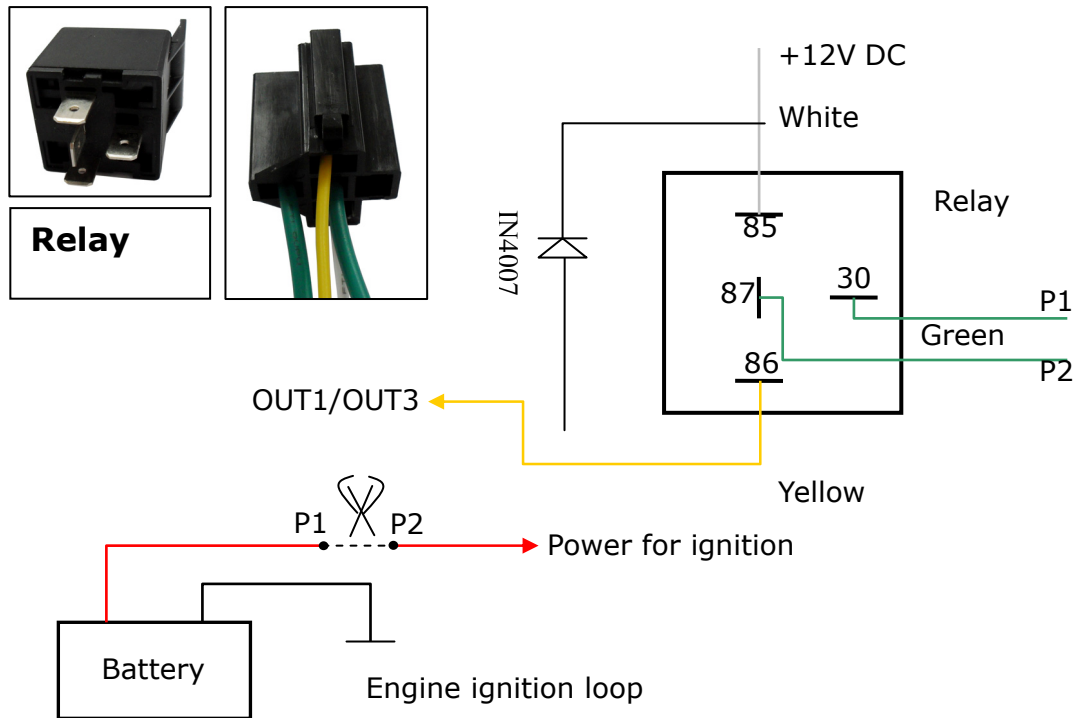
X=1: open the output so that it can drive the relay.

X=0: close the output.

For example:

`$SMS,000000;W022,1,0;!`

## 5.12 Output application



Trackers default output OUT1/OUT3 are closed, in this case P1 and p2 are connected inside the relay: when the output is open, relay is disconnected, so we can control engine's ignition loop.

For example:

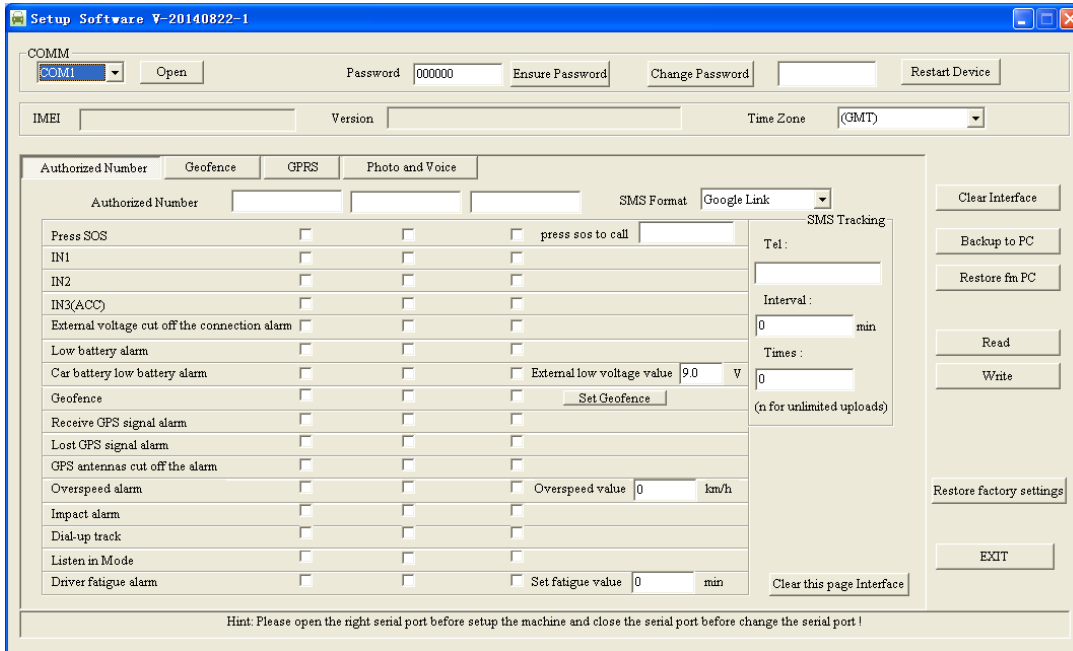
`$SMS,000000;W022,1,1;!` (Engine ignition loop disconnected)

`$SMS,000000;W022,1,0;!` (Engine ignition loop connected)

**Please refer to <A command list> for more information.**

## 6. Setup software

In addition to set the tracker parameter with SMS, we can set it on the PC computer with <Setup software>.



## 7. Install the device

### 7.1. Install I/O wire



I/O port			
Identifying			Function
1	VCC	red	DC IN Input voltage: 9 ~ 33V/1.5A
2	GND	black	Ground
3	SOS	orange	SOS emergency button
4	GND	black	Ground
5	IN1	brown	Digital input 1(positive triggered)
6	IN2	white	Digital input 2(positive triggered)
7	ACC	purple	Digital input ACC(positive triggered)
8	OUT1	green	Digital output 1, used for control relay or other (drivable electricity: 500 mA, withstanding voltage 50V)
9	OUT2	yellow	Digital output 2, used for control relay or other (drivable electricity: 500 MA, withstanding voltage 50V)
10	OUT3	pink	Digital output 3, used for control relay or other (drivable electricity: 500 MA, withstanding voltage 50V)
11	AIN2	grey	Analog input 2, general connect engine temperature sensor, input voltage: 0 ~ 3V (can customize other electric voltages)
12	AIN1	blue	Analog input 1, general connect fuel sensor input voltage: 0 ~ 3V (can customize other electric voltages)

## 7.2. Install Navigation LCD Panel (PND)

LCD uses resistive screen, it supports road navigation, making a phone call, send and receive SMS, and send target location remotely, etc. (Please connected the external power when you use it).



1	Red	+5V	DC IN is 5V when tracker connect to the external power source
2	Dangling		
3	Green	RS232 RX	Port of LCD receiving data
4	Dangling		
5	Yellow	RS232 TX	Port of LCD sending data
6	Dangling		
7	Blue	GPS RX	Port of receiving GPS data
8	White	GND	Ground

## 7.3. Install temperature sensor

It uses DS18B20, the measuring range of temperature is  $+125^{\circ}\text{C} \sim -55^{\circ}\text{C}$ ; up to support two ways temperature sensor. Waterproof and the longest wire length can be customized to 5m.



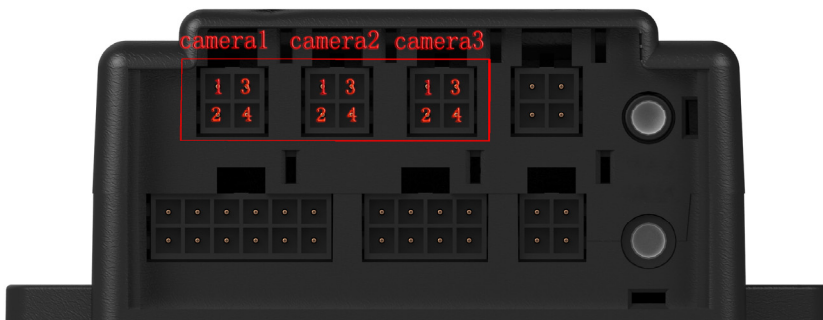
1	Black	GND	Ground
2	Yellow	T2	Temperature detection has two ways output, this is second way
3	Red	VCC	Power output's port (also can work normally without external power source)
4	Yellow	T1	Temperature detection has two ways output, this is first way

## 7.4. Install camera

Tracker supports three ways photographing and auto-light compensation at night. Its working voltage is 5V.

**Attention:** if you want to take a photograph, please make sure the tracker connected the external power.

Standard configuration is three ways RS232 connected camera, RS232's port also can be customized to connect other equipments.



1	Black	GND	Ground
2	Green	RS232 TX	RS232 send port
3	Red	+5V	The power output port (only when connected the external power source, the power output voltage is 5V)
4	Yellow	RS232 RX	RS232 receive port

## 7.5. Install RFID card reader

It uses RS485 bus communication, convenient to add other RS485 equipments, working voltage is 5V. It can be enabled only when engaged with an external power source.



1	Black	GND	Ground
2	Green	RS485 A	RS485 A V+
3	Red	+5V	The power output port (only when connected the external power source, the power output port is 5V)
4	Yellow	RS485 B	RS485 B V-



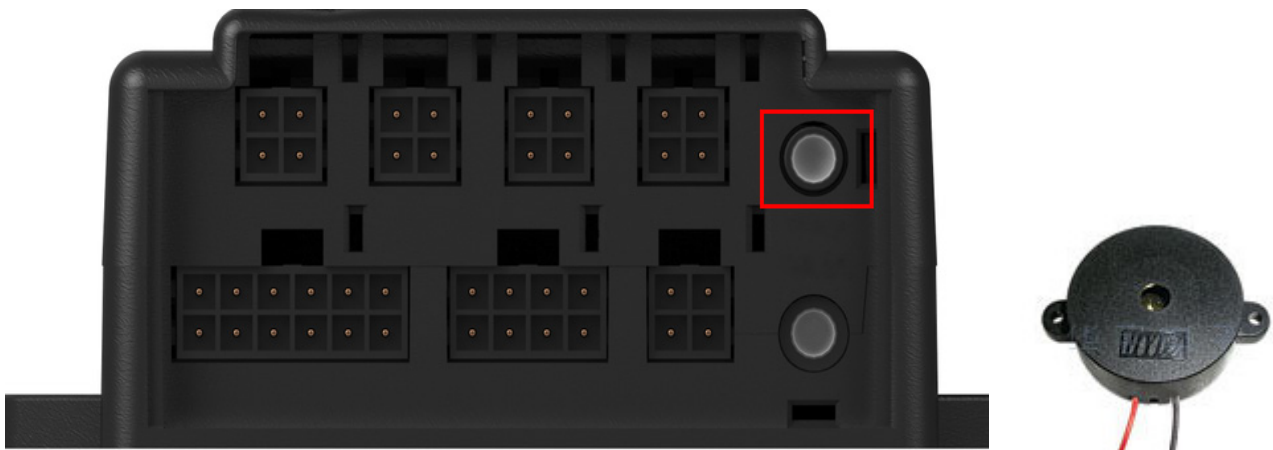
## 7.6. Two-way communication

The two-way communication function can only be enabled when use the headset with microphone for Apple, Samsung, MINU, Huawei etc.



## 7.7. Voice broadcast

Tracker supports TTL voice broadcast, but this function must be customized, our standard configuration is not including this.



## 8. Problems and solutions

<b>Problem: Tracker can not turn power switch on</b>	
<b>Possible cause</b>	<b>resolution</b>
Low battery	Please connect external power
<b>Problem: The tracker do not reply the SMS</b>	
<b>Possible cause</b>	<b>resolution</b>
The GSM antenna conjunction isn't connected firmly	Please reconnect the GSM antenna
The GSM antenna conjunction is incorrect	Make sure the GSM antenna and the GSM connecting base are connected
The GSM network is busy	Wait for a message. The GSM network may reply slowly when busy time or equipments breakdown
Password or command is wrong	Please use correct password and command format
Not enough SIM balance	Please change or recharge the SIM card
The SIM damaged or warped	Please check the SIM card, sweep metal of card to get in touch with a point, If still invalid then replace SIM card
<b>Problem: SMS received with latitude and longitude for zero</b>	
<b>Possible cause</b>	<b>resolution</b>
The GPS antenna conjunction isn't connected firmly	Please reconnect the GPS antenna
The GPS antenna conjunction is incorrect	Make sure the GPS antenna links the GPS conjunction
The tracker has already blocked the GPS signal	Move the tracker to open area w/o any tall building, tree and heavy raining. Those can shield GPS signal
The GPS signal is weak	Place the GPS antenna face to the sky
<b>problem: Can not connect the server by GPRS</b>	
<b>Possible cause</b>	<b>resolution</b>
The SIM card can not support the GPRS function	Enable the SIM card's GPRS function
The GPRS function has been disable	Enable the GPRS function
Incorrect IP address or PORT	Get the right IP address and port, then reset the device
The GSM signal is weak	Move the tracker to a place with strong GSM signal