GPS Vehicle Tracker

User Manual

V6.3

AVT310

Contents

1. Product Overview

AVT310 is a GPS/GPRS based tracking device specially developed and designed for vehicle real-time tracking and security.

AVT310 has inbuilt GPS module to obtain accurate position data and utilizes its GSM capability to send the position data to a specified mobile phone or server base for tracking and fleet management.

With internal memory, AVT310 can store GPS coordinates when there is no GPRS connection or at a specified interval requested by the user.

One optional feature of AVT310 is that a microphone can be linked out to be hidden somewhere inside the vehicle for listening to the cabin.

AVT310 has the following functions:

- Real time tracking via SMS or GPRS (TCP/UDP)
- Track on demand
- Show location directly on mobile phone
- Track by time interval
- Listen in (Voice Monitoring) (optional)
- GSM blind area memory
- Logging capacity up to 180,000 waypoints
- Inbuilt motion sensor for power saving
- SOS panic button
- Movement alarm
- Geo-fencing control
- Low battery alarm
- Over speed alarm
- GPS Blind area alarm (in/out)
- Power-cut alarm
- Engine cut (stop engine)
- I/O: 5 digital inputs, 3 negative and 2 positive triggering; 5 outputs
- Analog Input: 2 analog inputs of 10 bits resolution for connecting fuel level sensor or other sensors.

2. For Your Safety

Read these simple guidelines. Not following them may be dangerous or illegal. Read the full user manual for more information.

Proper Connection	When connecting with other device, read carefully its manual so as to carry out correct installation. Do not connect it to other incompatible devices.
Qualified Accessories	Use original parts, qualified batteries and peripheral equipments to avoid damage to AVT310.
Safe Driving	Drivers should not operate this product while driving.
Qualified Service	Only qualified personnel can install or repair AVT310.
Water Resistance	AVT310 is not water resistant. Keep it dry. Install it inside the vehicle or use waterproof

	bag if necessary.
Confidential Phone Number	For safety reason, do not tell other people the mobile phone number of your AVT310 without taking precautions of security settings.

3. AVT310 Characteristics

Items	Specification
Power Supply	+9V - +36V / 1.5A
Backup Battery	850mAh
Normal power consumption	85mA/h
Dimension	104mm x 62mm x 24mm
Installation Dimension	104mm x 83mm x 24mm
Weight	190g
Operating temperature	-20° to 55° C
Humidity	5% to 95% Non-condensing
Frequency	Quad Band GSM 850/900/1800/1900Mhz
GPS Module	latest GPS SIRF-Star III chipset
GPS Sensitivity	-158Db
GPS Frequency	L1, 1575.42 MHz
C/A Code	1.023 MHz chip rate
Channels	20 channel all-in-view tracking
Position Accuracy	10 meters, 2D RMS
Velocity Accuracy	0.1 m/s
Time Accuracy	1 us synchronized to GPS time
Default datum	WGS-84
Reacquisition	0.1 sec., average
Hot start	1 sec., average
Warm start	38 sec., average
Cold start	42 sec., average
Altitude Limit	18,000 meters (60,000 feet) max.
Velocity Limit	515 meters/second (1000 knots) max.
LED	2 LED lights to show GPS/GSM status.
Flash Memory	4MB
Button	One SOS Button
Interface	5 digital inputs (3 negative and 2 positive triggering); 2 analog inputs; 5 outputs.

4. Getting Started

This section will describe how to set up your AVT310.

4.1 Hardware and Accessories

AVT310 is supplied in a box which includes:


AVT310 with Battery


GPS Antenna


GSM Antenna


Wires with SOS Button


USB Cable

USB to Serial


CD

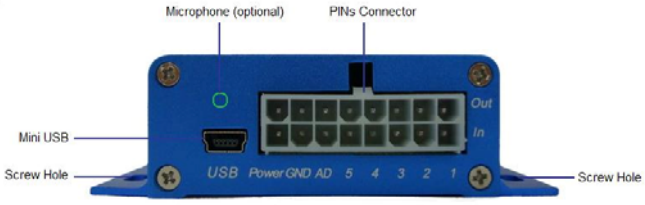
4.2 View

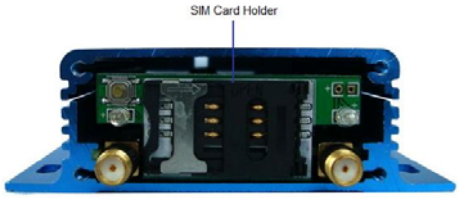
Front View


Side View


Back View

4.3 Functional Parts

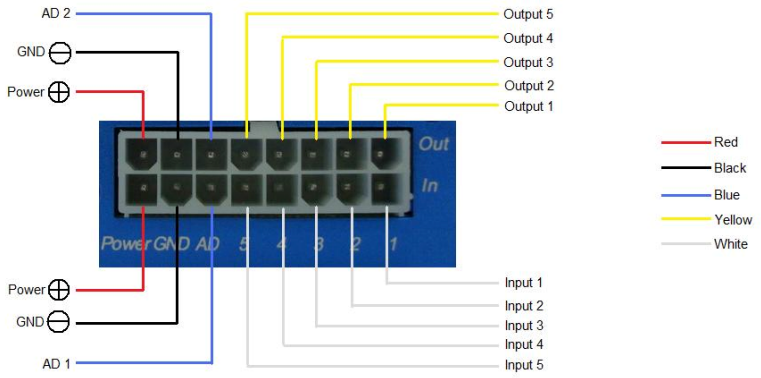




GPS LED (Blue)	
On	One button is pressed
Flashing (every 0.1 second)	The unit is being Initialized
Flashing (0.1 second on and 2.9 seconds off)	AVT310 has a GPS fix
Flashing (1 second on and 2 seconds off)	AVT310 has no GPS fix
GSM LED (Green)	
On	One call is coming in / one call is being made
Flashing (every 0.1 second)	The unit is being Initialized
Flashing (0.1 second on and 2.9 seconds off)	AVT310 is connected to the GSM network
Flashing (1 second on and 2 seconds off)	AVT310 is not connected to the GSM network
Power On/Off Button	Press and hold for 3~5 seconds to turn on/off AVT310.

SOS Button	SOS button is connected with the wires. Press it to send SOS alarm to the preauthorized phone number.
Mini USB	Used for firmware update, configuration on PC and exporting stored data. (USB to Serial Converter is required for firmware update, configuration and exporting stored data)
SIM Card Holder	To insert SIM card here
GSM Antenna	Connector for GSM antenna
GPS Antenna	Connector for GPS antenna
Screw Holes	There are 4 screw holes on the tracker, 2 along either side that act as fixing points to the vehicle
Microphone (optional)	A microphone to be linked out for listening to the cabin (Voice Monitoring)

PINs Connector



PIN	Color	Function
Power	Red	DC In (power input). Input voltage: 9V~36V. 12V suggested.
GND	Black	Ground
In	White	Digital Inputs. In1, In2 and In3 are negative triggering; In4 and In5 are positive triggering.
Out	Yellow	Outputs. Low voltage (0V) when effective and open drain when ineffective. Output open drain sink voltage (ineffective): 45V max. Output low voltage sink current (effective): 500mA max.
AD	Blue	10 Bits Resolution Analog Inputs. Input voltage: 0~6V.

DC Characteristics of PINs

PIN	Inactive	Active	Maximum
Input 1/2/3	Open drain or >1V	0V(GND)	45V
Input 4/5	Open drain or 0V(GND)	>3V	45V
Output 1/2/3/4/5	Open drain	0V (GND)	45V/500mA
DC IN	/	9-36V	45V
AD 1/2	/	0-6V	45V

4.4 Connecting and Installation

Read this manual before using your AVT310 and check if all parts are included in the packaging box.

4.4.1 Ensure that your AVT310 has a working SIM installed.

- Check that the SIM has not run out of credit (test the SIM in a phone to make sure it can send and receive SMS)
- Check that the SIM Lock code is turned off
- If you require the function of sending an SMS location report to the authorized phone number when it makes a call to the

AVT310, please make sure the SIM installed supports displaying caller ID.

Before inserting SIM card, cut off the power for AVT310.

Install SIM Card

- Unscrew and remove the front cover of AVT310.
- Insert the SIM card by sliding it into the card slot with the chip module facing to the connectors on PCB.
- Put back the front cover and screw it up.

4.4.2 Antenna Connection

Connect the GSM Antenna to AVT310.

Connect the GPS Antenna to AVT310.

- GPS antenna is used to receive satellite signals in the sky. It should be fixed to face the sky (to be placed under the windscreen is recommended) and should not be covered or shielded by any objects containing metal.

4.4.3 Find a suitable place inside the car for installing AVT310. Wiring connections must be firm and reliable and the joints should be wrapped with insulating tape tightly. The unused electrical wire should be properly insulated.

Check if all wirings have been connected correctly and then connect the AVL unit to the motor power.

Check that the Red LED (Battery) is flashing 1 second on and 2 seconds off.

Make a missed phone call the AVT310 using a mobile phone to check if the calling can go through and the AVT310 replies with an SMS indicating longitude, latitude, speed and date.

5. Change Password

Command: W******,001,######

Description: Changes user's password.

Notes:

1. ****** is user's password and the default password is 000000. The tracker will only accept commands from a user with the correct password. Commands with wrong password will be ignored.
2. ###### is the new password. Password should be 6 digits.

Example:

W000000,001,123456

W123456,001,999999

6. Time Zone

Command: W******,032,T

Description: Corrects time into your local time

Notes:

1. Default time of the tracker is GMT

2. This correction is applied to location reports by SMS and SMS alarms.

T=0, to turn off this function.

T=[1, 65535] to set time difference in minute to GMT.

For those ahead of GMT, just input the time difference in minute directly. For example, GMT+8, W000000,032,480

'-'is required for those behind GMT. For example, W000000,032,-120.

Example:

W000000,032,480

W000000,032,-120

7. Track

7.1 Track by SMS

- Track on Demand - Reply with longitude, latitude, speed and date

Command: W******,000

Description: Get the current location of the tracker, send this SMS or make a telephone call directly to the tracker and it will report its longitude and latitude by SMS with format as follows:-

Latitude = 22 32 36.63N Longitude = 114 04 57.37E, Speed = 2.6854Km/h, 2008-12-24,01:50

Example:

W000000,000

- Track on Demand - Reply with a Google link

Command: W******,100

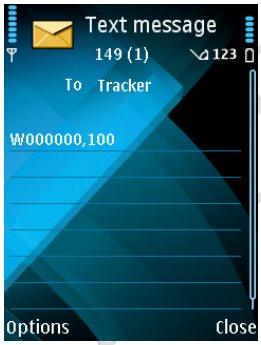
Description: Send this command to the tracker and then you receive an SMS with an http link. Click on the link then the location can be shown directly on Google Map on your mobile phone. For example:

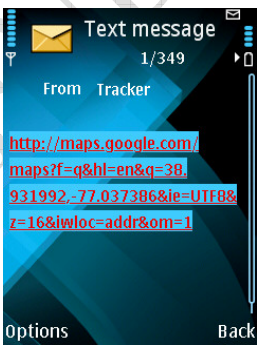
http://maps.google.com/maps?f=q&hl=en&q=22.543908,114.088564&ie=UTF8&z=16&iwloc=addr&om=1

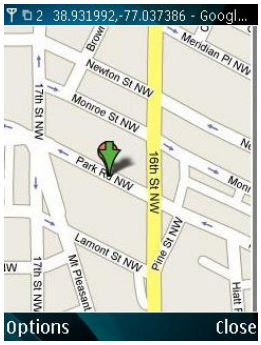
Notes: Only smart phones and PDA support this function.

Example:

W000000,100







7.2 Track by Calling

Make a missed call to the tracker and it will report its longitude and latitude by SMS with format as follows:-

Latitude = 22 32 36.63N Longitude = 114 04 57.37E, Speed = 2.6854Km/h, 2008-12-24,01:50

7.3 Track by Preset Interval

Command: W******,002,XXX

Description: Sets an interval for the tracker to continuously return its location by SMS

Notes:

1. XXX is the interval in minute.

2. If XXX=000 to turn off tracking by time

Example:

W000000,002,030

The tracker will send location data back to your mobile phone every 30 minutes.

7.4 Google Earth and Google Map

Download Google Earth from http://earth.google.com/.

Start Google Earth (For more information about Google Earth please refer to http://earth.google.com/) or go to http://maps.google.com in your Internet Explorer.

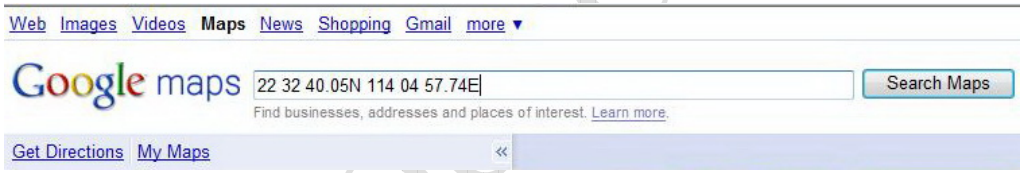
Input the latitude and longitude that you receive from the tracker by SMS and click the search button. Google Earth or Google Maps will display the location for you.

Example:

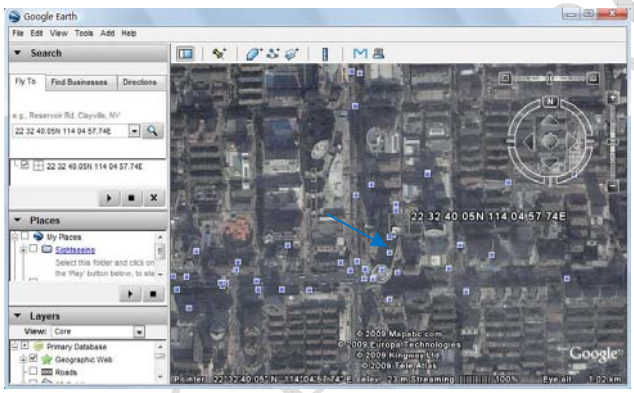
When you receive: Latitude = 22 32 40.05N Longitude = 114 04 57.74E

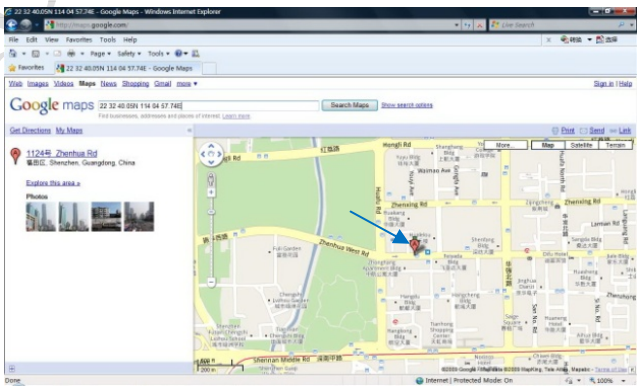
Type as the following picture shows:

(Note: you should input the latitude and longitude as: 22 32 40.05N 114 04 57.74E)



And then you can find the location of your tracker:

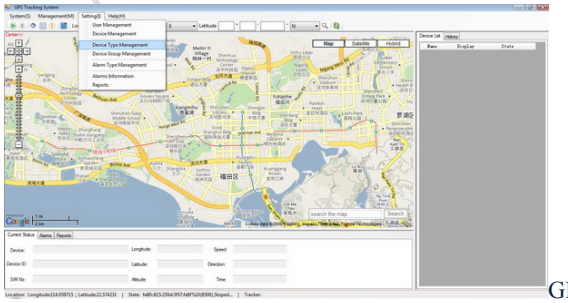




Or you can use local map software on PDA or car navigation device to input the coordinates.

7.5 Track by 800E

If you have bought our GPRS tracking software 800E, after proper configuration, you can do tracking on 800E.



GPS Tracking System - 800E

Please refer to 800E User Guide for more information.

7.6 Track by 800D Web based tracking software.

7.6.1-Configure AVT310 by Parameter Editor V1.39.

GPS Tracker Parameter Editor V1.39

Please refer to <GPS Tracker Parameter Editor> for more information.

7.6.2. Configure AVT310 by SMS

Step 1: Set Tracker ID

Command: W******,010,ID

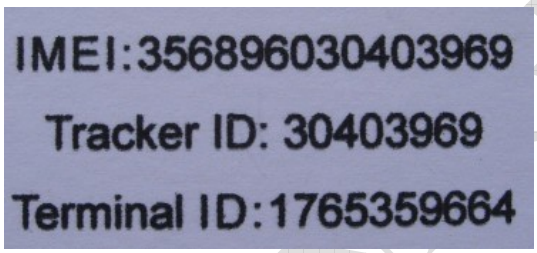
Description: Send this command to set an ID for the tracker. Tracker ID must not over 14 digits.

Example:

W000000,010,00001

Notes:

On the packing box of AVT310, you can find a white label writes “IMEI, Tracker ID, Terminal ID".



Example:

The “Tracker ID: 30403969”, and then you should send.

W******,010,30403969

AVT310 will reply “SET SIM OK/30403969”

Tracker ID is 304043969 now.

Step 2: Set APN

Command: W******,011,APN,Username,Password

Description: Sets APN details for the tracker

Notes:

APN defaulted as CMNET. Please contact your SIM card provider for your APN name.

If no username and password required, just leave them blank.

Example:

W000000,011,CMNET,Myname,6688 [with APN user name and password]

W000000,011,CMNET [without APN user name and password]

AVT310 will reply “SET APN OK/CMNET”

Step 3: Set IP and Port

Command: W******,012,IP,Port

Description: Sets IP and Port for tracker for GPRS communication.

Notes:

Below is our 800D web based tracking server IP and Port.

IP: 119.146.223.203

Port: 8886

Example:

W000000,012, 119.146.223.203,8886

AVT310 will reply “SET APN OK/119.146.223.203,8886”

Step 4: Enable GPRS Tracking

Command: W******,013,X

Description: Enables GPRS tracking function.

Notes:

X=0, turn off GPRS tracking (default);

X=1, to enable GPRS tracking via TCP

X=2, to enable GPRS tracking via UDP

Example:

W000000,013,1

AVT310 will reply “Open TCP OK”

Step 5: Set GPRS Interval

Command: W******,014,XXXXX

Description: Sets time interval for sending GPRS packets.

Notes:

XXXXX should be in five digits and in unit of 10 seconds.

XXXXX=00000, to turn off this function;

XXXXX=00001~65535, time interval for sending GPRS packet and in unit of 10 seconds.

In this example, the tracker will send every 30 seconds.

Example: W000000,014,00003

The tracker will send every 30 seconds.

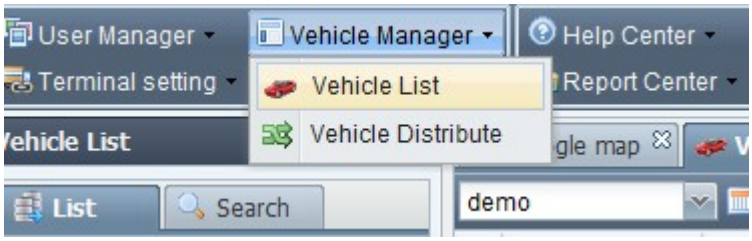
AVT310 will reply “SET GPRS Timer OK/00003”

7.6.3 Add AVT310 to 800D web based tracking software

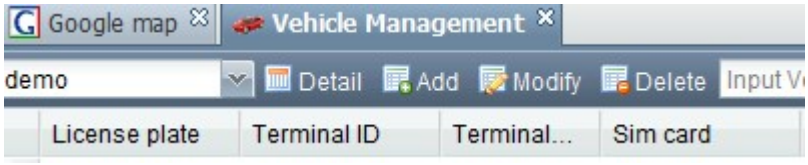
Please go to http://119.146.223.203

Enter the user name and password we provided.

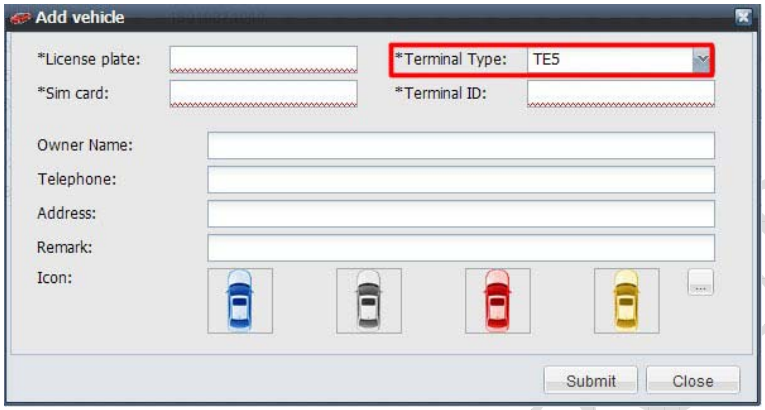
After log in, please go to “Vehicle Manager-Vehicle List”



You will see the below window



Please click “Add” button, you will see the below window:



License Plate: Define by yourself; you can enter A-Z number or Numeric.

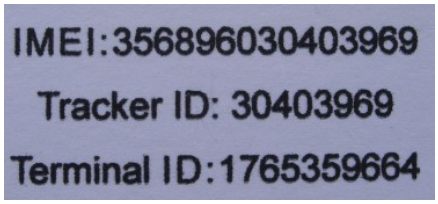
Very Important Note: Terminal ID and Plate number are unique on the software, you can add once only, you need to delete it from database before adding it again. Only admin account can delete id from database, general user cannot. You do not need to delete and re-add if the device cannot work on software, because it's caused by your wrong sms setting, not the software.

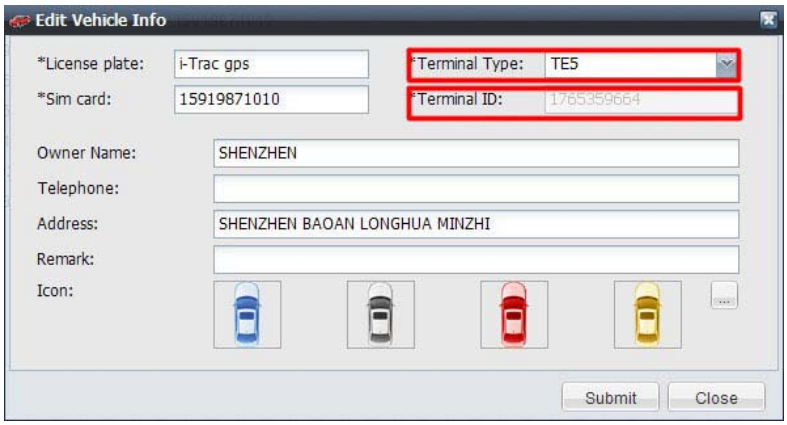
Terminal Type: Choose” TE5”

SIM card: the SIM card phone number you put in AVT310.

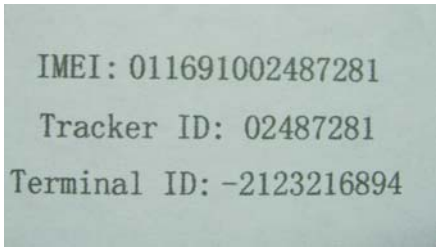
Terminal ID: On the packing box of AVT310, you can find a white label writes “IMEI, Tracker ID, Terminal ID".

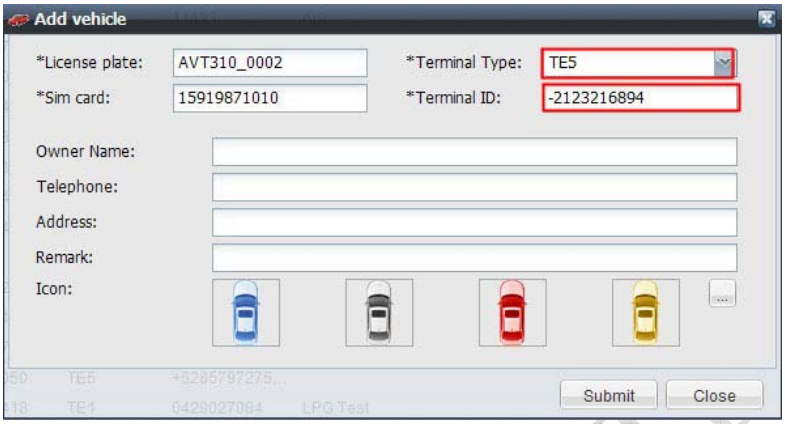
Very Important Note: Please do not omit the minus if there's a minus before the terminal ID.



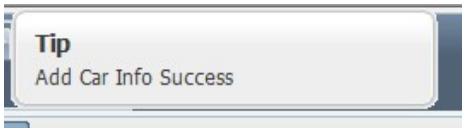


And,

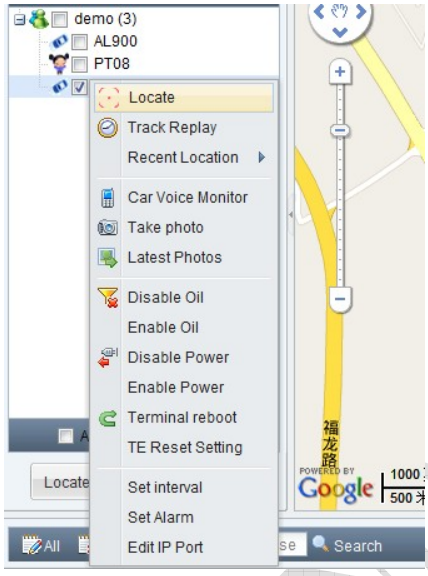




Click "Submit", and then you add the car successfully on the software 800d.



Put a check mark on the device, and right click, you will see the menu as below picture. Now you can track online.



8. Authorization

Command: W******,003,F,P,T

Description: Authorizes phone numbers for the SOS button (or inputs) for receiving location reports and SMS alarms.

Notes:

F=0, to turn off this function; (default)

F=1, Sends SMS to the authorized phone number;

P=1, set an authorized number for SOS button (Input 1)

P=2, set an authorized number for Input 2

P=3, set an authorized number for Input 3

T: Preset phone number. Max.16 digits

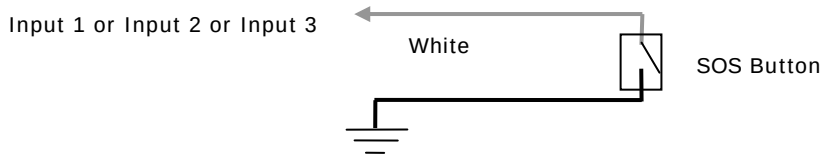
Example:

W000000,003,1,1,88888888

9. Application Examples for Inputs

9.1 SOS Button Connection

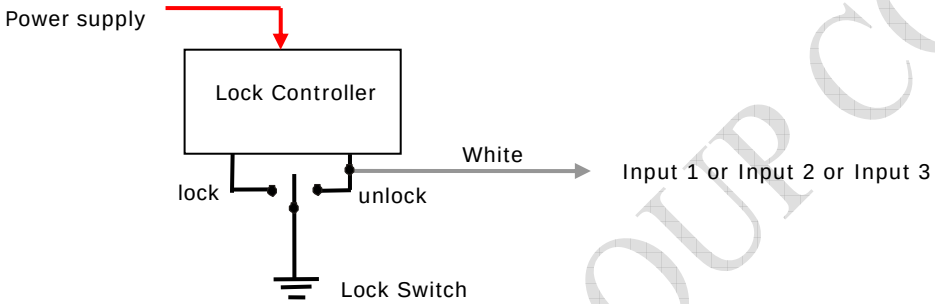
Connect the SOS button and wires as below picture shows:



Note: input voltage to Input must not over 45V

After above authorization is complete, once the SOS is pressed, an SOS SMS - “SOS Alarm” will be sent to the pre authorized phone number and then a message with longitude and latitude to follow.

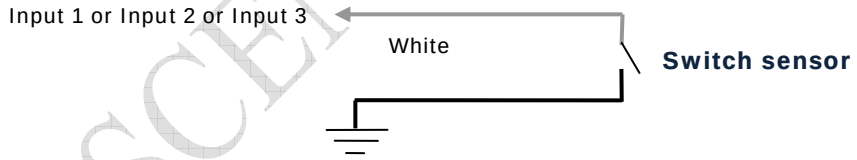
9.2 Detecting Lock Status of Car’s Door or Trunk (Car Boot).



When the lock is opened, there will be negative triggering to Input 1 or Input 2 or Input 3, then an SMS alarm will be sent to the authorized phone number or a GPRS alarm will be sent to the server (please refer to the GPRS Command 0x9999 in <GPRS Communication Protocol>).

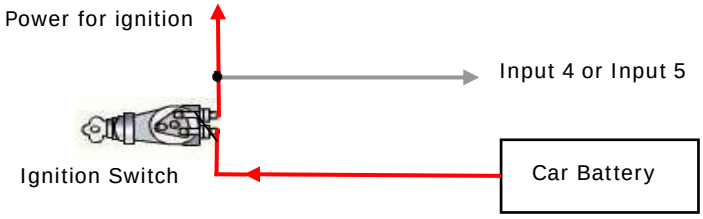
9.3 Connecting with Switch Sensors

The SMS alarm will be sent to the authorized phone number.



9.4 Ignition Detection

Input 4 or Input 5 (positive triggering) can be used for ignition detection. The detection alarm will be sent to the server via GPRS. Please refer to <GPRS Communication Protocol> Alarm Command 0x9999 for more information.



9.5 Analog Input (AD1 and AD2)

Input voltage should be 0~6V. Please refer to <GPRS Communication Protocol >for more information for AD1 and AD2 data.

For example:

094506.000,A,2232.5412,N,11404.6919,E,0.00,,290709,,*12|1.7|110|0000|00AA,0267

AD1 is 0x00AA and AD2 is 0x0267.

Voltage Formula: Input Voltage=(AD*6)/1024

0x00AA=>170(decimal)=>(170*6)/1024=0.99609375V(voltage)

0x0267=>615(decimal)=>(615*6)/1024=3.603515625V(voltage)

Application Example - Fuel Level Sensor

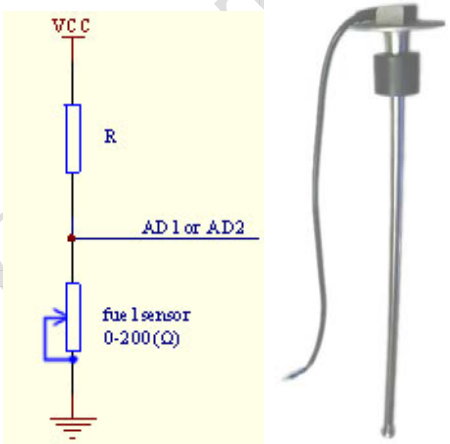
Fuel level sensors supplied by us are resistance-type sensors with output resistance: 0-200Ω(ohm).

For the circuit shown on the right picture, if VCC is 12V, R should be 200Ω(ohm) and if VCC is 24V then R should be 600Ω(ohm) to make the input range to AD1 or AD2 is 0-6V.

Below formula is for calculating the fuel percent left for this fuel level sensor:

$$\frac{1024 - Value_{AD1/AD2}}{1024}\%$$

Note: The value must be converted into decimal, for example, 0x0267 is 615 in decimal.



10. Low Power

Command: W******,004,X

Description: When the tracker's voltage is lower than the preset value, it will send an SMS alarm to the authorized phone number for SOS.

Notes: X is the preset value of voltage.

=0 , to turn off this function	=1, <3.3V	=2 , <3.4V
=3 , <3.5V (default)	=4 , <3.6V	=5 , <3.7V

Example: W000000,004,2

11. Over speed

Command: W******,005,XX

Description: Turns on over speed alarm. When the tracker speeds higher than the preset value, it will send an SMS to the phone number for SOS.

Notes: XX is the preset value of speed and in 2 digits.

=00 , to turn off this function

=[01, 20] (unit: 10Km/h)

Example: W000000,005,08

When the tracker's speed is over 80km/h, an SMS alarm will be sent out.

12. Movement/Geo-fence

12.1 Movement Alarm

Command: W******,006,XX

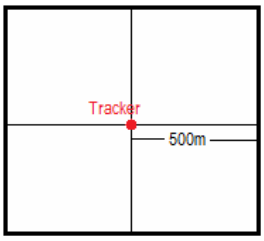
Description: When the tracker moves out of a preset square scope, it will send an SMS alarm to the authorized phone number for SOS.

Notes: XX is the preset distance to the tracker's original place

=00, to turn off this function

=01, 30m	=02, 50m	=03, 100m	=04, 200m
=05, 300m	=06, 500m	=07, 1000m	=08, 2000m

Example: W000000,006,06



When tracker moves out of this square scope, it will send out an SMS alarm.

12.2 Geo-fence Alarm

Command: W******,017,X or W******,117,X

Description: Turns on Geo-fencing alarm. When the tracker moves in/out the preset scope, it will send an SMS alarm to the authorized phone number for SOS.

Notes:

1. 017 is for alarm when tracker moves out the preset scope;
2. 117 is for alarm when tracker moves in.
3. X is the coordinates which include: Lower-left X,Lower-left Y,Upper-right X,Upper-right Y
4. Lower-left X should be less than Upper-right X;
5. All longitudes and latitudes should be in ASCII format as follows:-
   Longitude: DDDFF.FFFF,E/W. 4 places of decimal. '0' is needed to be stuffed if no value available.
   Latitude: DDFF.FFFF,N/S. 4 places of decimal. '0' is needed to be stuffed if no value available;
6. Send W******,006,00 to turn off Geo-fence function.

Example:

W000000,017,11404.0000,E,2232.0010,N,11505.1234,E,2333.5678,N

W000000,117,11404.0000,E,2232.0010,N,11505.1234,E,2333.5678,N

Remarks:

1. Only one alarm can be set in either In or Out;

2. Only one alarm can be set in either Movement Alarm or Geo-fence Alarm.

13. Output Control

13.1 Output Control (Immediate)

Command: W******,020,1,F

Description: Sends this command to control the Output of AVT310

Notes:

F=0, to close the output (open drain);

F=1, to open the output (low voltage).

Example: W000000,020,1,1

13.2 Output Control (Conditional)

Command: W******,120,1,F or W******,220,1,F

Description: Sends this command to control the Output of AVT310. This command is only workable when the speed is below 10km/h(command 120) or 20km/h(command 220) and meantime GPS is available.

Notes:

F=0, to close the output (open drain);

F=1, to open the output (low voltage).

Example:

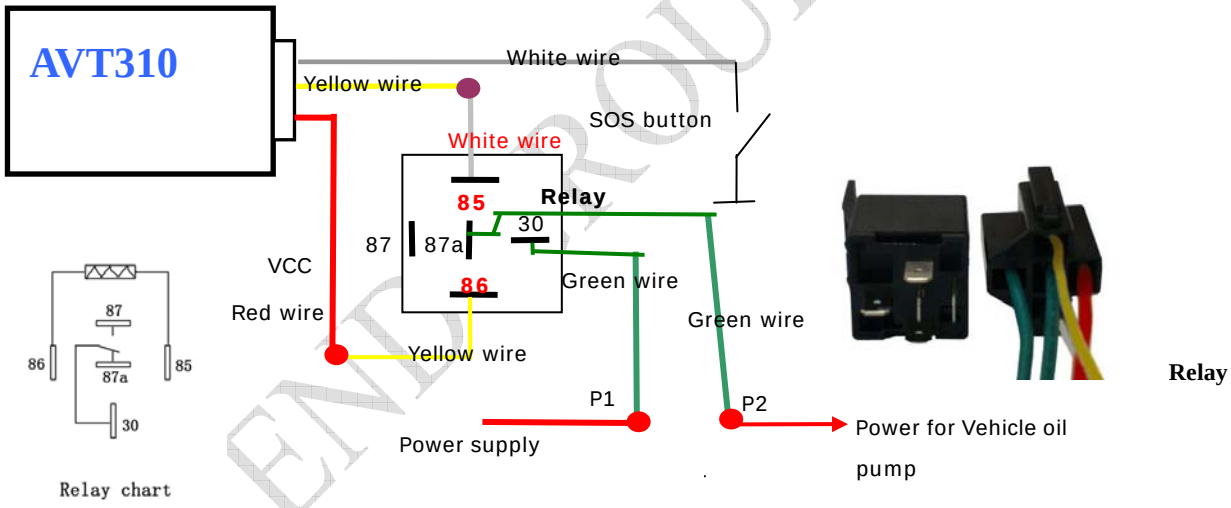
W000000,120,1

W000000,220,1

13.3 Application Examples for Outputs

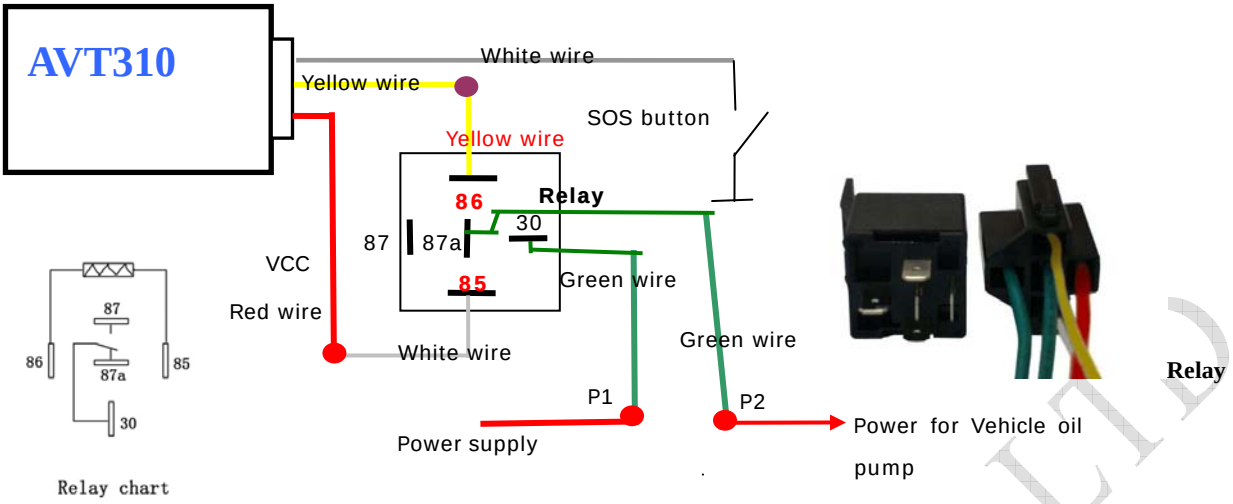
13.3.1 Engine Cut

Relay Connection: Connect a replay as below picture shows:



Relay

1.



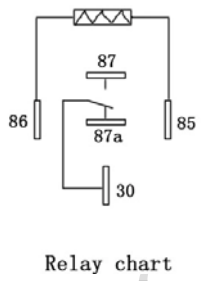
2.

Calculate the correct VCC value according to relay's parameter to comply with the following requirements:

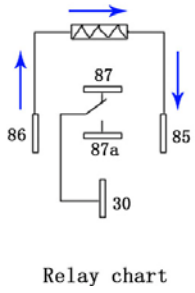
Output open drain sink voltage (ineffective)	45V max
Output low voltage sink current (effective)	500mA max

Normally two green wires are connected solidly (P1 and P2 are Normal Close [NC] in the relay) (picture a.), when the Output is open (Output be Low voltage), two green wires will disconnect, the engine is then cut.(picture b. or picture c.)

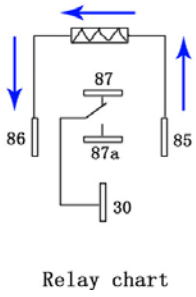
a.



b.



c.



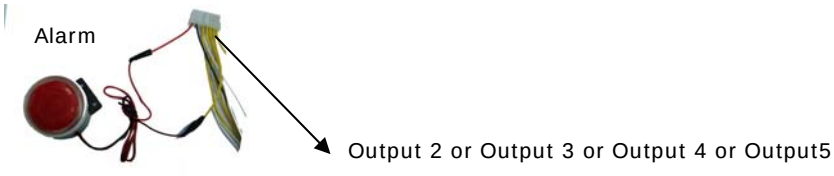
Take Output1 as an example:

W000000,020,1,1 (cut engine)

W000000,020,1,0 (cancel engine-cut)

13.3.2 Connecting with Car Alarm

When the Output that connected to the car alarm is open, the alarm will start to work.



14. Listen in (Voice Monitoring) (optional)

Command: W******,030,T

Description: Authorizes a phone number to make a silence call to the tracker, the track answers the call automatically and allows the caller to listen to what happens around the tracker. There is no voice indication that the call is in progress

Note:

1. T is the telephone number for Voice Monitoring and max. 16 digits
2. Calls from unauthorized number are treated as normal incoming calls and indicated by beeps.

Example:

W000000,030,88888888

15. Heading Change Report

Command: W******,036,degree

Description: when the heading direction of the tracker changes over the preset degree, a message with location data will be sent back to the server by GPRS. This is to enhance the accuracy when the tracker makes a direction change.

Notes:

degree=0, to turn off this function.

degree=[1,360], to set degree of direction change.

Example: W000000,036,90

When the tracker turns more than 90 degree, a message will be sent back to the server.

16. Track Log

16.1 Log by Interval

Command: W******,031,X

Description: Sets time interval for logging GPS information. The information is stored within the device memory. When the memory gets full, the newest record will be overwritten on top of the oldest (FIFO - First In, First Out). In that case, only the newest information is stored.

Note:

1. X=0, to turn off this function. X=[1, 65535] to set interval in the unit of SECOND.
2. The logged message is in GPRMC format and includes:
   - *Date and time*
   - *Longitude*
   - *Latitude*
   - *Speed*
   - *Direction*
3. All data, stored within the memory, may be exported to the PC using the USB connector. For this matter the “GPSLog” program has to be used (please refer to < GPSLog User Guide> and <GPRS Communication Protocol> for more information).
4. The device has 4MB internal memory space for storing the track log and is able to store up to 180,000 records within the memory.

Example:

W000000,031,60

The tracker will store GPS data every 60 seconds.

16.2 Auto Log when no GPRS

When there is no GPRS connection, the tracker can store all GPS information triggered by preset tracking interval, alarms, request, or button activation and send this information (FIFO - First In, First Out) to server by GPRS or preauthorized mobile phone by SMS when GPRS connection recovers.

The interval memory can store up to 1500 SMS and 4600 GPRS message.

17. Power Down

Command: W******,026,XX

Description: Makes the tracker into power down mode(for power-saving purpose) when it is inactive or stationary for a period of time. In Power Down states, GPS stops working and GSM enters sleep and stop sending out message until it is activated by message, incoming calls, movement or any input changes.

Notes:

XX=00, to turn off this function.

XX=01~99, to turn on Power Down after a specified period of being inactive (or stationary). It is in unit of minute.

Example: W000000,026,10

The tracker will enter power down mode after it is inactive (or nstationary) for 10 minutes.

18. Initialization

Command: W******,990,099###

Description: This is to make all settings (except for the password) back to factory default.

Notes:

Turn on the device, press the SOS button for five times continuously and the red LED will be on, and then send (within 120 seconds) this SMS to the tracker.

is the ending character and is required in the text message.

Example: W000000,990,099###

19. Password Initialization

Command: W888888,999,666

Description: This is to make the password back to factory default in case you forget your password.

Notes: turn on the tracker, press the SOS button for five times continuously and the red LED will be on, and then send this SMS (within 120 seconds) to the tracker to make the password back to factory default (000000).

Example: W888888,999,666

For more details regarding SMS commands, please go to Annex 1 Command List in page

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Annex 1. SMS Command List

Note: ****** is user's password and the default password is 000000. The tracker will only accept commands from a user with the correct password. Commands with wrong password will be ignored.

Description	SMS Command	Example
Track on Demand	W******,000	W000000,000
Remarks: To get the current location of the tracker, send this SMS or make a telephone call directly to the tracker and it will report its longitude and latitude by SMS with format as follows:- Latitude = 22 32 36.63N Longitude = 114 04 57.37E, Speed = 2.6854Km/h, 2008-12-24,01:50		
Track on Demand -Google Link	W******,100	W000000,100
Remarks: Send this command to the tracker and then you receive an SMS with an http link. Click on the link then the location can be shown directly on Google Map on your mobile phone. For example: http://maps.google.com/maps?f=q&hl=en&q=22.543908,114.088564&ie=UTF8&z=16&iwloc=addr&om=1 (Note: Only smart phones and PDA support this function.)		
Change Password	W******,001,######	W000000,001,123456
Remarks: To change user's password. ###### is the new password. Password should be 6 digits.		
Track by Interval	W******,002,XXX	W000000,002,030
Remarks: To set interval for automatic timed report. XXX is the interval in minute. If XXX=000 to turn off tracking by time. In this example, the tracker will send location data back to your mobile phone every 30 minutes.		
Authorize Phone Number for SOS, B and C button	W******,003,F,P,T	W000000,003,1,1,88888888
Remarks: To authorize phone numbers for the buttons/inputs for receiving location reports and SMS alarms. F=0, to turn off this function; (default) F=1, sends SMS to the authorized phone number; P=1, set an authorized number for SOS button (Input 1) P=2, set an authorized number for B button (Input 2) P=3, set an authorized number for C button (Input 3) T: Preset phone number. Max.16 digits		
Low Power Alarm	W******,004,X	W000000,004,2
Remarks: When the tracker's voltage is lower than the preset value, it will send an SMS alarm to the authorized phone number for SOS.		

X is the preset value of voltage.

=0 , to turn off this function	=1, <3.3V	=2 , <3.4V
=3 , <3.5V (default)	=4 , <3.6V	=5 , <3.7V

Overspeed Alarm	W******,005,XX	W000000,005,08

Remarks: When the tracker speeds higher than the preset value, it will send an SMS to the phone number for SOS.

XX is the preset value of speed and in 2 digits.

=00 , to turn off this function

=[01, 20] (unit: 10Km/h)

In this example, when the tracker's speed is over 80km/h, an SMS alarm will be sent out.

Movement Alarm	W******,006,XX	W000000,006,06

Remarks: When the tracker moves out of a preset square scope, it will send an SMS alarm to the authorized phone number for SOS.

XX is the preset distance to the tracker's original place

=00, to turn off this function

=01, 30m	=02, 50m	=03, 100m	=04, 200m
=05, 300m	=06, 500m	=07, 1000m	=08, 2000m

Geo-fence Alarm	W******,017,X W******,117,X	W000000,017,11404.0000,E,2232.0010,N,11505.1234,E,2333.5678,N W000000,117,11404.0000,E,2232.0010,N,11505.1234,E,2333.5678,N

Remarks: 017 is for alarm when tracker moves out the preset scope; 117 is for alarm when tracker moves in.

When the tracker moves in or out, it will send an SMS alarm to the authorized phone number for SOS.

X is the coordinates which include:

Lower-left X,Lower-left Y,Upper-right X,Upper-right Y

For example, 11404.0000,E,2232.0010,N,11505.1234,E,2333.5678,N

Note:

1. Lower-left X should be less than Upper-right X;
2. All longitudes and latitudes should be in ASCII format as follows:-

   Longitude: DDDFF.FFFF,E/W. 4 places of decimal. '0' is needed to be stuffed if no value available.

   Latitude: DDFF.FFFF,N/S. 4 places of decimal. '0' is needed to be stuffed if no value available;
3. Only one alarm can be set in either Movement Alarm or Geo-fence Alarm;
4. Send W******,006,00 to turn off Geo-fence function.

Extended Functions	W******,008,ABCDEFGHIJ###	W000000,008,1011100011###

Remarks:

A=0, turn off the function of sending SMS position report after a phone call is made to the tracker.

A=1, turn on the function of sending SMS position report after a phone call is made to the tracker.

B=0, location data of NMEA 0183 GPRMC will be interpreted into normal text for easy reading.

For example, *Longitude = 114 degree - 04 minute -57.74 second, Latitude = 22 degree -32 minute -40.05 second*

B=1, location data complies with NMEA 0183 GPRMC protocol.

For example, $GPRMC,161509.000,A,2232.5485,N,11404.6887,E,0.3,153.7,290709,,*03

C=0, turn off the function to automatically hang up an incoming call.

C=1, turn on the function to automatically hang up an incoming call after 4 - 5 rings.

D=0, turn off the function of sending an SMS when the tracker is turned on.

D=1, turn on the function of sending an SMS to SOS number when the tracker is turned on.

E, defaulted as 1 (the tracker shuts down automatically when the power voltage is lower than 3V).

F=0, turn off the SMS alarm when the tracker enters GPS blind area.

F=1, turn on the SMS alarm when the tracker enters GPS blind area. SMS is to be sent to the authorized phone number for SOS.

G=0, all LEDs work normally.

G=1, all LEDs stop flashing when the tracker is working.

H, reserved and defaulted as '0'

I=0, turn off the function of sending SMS alarm when the extra power of the vehicle tracker is cut.

I=1, turn on the function of sending an SMS alarm to the authorized phone number for SOS when the extra power of the vehicle tracker is cut.

E, defaulted as 1 (the tracker shuts down automatically when the power voltage is lower than 3V).

is the ending character

(ABCDEFGHIJ defaulted as 1000100001)

Presetting by SMS for GPRS tracking (*Ensure that your SIM card supports GPRS connection prior to setting)*

Set Tracker ID	W******,010,ID	W000000,010,00001
Remarks: to set a digital ID for the tracker. Tracker ID must not over 14 digits.		
Set APN	W******,011,APN,Username,Password	W000000,011,CMNET,yourwebsite,6688 W000000,011,CMNET
Remarks: If no APN username and password are required, just input APN only; APN defaulted as 'CMNET'; APN + username + password should not over 39 characters.		
Set IP and Port	W******,012,IP,Port	W000000,012, 220.121.7.89,8500 W000000,012,www.yourwebsite.net,8500
Remarks: IP is your server's IP or the domain name. Port: [1,65534]		
Set DNS Server IP	W******,009,DNS Server IP	W000000,009,220.23.4.90
Remarks: In case the domain name you set by the last command (W******,012,IP, Port) doesn't work, which means your server IP is not properly set. You can first use this command to set DNS Server IP (please check with your DNS server provider for the DNS Server IP) and then redo the command W******,012,IP, Port.		
Enable GPRS Tracking	W******,013,X	W000000,013,1
Remarks: X=0, to turn off GPRS tracking (default); X=1, to enable GPRS tracking via TCP X=2, to enable GPRS tracking via UDP		
Set GPRS Interval	W******,014,XXXXX	W000000,014,00060
Remarks: to set time interval for sending GPRS packets. XXXXX should be in five digits and in unit of 10 seconds.		

XXXXX=00000, to turn off this function;

XXXXX=00001~65535, time interval for sending GPRS packet and in unit of 10 seconds.

In this example, the tracker will send every 600 seconds (10 minutes).

Heading Change Report	W******,036,degree	W000000,036,90

Remarks: when the heading direction of the tracker changes over the preset degree, a message with location data will be sent back to the server by GPRS.

degree=0, to turn off this function.

degree=[1,360], to set degree of direction change.

For more information regarding GPRS tracking please refer to <GPRS Communication Protocol>

Output Control (Immediate)	W******,020,P,F	W000000,020,1,1

Remarks:

P =1, Output1;	=2, Output2;	=3, Output3;	=4, Output4;	=5,Output5

F =0, to close the output (open drain)	=1, to open the output (Low voltage)

For example, if you have connected Output1 with a relay, you can send W000000,020,1,1 to stop the engine.

Output Control (Conditional)	W******,120,ABCDE W******,220,ABCDE	W000000,120,10000 W000000,220,10000

Remarks: This function is achievable only when the speed is below 10km/h(command 120) or 20km/h(command 220) and meantime GPS is available.

ABCDE represents Out1, Out2, Out3, Out4, and Out5 respectively.

If A or B or C or D or E,

=0, to close the output (open drain)	=1, to open the output (low voltage)	=2, to remain previous status

Sleep Mode	W******,021,XX###	W000000,021,02###

Remarks: this setting is for power saving.

XX=00 turn off sleep mode	XX=01 Level I	XX=02 Level II

is the ending character

Here is some explanation for the sleep mode. First, assume that the GPS acquisition time is ONE minute.

[1] In Level I

The GPS module will be working for the first three minutes (i.e. 3 times of acquisition time) and then shut down for ONE minute (i.e. equivalent to acquisition time), and then work again for another three minutes……

[2] In Level II

The GPS module will be working for the first two minutes (i.e. twice of acquisition time) and then shut down for ONE minute (i.e. equivalent to acquisition time), and then work again for another two minutes……

Power Down	W******,026,XX	W000000,026,10

Remarks: to set power down mode when the tracker is inactive (stationary) for a period of time.

In Power Down mode, GPS stops working and GSM enters sleep and stop sending out message until it is activated by message, incoming calls, movement or input changes.

XX=00, to turn off this function.

XX=01~99, to turn on Power Down after a specified period of being inactive. It is in unit of minute.

In this example, the tracker will enter power down mode after it is inactive for 10 minutes.

Listen in (Voice Monitoring)	W******,030,T	W000000,030,88888888
Remarks: T is the telephone number for Voice Monitoring and max. 16 digits		
Set Logging Interval	W******,031,X	W000000,031,60
Remarks: to set the interval for storing GPS data into tracker's flash memory. (Note: this interval is not relevant to the interval of SMS/GPRS tracking) X=0, to turn off this function. X=[1, 65535] to set interval in second. In this example of W000000,031,60, the tracker will store location data every 60 seconds.		
Correct Time Difference	W******,032,T	W000000,032,480 W000000,032,-120
Remarks: Default time of the tracker is GMT, you can use this comment to correct it to your local time. This command is for SMS tracking only. T=0, to turn off this function. T=[1, 65535] to set time difference in minute to GMT. For those ahead of GMT, just input the time difference in minute directly. For example, GMT+8, W000000,032,480 '-'is required for those behind GMT. For example, W000000,032,-120.		
Set SMS Initials	W******,033,P,Char	W000000,033,1,help
Remarks: this command is to set initial characters for SOS message when SOS/IN1, Button B/IN2, Button C/IN3 is pressed. P=1, SOS button/Input1 P=2, B button/Input2 P=3, C button/Input3 Char is the character in SOS message and max 32 characters 加入默认值		
Set Prefix (Country Code)	W******,502,*Data#	W000000,502,*+86#
Remarks: be advised caution in this setting. Normally, your country code (for example in China it is +86) will be automatically added and displayed prior to a phone number when sending SMS. In this case, you don't have to do this setting. If the country code is not added, you are required to input the country code, for example, +86, to enable the tracker can send out SMS to your mobile phone. Data: max 10 digits		
Get Version No. and Serial No.	W******,600	W000000,600
Remarks: to get the version and serial number of tracker's firmware		
Get IMEI	W******,601	W000000,601
Remarks: to get IMEI of the tracker		
Reboot GSM	W******,901###	W000000,901###
Remarks: to reboot the GSM module of the tracker		
Reboot GPS	W******,902###	W000000,902###
Remarks: to reboot the GPS module of the tracker		
Initialization	W******,990,099###	W000000,990,099###

Remarks: Turn on the device, press the SOS button for five times continuously and then send (within 120 seconds) this SMS to the tracker to make all settings (except for the password) back to factory default. ### is the ending character.		
Password Initialization	W888888,999,666	W888888,999,666
Remarks: In case you forget your password, turn on the tracker, press the SOS button for five times continuously and then send this SMS (within 120 seconds) to the tracker to make the password back to factory default (000000).		

Annex 2. Troubleshooting

Problem: Unit will not turn on	
Possible Cause:	**Resolution:**
Wiring was not connected properly	Check and make sure wiring connection is in order.
Battery needs charging	Recharge battery
Problem: Unit will not respond to SMS	
Possible Cause:	**Resolution:**
GSM antenna was not installed properly	Make AVT310 connected to GSM network.
GSM Network is slow	Wait for SMS. Some GSM networks slow down during peak time or when they have equipment problems.
Unit is sleeping	Cancel sleeping mode
Wrong password in your SMS or wrong SMS format	Write correct password or SMS format
The SIM in AVT310 has run out of credit	Replace or top up the SIM card
No SIM card	Insert a working SIM card. Check in phone that the SIM can send SMS message.
SIM card has expired	Check in phone that the SIM can send SMS message. Replace SIM card if needed.
SIM has PIN code set	Remove PIN code by inserting SIM in you phone and deleting the code.
SIM is warped or damaged	Inspect SIM, clean the contacts. If re-inserting does not help try another to see if it will work.
Roaming not enabled	If you are in a different country your SIM account must have roaming enabled.
Error connecting GSM antenna	Make sure the GSM antenna is connected to the GSM interface.
Problem: SMS received starts with 'Last…'	
Possible Cause:	**Resolution:**
Unit does not have clear view of the sky	Move the antenna of the unit to a location where the sky is visible.
AVT310 is in an inner place	Wait for the target to come out
Battery is low	Recharge the unit and the GPS will start working.
Error connecting GPS antenna	Make sure the GPS antenna is connected to the GPS interface.
Problem: Unit Fails to Connect to Server via GPRS	
Possible Cause:	**Resolution:**
SIM card in AVT310 does not support GPRS function	Enable SIM card GPRS function.
GPRS function of AVT310 is turned off	Turn on GPRS function of AVT310.
Incorrect IP address or PORT	Get the right IP address and PORT and reset to AVT310.
GSM signal is weak	Move the unit to a location with good GSM reception.

Contacts

If you encounter any problems when using our products, and cannot solve them by yourself, please contact our technical support team by writing an e-Mail to us. We will be pleased to help you.