GPS Vehicle Tracker – User Manual – Version 6.2

1. Product Overview

GPS Vehicle Tracker has been specially designed and developed for real time tracking of your vehicles and to assist in fleet management. With superior GPS and GSM modules, the GPS Vehicle Tracker has good sensitivity and stable performance.

GPS Vehicle Tracker has the following features:

- Tracking via SMS or GPRS (TCP/UDP)
- Track on demand or by time interval
- SOS panic button
- Geo-fencing control
- Movement alarm
- Low battery alert
- Speeding alert
- Alert when GPS Vehicle Tracker enters/exits GPS blind area
- Power Cut Alarm
- Engine Cut (Optional)

2. For Your Safety

Read these simple guidelines. Not following them may be dangerous or illegal.

- **Proper Connection** – When connecting with other devices carefully read the instructions and ensure that such work is undertaken by a competent person.

- **Qualified Accessories** – Only use original parts as authorised for use with the GPS Vehicle Tracker.

- **Qualified Service** – Only qualified personnel can repair GPS Vehicle Tracker.

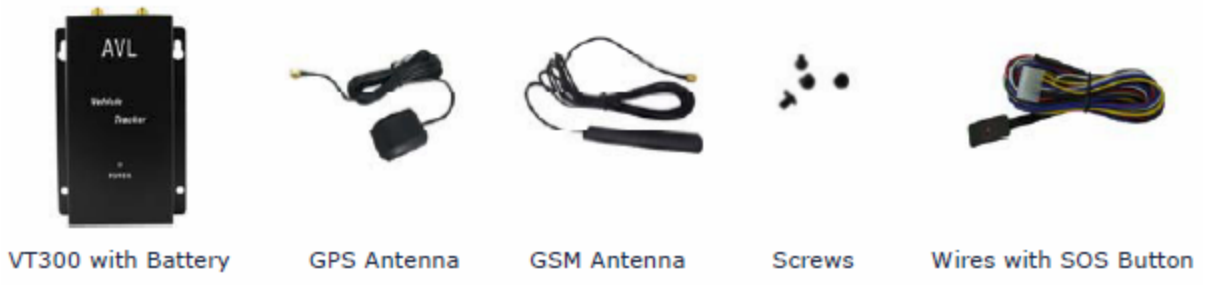
- **Water Resistance** – GPS Vehicle Tracker is not water resistant. Keep it dry and mount within the vehicle or within an IP rated box if necessary.

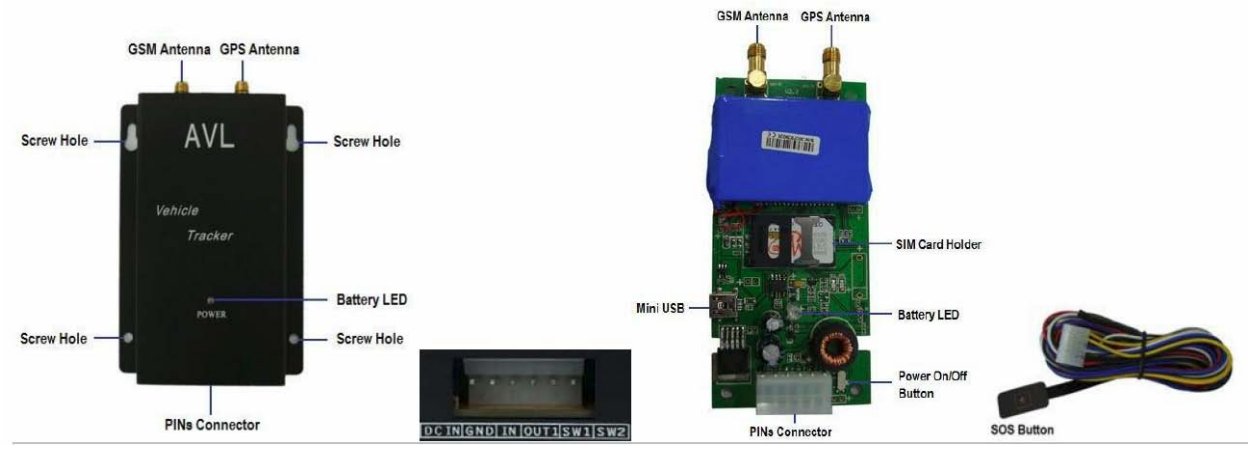
3. GPS Specification

Item	Specification
Charging Voltage	DC +9V to + 36V /1.5A
Internal Battery	Rechargeable and replaceable 850 mAh battery
Normal Power Consumption	85mA/h
Dimension	115mm × 60 mm × 21 mm
Weight	140g
Operating Temperature	-20° to 55° C
Humidity	5% to 95% Non-condensing
GSM module	GSM 900/1800/1900Mhz or GSM 850/900/1800/1900Mhz
GPS chipset	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
Re-aquisition	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	1 External LED light to show power (Internal LED to show GPS and GSM status)
Button	1 remote button for SOS

4. Getting Started

This section will describe how to set up your GPS Vehicle Tracker.





4.1 Hardware and Accessories

GPS Vehicle Tracker includes:

- GPS Vehicle Tracker main unit with battery
- Cable loom with SOS button
- GSM Antenna
- GPS Antenna
- Mounting screws

4.2 Light, Button and Connector Functionality

Your GPS Vehicle Tracker has 1 external LED light:

Red LED - indicating power status	
Off	Power is off or charging is complete
Dim	Power attached and battery fully charged
Flashing (every 0.1 second)	Low power
On	Charging
Flashing (on 1 second, off 2 seconds)	Working
Functionality	
Power Switch	To turn GPS Vehicle Tracker on/off The switch is in the off position as factory default. When all the wires are connected and the loom is plugged in, the GPS Vehicle Tracker will be switched on automatically when the yellow cables (SW1 and SW2) are connected together.
SOS Button	The SOS button is pre wired into the loom. Press SOS button to send an SMS to the pre-programmed phone number.
Mini USB	Used for firmware upgrade and configuration.
SIM Card	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 for fixing to the vehicle
PIN Connectors	
DC IN - RED	DC In: 9V – 36V. 12V Suggested
GND – BLACK	Ground
IN – WHITE	Input. Negative Triggering. Low Voltage (0V) when effective and open drain or HIGH Voltage (>1V and max . 45V) when ineffective)
OUT1 – BLUE	Output. 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
SW1 - Yellow	For the GPS Vehicle Tracker to function correctly and switch on, there must be a continuous loop between SW1 and SW2.
SW2 - Yellow	

4.3 Connecting and Installation

IMPORTANT: Please read this manual before connecting / using your GPS Vehicle Tracker.

Ensure that your GPS Vehicle Tracker has a working SIM installed.

- Check that the SIM lock code is turned off. The unit will accept any SIM card except 3 Mobile or any operator that requires you only use a 3G handset / unit (currently only 3 Mobile)
- Test the SIM in a phone to make sure it can send and receive SMS
- Take a note of the telephone number associated with the SIM
- Check that the SIM has not run out of credit

- **If you require the function of sending an SMS location report to the authorised phone number when it makes a call to the GPS Vehicle Tracker, please make sure the SIM installed supports displaying caller ID.**
- Before inserting the SIM card, ensure that no power is connected to the GPS Vehicle Tracker observing the correct position to insert.
- Unscrew and remove cover

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

Antenna Connection

Connect the GSM Antenna to the GPS Vehicle Tracker
Connect the GPS Antenna to the GPS Vehicle Tracker

The GPS antenna is used to receive satellite signals. It should ideally be fixed towards the sky without obstruction from metallic windscreens or metal objects.

Installation

Find a suitable place inside the vehicle for mounting the GPS Vehicle Tracker. Wiring connections must be firm and reliable and the joints should be wrapped with insulating tape. The unused electrical wire should be properly insulated.

Check all wirings have been connected correctly and connect the connector to the GPS Vehicle Tracker.

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

Make a call (allow to ring for 10 seconds and then cut off the call) to the GPS Vehicle Tracker using a mobile phone to ensure that a call can be received and the tracker responds with longitude, latitude data.

Mount the SOS button in the desired location with the self adhesive pad.

5. SMS Command

GPS Vehicle Tracker will only accept commands from a user with the correct password. Commands with the wrong password are ignored. **The default password is 000000.**

Ensure that where letters are used in programming messages that you use capital letters and follow the commands detailed.

Before using the GPS we recommend that you change the password. To do this:

Description: Changes user's password.
Command: W******,001,######

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

5.1 Basic Commands

5.1.1 Return the location of the tracker

Description: To find out the location of your GPS Vehicle Tracker, send an SMS or make a telephone call directly to GPS Vehicle Tracker and it will report its location by SMS. To locate via SMS:

Command: W<password>,<000>
Example: W000000,000

Shortly after ringing the GPS Vehicle Tracker or sending the SMS an SMS is received (example):

Latitude = 51 28 08.30N Longitude = 0 27 20.89W, Speed = 2.6854Km/h, 2009-08-01,21:50

This means the tracker is in location 51 28 08.30N 0 27 20.89W, travelling at 2.6854 Km/H on 1st August 2009 at 9:50pm. See Section 7 for more details.

To get GPS Vehicle Tracker's location by another easier way:

IMPORTANT NOTE: THE CALLER ID ON YOUR PHONE MUST BE SET TO SEND YOUR CALLER ID WHEN YOU MAKE A CALL

- Call GPS Vehicle Tracker using your mobile phone
- After listening to the ring for 10 - 20 seconds, hang up the phone.
- Then, in about 15 seconds, your mobile phone will receive an SMS with longitude and latitude.

5.1.2 Return Location of Tracker with Google Maps Link

Description: To find out the location of your GPS Vehicle Tracker and for the GPS to send you a URL link, to link directly to Google Maps:

Command: W<password>,<100>
Example: W000000,100

You will receive and SMS with a link that looks like:

http://maps.google.com/maps?f=q&hl=en&q=22.540103,114.082329&ie=UTF8&z=16&iwloc=addr&om=1

Click on the link to view the Google Map location

5.1.3 Track by Pre-Set Interval

Description: You can set the GPS Vehicle Tracker to automatically send you timed reports with details of its location according to the time interval you set.

Command: W<password>,002,XXX
Notes: XXX is the interval in minute. If XXX=000 it will stop tracking
Example: W000000,002,005
SMS received: Set Time OK/005
Meaning: GPS Vehicle Tracker will report its location by SMS every 5 minutes.

5.1.4 Stop automatic timed report

Description: Automatic timed reports will stop once GPS Vehicle Tracker receives stop command.

Command: W<password>,002,000
Example: W000000,002,000
SMS received: Set Timer OK/000
Meaning: GPS Vehicle Tracker will stop automatic timed report.

5.1.5 Authorising SOS number

Description: When the SOS button is pressed an SMS is sent to a preset number with location details. To set this number use the following command.

Command: W<password>,003,F,1,T
Example: W000000,003,1,079731234567
Notes: F=0, to turn off this function
F=1, Sends SMS to authorised number
T= Preset phone number (max. 16 digits)

5.2 GPRS Settings by SMS

NOTE:

TRACKING VIA GPRS IS AN ADVANCED FUNCTION AND YOU SHOULD BE FULLY FAMILIAR WITH THE REQUIREMENTS OF GPRS SETTINGS AND ITS APPLICATION BEFORE ATTEMPTING TO PROGRAMME THE GPS VEHICLE TRACKER.

To tracking via GPRS, you should set the GPS Vehicle Tracker ID, IP, Port and APN for GPS Vehicle Tracker. Ensure that your SIM card in GPS Vehicle Tracker supports GPRS connection prior to setting.

5.2.1 Set ID for GPS Vehicle Tracker

Command: W<password>,010,ID
Note: Tracker ID must not be over 14 digits.
Example: W000000,010,123456789
SMS received: Set SIM OK/123456789

5.2.2 Set APN

Command: W<password>,011,APN,APN Username,APN Password
Note: If no APN name and password required, input APN only.
Example: W000000,011,CMNET
SMS received: Set APN OK/CMNET

5.2.3 Set IP Address and Port

Command: W<password>,012,IP,PORT
Example: W000000,012,202.116.11.12,8000
SMS received: Set IP OK/202.116.11.12,8000

5.2.4 Set Time Interval for Sending GPRS Packet

Command: W<password>,014,time interval(in unit of 10 seconds)
Example: W000000,014,00003
GPS Vehicle Tracker will reply with an SMS to confirm this setting and will send a GPRS packet every 30 seconds

5.2.5 Enable GPRS Tracking Function

Command: W<password>,013,X
Notes: X=0, to turn off GPRS tracking function (default)
X=1, to set TCP
X=2, to set UDP
Example: W000000,013,1
GPS Vehicle Tracker will reply with an SMS to confirm this setting.

6. Tracking on Map

You can use the co-ordinates supplied by the GPS Vehicle Tracker in 5.1.1 to enter into your own mapping software or use applications such as Google Maps or Google earth:

Option 1: Download Google Earth from http://earth.google.com/
Start the Google Earth (For more information about Google Earth please refer to http://earth.google.com/)

Option 2: In your web browser open http://maps.google.co.uk

In the search box input the latitude and longitude that you receive from the tracker by SMS and click the search button.

For example if your SMS received was:
Latitude = 51 28 08.30N Longitude = 0 27 20.89W, Speed = 2.6854Km/h, 2009-08-01,21:50

In the search box you would enter: 51 28 08.30N 0 27 20.89W

Hit the search icon / button and you can now see the location of your tracker.

7. Troubleshooting

Problem: Unit will not turn on	
Possible Cause:	**Resolution:**
Wiring is not connected properly	Check and ensure all wiring is installed correctly Yellow wire on loom has been cut and not connected to a switch / switch is turned off
Battery needs charging	Charge battery for at least 3 hours

Problem: Unit will not reply with SMS	
Possible Cause:	**Resolution:**
GSM antenna is not installed properly	Connect GSM antenna to correct interface
GSM Network is slow	Wait for SMS. Some GSM networks slow down during peak time/ during maintenance.
Unit is sleeping	Cancel sleeping mode
Wrong password in your SMS / SMS format	Write correct password or SMS format
The SIM in GPS Vehicle Tracker has run out of credit	Replace or top up the SIM card
No GSM signal	Check with a mobile phone to see if there is a signal in the area or try to call the unit to see if you hear a ring tone.
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 your 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.
Battery is low	Recharge the unit and the GSM will start working.

Problem: SMS received starts with 'Last…'	
Possible Cause:	**Resolution:**
Unit does not have clear view of the sky	Move the unit to location where the sky is visible. Tall buildings, trees, heavy rain, can cause problems with the GPS reception.
Bad GPS reception	Ensure antenna has clear view of sky.
Battery is low	Recharge the unit and the GPS will start working.
GPS antenna is not installed properly	Connect GPS antenna to correct interface

8. Full SMS Command List

Remarks: ****** is user's password and the default password is 000000.

ENSURE YOU FOLLOW THESE INSTRUCTIONS CAREFULLY TO AVOID INCORRECTLY PROGRAMMING YOUR GPS VEHICLE TRACKER

Description	Command	Remarks
Get current location	W******,000	Get current location of GPS Vehicle Tracker
Change user's password	W******,001,######	****** is old password ###### is new password
Set interval for automatic timed report	W******,002,XXX	XXX is the interval in minute. If XXX=000 it will stop tracking
Set authorised phone number for SOS button	W******,003,1,T	F=0, to turn off this function; (default) F=1, to turn on this function; T: Preset phone number. Max.16 digits Example: W000000,003,1,079731234567
Set low power alert When GPS Vehicle Tracker voltage is lower than the preset value, it will send one low power alert to the SOS preset number.	W******,004,X	X (voltage preset value) =0 , to turn off this function =1, <3.3V send SMS alert =2 , <3.4V send SMS alert =3 , <3.5V send SMS alert (default) =4 , <3.6V send SMS alert =5 , <3.7V send SMS alert
Set over speed alert When GPS Vehicle Tracker speeds higher than the preset value, it will send an SMS to the SOS preset number.	W******,005,XX	XX (the preset value of speed) =00 , to turn off this function =[01, 20] (unit: 10Km/h) For example: W000000,005,08, it will send alert when it is over 80Km/h

Set Movement alert When GPS Vehicle Tracker moves out of preset scope, it will send one Geo-fence SMS to the SOS preset number. (Based on current location of GPS)	W******,006,XX	XX (preset distance to 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 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.	W******,017,X or W******,117,X	1. 017 is for alarm when tracker moves **out of** the preset scope. 2. 117 is for alarm when tracker moves **into** the preset scope. 3. X is the co-ordinates 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 used if no value available. Latitude: DDFF.FFFF,N/S. 4 places of decimal. '0' is needed to be used 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
Sleep Mode Put the GPS Vehicle Tracker into sleep mode to conserve battery power.	W******,021,XX###	**Level 1:** The GPS will be working for the first 3 minutes and then shut down for 1 minute and then work again for another 3 minutes etc. **Level 2:** The GPS will be working for the first 2 minutes and then shut down for 1 minute and then work again for another 2 minutes etc. XX (sleep mode) =00 Sleep mode turned off =01 Level 1 Sleep mode =02 Level 2 Sleep mode **Example**: W000000,021,02### (**###** is the ending character)

Power Down To power down the GPS Vehicle Tracker when inactive for a preset length of time.	W******,026,XX	In Power Down mode, GPS stops working and GSM enters sleep and stops sending out messages until it is activated by message, incoming calls or triggered by buttons. 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 units of one minute. (In the example below the GPS unit will power down after 10 minutes of inactivity). **Example**: W000000,026,10
Set SMS Characters for SOS This command is to set initial characters for SOS message when SOS button is pressed.	W******,033,1,Char	**Char:** Up to 32 User Defined characters **Defaults:** SOS: SOS Alarm!
Reboot GSM	W******,901###	**###** is the ending character. **Example**: W000000,901###
Reboot GPS	W******,902###	**###** is the ending character. **Example**: W000000,902###
Set time zone difference	W******,032,T	T=0, to turn off this function T=[1, 65535] to set time difference in minute to GMT. Default value is GMT For those ahead of GMT, just input the time difference in minute directly. For example, W000000,032,120 '-'is required for those behind GMT. For example, W000000,032,-120.
Veer Report	W******,036,degree	When the heading of the tracker changes over the preset degree, a message with location data will be sent back to the server by GPRS. Degree = 0, turn off this function Degree= [1 to 360], to set degree of direction change
Reset GPS Vehicle Tracker back to Factory Settings 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 to make all settings (except for the password) back to factory default.	W******,990,099###	**###** is the ending character. **Example**: W000000,990,099###

Reset Password back to 000000 If you forget your password, 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).	W888888,999,666	**Example**: W888888,999,666
Extend Settings	W******,008,ABCDEFGHIJ### (default value is: ABCDEFGHIJ= 1000100001)	**A=0**, turn off the function of sending an SMS location report to the authorised phone number when it makes a call to GPS Vehicle Tracker. **A=1**, turn on the function of sending an SMS location report to the authorised phone number when it makes a call to GPS Vehicle Tracker. **B=0**, location data of NMEA 0183 GPRMC will be interpreted into normal text for easy reading. For example: Longitude = 114 degree - 04 cent -57.74 second Latitude = 22 degree -32 cent -40.05 second **B=1**, location data complies with NMEA 0183 GPRMC protocol. For example: $GPRMC,072414.000,V,3114.3763,N, 12131.3255,E,0.00,0.00,050805,*00 **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 GPS Vehicle Tracker is turned on. **D=1**, Turn on the function of sending an SMS to SOS number when GPS Vehicle Tracker is turned on. **E**, defaulted as 1 (the GPS Vehicle Tracker shuts down automatically when the power voltage is lower than 3V). **F=0**, Turn off the alert when GPS Vehicle Tracker enters GPS blind area. **F=1**, Turn on the alert when GPS Vehicle Tracker enters GPS blind area. SMS is to be sent to SOS number **G=0**, all LED lights work normally **G=1**, all LED lights stop flashing when GPS Vehicle Tracker working. H, reserved and defaulted as 0 I=0, turn off the function of sending SMS alarm when the extra power of the tracker is cut. I=1, turn on the function of sending SMS alarm when the extra power of the tracker is cut. J, reserved and defaulted as 1 **###** is the ending character

Presetting by SMS for GPRS tracking **(**Ensure that your SIM card supports GPRS connection prior to setting)		
Set ID for GPS Vehicle Tracker	W******,010,ID	ID Tracker ID must not over 14 digits.
Set APN	W******,011,APN,APN Name, APN Password	If no APN name and password required, just insert APN only; APN defaulted as 'CMNET'; APN + APN name + password not over 39 characters.
Set IP Address and Port	W******,012,IP, Port	IP: xxx.xxx.xxx.xxx Port: [1,65534]
Enable GPRS Tracking Function	W******,013,X	X=0, turn off GPRS tracking (default); X=1, enable TCP X=2, enable UDP
Set Time Interval for sending GPRS Packet	W******,014,XXXXX	XXXXX should be in five digitals 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.

We shall not be held liable for direct, indirect, special, incidental or consequential damages (including but not limited to economic loss, such as loss of profits, loss of business or business interruption, loss of revenue, loss of goodwill or loss of anticipated savings / profits arising out of the use or inability to use this product or documentation, even if advised of the possibility of such damages.

Appendix 1 – Engine Cut Off Module

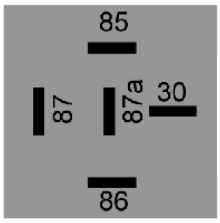
NOTE: THIS MODULE SHOULD ONLY BE INSTALLED BY A COMPETENT ENGINEER AS INCORRECT INSTALLATION COULD RENDER THE VEHICLE INOPERABLE

The Engine Cut off Module is an optional device that can be attached to your GPS Vehicle Tracker, to allow for the engine to be cut. It is made up of two parts: a 14VDC Relay and a Relay Wiring Loom Connector.

The optional relay supplied with the GPS Vehicle Tracker is rated at 14VDC and should only be used with the 12VDC power supply to which the GPS Vehicle Tracker is attached.

The Relay Wiring Loom Connector has 5 wires attached:

Thin White: Terminal 85 **-** attached to relay coil
Thin Yellow: Terminal 86 **-** attached to relay coil
Thick Green x 2: Terminal 87a & 30 **-** normally closed circuit switch
Thick Yellow: Terminal 87 - Not Used



Base of Relay

Connect the relay to the GPS Vehicle Tracker as shown overleaf using the supplied wiring connector.

Note: The two green wires connected via the relay are Normally Closed when the relay coil has no current passing through it.

NOTE: IT IS RECOMMENDED THAT THE PASSWORD IS CHANGED BEFORE USING THE FUNCTIONS TO CUT OFF THE ENGINE AND THE PHONE NUMBER AND THE PASSWORD OF THE GPS VEHICLE TRACKER IS ONLY GIVEN TO THOSE PEOPLE THAT SHOULD HAVE CONTROL OVER THE VEHICLE.

SMS Commands for use with Engine Cut Off Module

Output Control (Unlimited)

Description: Sending this command will **IMMEDIATELY** stop the engine when the command is sent.

Command:	W<password>,020,1,F
Example:	W000000,020,1,1
Meaning:	This command will cut off the engine
Note:	**F=0, to change the relay from Open to Closed state i.e. the two green wires now complete a circuit and, for example, the engine can be started.** **F=1, to change the relay from Closed to Open state i.e. the two green wires no longer complete a circuit and, for example, the engine will cut out.**

Output Control (Limited)

Description: Send this command to control the output of the GPS Vehicle Tracker. This command will only work when the speed of the vehicle is below 10km/h or 20km/h and a GPS signal is available.

Command:	W<password>,120,F or W<password>,220,F
Example:	W000000,120,1 or W000000,220,1
Meaning:	This command will cut off the engine when it reaches 10km/h or 20km/h as set
Note:	**F=0, to change the relay from Open to Closed state i.e. the two green wires now complete a circuit and, for example, the engine can be started.** **F=1, to change the relay from Closed to Open state i.e. the two green wires no longer complete a circuit and, for example, the engine will cut out.**

NOTE: ONCE INSTALATION IS COMPLETE IT IS ESSENTIAL THAT THE ENGINE CUT OFF MODULE IS TESTED AND VERIFIED AS WORKING CORRECTLY IN A SAFE ENVIRONMENT. THE INSTALLER MUST ENSURE THAT THEY EXPLAIN TO THE END USER THE FUNCTION OF THE ENGINE CUT OFF AND WHAT SETTINGS HAVE BEEN PROGRAMMED TO THE GPS VEHICLE TRACKER.

Example Wiring Diagram