PORTMAN

GPS GPRS TRACKING AND ALARM SYSTEM

HEU

OPERATION & INSTALLATION MANUAL

REV: 2.8 (Standard, HEU-v4.0, HEU-I)

I . BRIEF INTRODUCTION

GPS GPRS Tracking and Alarm System utilize the GPS and car alarm functions in one unit. You can monitor the vehicle location and control the car alarm remotely. In addition, the unit will send event report if any trigger occurs. It has built-in 2 outputs and 5 inputs to perform essential alarm functions.

The standard report sent by the unit includes the information: (1) unit's ID, (2) status, (3) time, (4) GPS's latitude and longitude, (5) speed, (6) direction, (7) report configuration parameters, and (8) event number.

The reporting mode can be categorized as 'time' report, 'distance' report, or 'intelligent' report. User can choose the reporting mode and related parameters via the PC setup program or the remote server.

The device has built-in 9 Geofence and 1 Self Geofence sets in circular shape; it will send the report to the server if the Geofence event is triggered.

The UNIT must be initialized by PORTMAN PC setup program in order to make communication with the remote server /call center. There are four main sections that allow users to program the device, (1) User detail (Device ID, server IP, and port, GPRS APN….) (2) Geofence (9 circular Geofence and 1 Self Geofence,) (3) Report (Time, Distance, Intelligent mode, Low battery, Course change…) (4) ALARM Setup (to enable or disable the event generated by the inputs, e.g. ACC…and set the conditions for sleep mode) Those data is saved in device's EEPROM and will not be lost even if the power is failure.

A unique Self-Geofence report: user can press the Self-Geofence button to turn On or Off the self-Geofence function. The system will record the current position and use a pre-defined circular Geofence radius to guard the vehicle. If the vehicle moves out of the Geofence zone, a report will be sent.

When there is no GPRS service or the server is offline, the unit will send SMS report to the SMS number if defined. And the number of short message can be set from the pc setup program or remote setup program. After connect the server, all the report will be sent out again.

The server can not only configure the device just like the PC setup program does, but it also can send the command to control the device. The unit can communicate with the server via UDP, TCP or SMS protocol.

Flash memory for recording reports up to 900 reports. It can be read out from the PC setup program via serial port.

User configurable sleep mode:
The unit will go to sleep mode when ACC off, this feature is configurable. "GPS" or "GPRS" can be selected to power off. Also you can select both of them go to sleep mode. User can setup the automatically wakeup time during the sleep mode to ensure the device is working. The system can send out a wakeup report to the server after waking up.
During the sleep mode, if any of the inputs are triggered, the system will wake up and send relevant reports to the server. The input triggers for waking the device up are selectable.
All the auto report (Time, Distance, Intelligent…) will not be send when ACC off.
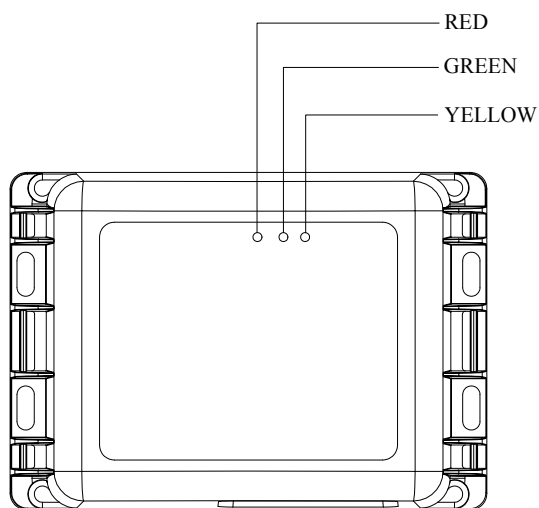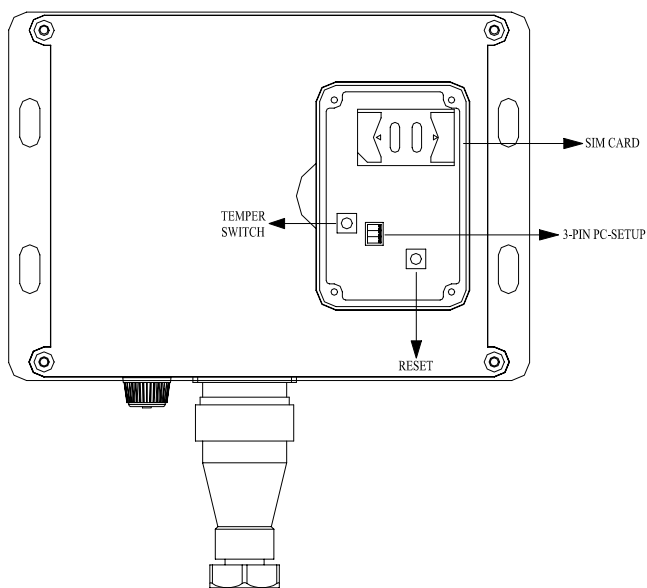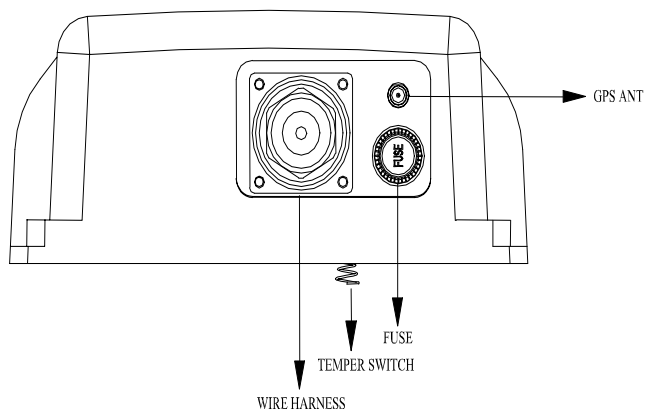
In addition, the system has a built-in rechargeable battery (12V 1.2A/H) for emergency use. The system will send an emergency "power cut" report when all of the external power is removed. User can check the external battery capacity status from the server. There system has another important security function-GPS Antenna Presence Detection. The system will send an emergency "GPS antenna failed" report when the GPS antenna is removed

Waterproof casing design

II. BASIC FUNCTIONS

FUNCTIONS	APPLICATIONS
GPS	GPS receiver will output a complete position, velocity, and time (PVT) solution in the NMEA Version 3.0 protocol
GPRS, SMS	GPRS use standard TCP or UDP communicate protocol. If the GPRS service is failed, the SMS mode will be turned on for emergency use.
5 Input	1. In-vehicle ACC 2. 2 general input port 3. Valet Switch+LED 4. Tamper Switch 5. Built-in 3-D acceleration sensor
2 Output	1.Built-in cut relay NO output 2. Siren
2 Button Valet Switch with 1 LED indicator	1. Activate Self-Geofence (press button1 once.) Deactivate Self-Geofence (press button1 once.) 2. Help request report (press button1 for 2 seconds.) 3. Panic report (press button 2 once). 4. Emergency-release. (Press button1+2 three times when ACC ON) 5. Intelligent power saving and control. (Press button1+2 for 5 sec.)
PC-setup	Initialize the unit and program the device, including Network APN, server IP address, user message, report control, and Geofence setting, etc … Note that Network APN and server IP details must be set before the installation.
Standard Report	Automatic report for AVL tracking purpose: Fixed time report Fixed distance report Intelligent report (combine time and distance)
Event Report	Speeding report Low battery report Geofence trigger report ACC on/off Unit box is open/closed GPS antenna disconnect A/D input trigger, e.g. air bag deploy Acceleration sensor trigger…………
History data store	900 reports can be saved in unit, and can be read from server and pc-setup

III. PANEL INSTALLATION AND WIRING DIAGRAM

GPS ANT

FUSE

TEMPER SWITCH

WIRE HARNESS

SIM CARD

TEMPER
SWITCH

3-PIN PC-SETUP

RESET

RED

GREEN

YELLOW

IV. STATUS INDICATOR

The system has three statuses LED; the following is their corresponding description:

Red: Power indicator. When the unit power on, the led will light all the time.

Yellow: GPRS indicator. This LED will flash when the device received the signal of the GSM base station.

Green: GPS indicator. This LED will turn continuously on when the unit received a valid GPS data.

Valet Switch LED:

Button switch + LED diagram is listed below, including 2 Buttons and 1 LED.

HEU valet switch operation.

2 buttons are defined as Button 1 and 2, please refer to the above diagram

1.) Self-Geofence: Press Button 1 once to activate self-Geofence. LED will be continuous ON. Press the button again to deactivate self-Geofence. LED will be OFF.

2.) Help button: Press Button 1 for 2 seconds: send HELP request message to the server. LED will flash 3 times.

3.) Panic Button: Press Button 2 once, the unit will send emergency report to the server. LED will flash 6 times. Press Button 2 once, panic will be released.

4.) Emergency-Release Button: Press Button 1+2 together for 3 times when ACC on, the unit will emergency Release. LED will flash 9 times.

5.) Intelligent power saving and control: Press button1+2 for 5 seconds., the unit will cut power of backup battery.

V. PC SETUP AND SYSTEM INITIATION

PC setup Procedure:

1.) Connect the 3 pin serial cable to HEU PC setup port.

2.) Open the PC setup program.

3.) Select the correct COM port for communication.

4.) Power on the device or press the reset button for at least 1 second.

5.) Click "ok" to start the program

Note that, if the connection fails, please check the cable connection is secured correctly. Press the reset button for a longer time, e.g. another 2 seconds.

A. LOGIN dialog window

Connect 3 pin DB9 serial cable to HEU PC setup port. Choose the correct COM port, and click "OK".
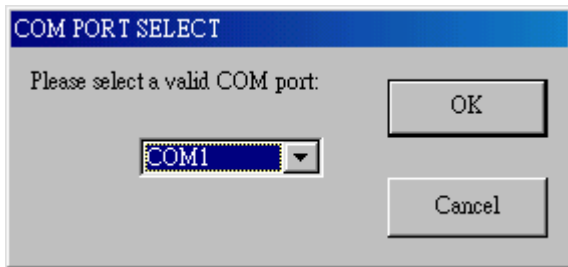
Note that: it is necessary to power on and reset the PORTMAN device soon after starting the PC setup program. PC setup program will detect the hardware for 60 seconds. If no hardware is detected, it will exit.

During the opening up screen shown as below, user can press "Esc" key to terminate the program.

B. Version No. Checking

The below interface will last until correct HEU Version No. is checked. (You should run this program before turn on power of HEU)


C. MAIN INTERFACE

1.[User detail]:

(1) Set Device ID for HEU. The device must be unique in order to be identified by the server.

(2) Set Access Point Name (APN), User Name (GPRS), Password (GPRS). The maximum length of the APN, User name and Password is 49 characters. Note that, some service providers do not require USER name or PASSWORD, hence, user can leave blank in this section.

(3) "TCP/UDP" address and Port number of alarm center being set, HEU will send message to these address. Note that only one TCP or UDP server will be used at the same time.

(4) HEU can save 900 reports (900-1) recently; Click 'Export' button can export them into Excel or Notepad.
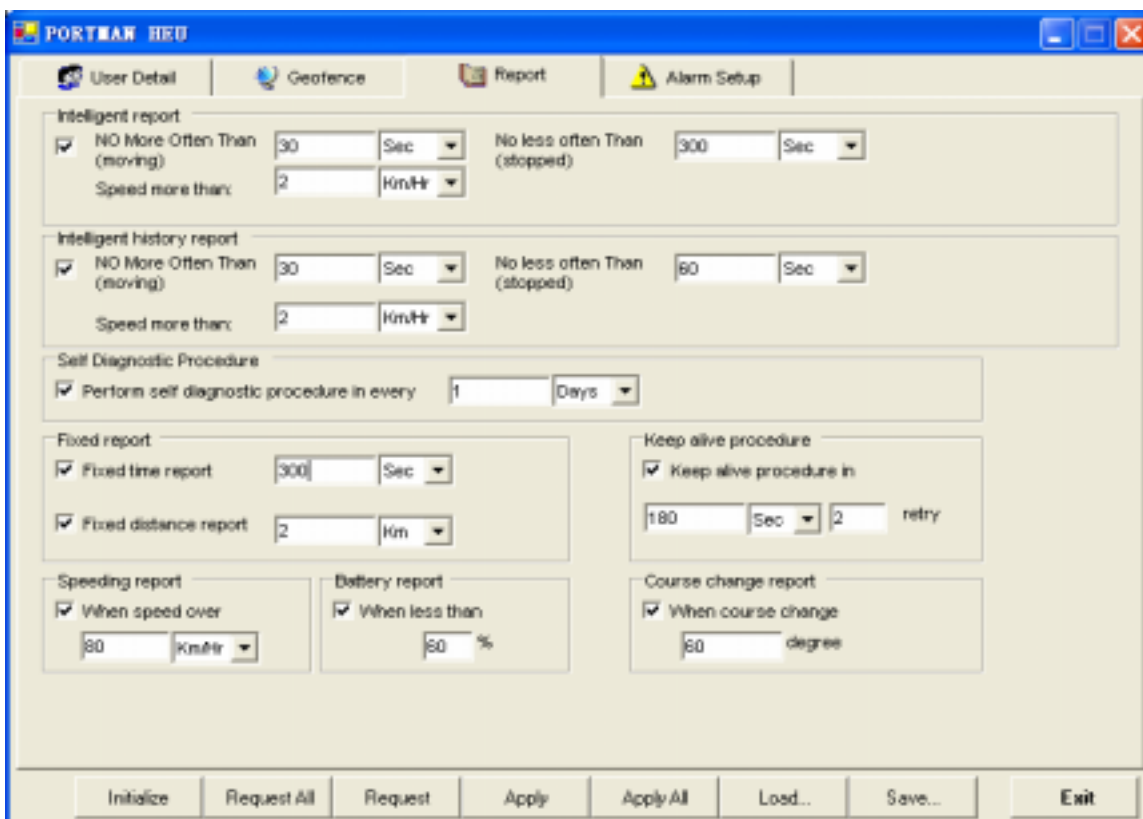
2. [Geofence]:
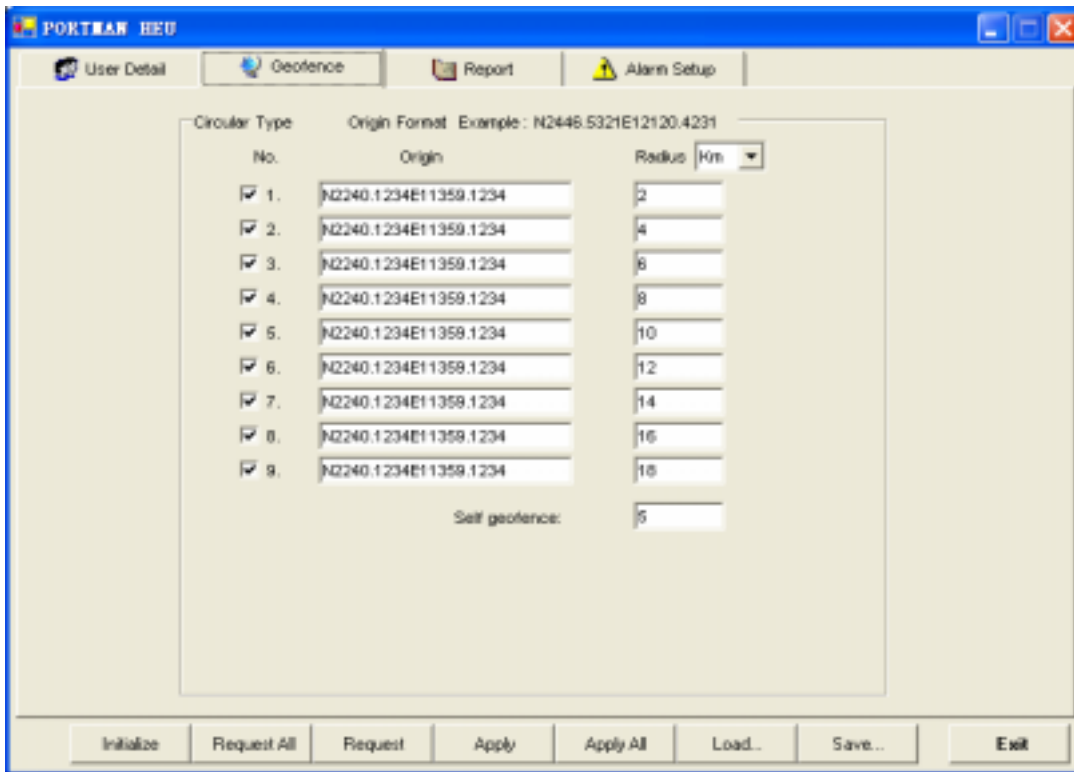
Setup the Geofence (in circular shape) parameters in this window. The format will be center of the Geofence and the related radius.

User can also set the radius for the self-Geofence in this field. The self-Geofence can be activated/deactivated from the 2 button LED switch.

3.[Report]:

In the working mode, the system will use the configurations as defined in this section. To activate the automatic report, please select "√" in checkbox and fill in data in the textbox.

The reports will be summarized as

(1) Intelligent report
Parameters: On/Off, Report time when moving, Report time when stop, and Moving Speed (min. Speed is 0.1 km/Hr, max. Speed is 1000 km/Hr).

(2) Intelligent history report (record the report in the system's flash ram)
Parameters: On/Off, Report time when moving, Report time when stop, and Moving Speed (min. Speed is 0.1 km/Hr, max. Speed is 1000 km/Hr).

(3) Fixed time report
Parameters: On/Off, and time.

(4) Fixed distance report
Parameters: On/Off, and distance. (min. distance is 0.1 km, max. distance is 100 km).

(5) Course change report
Parameters: On/Off, and course change in degree.

(6) Low battery warning report (to alert user when the battery level is low)
Parameters: On/Off, and warning battery level for report. For example, 60 to represent 60% lower level report. The system will ignore the parameter with a value '0' to prevent continuous non-stop reporting.
Power cut report: default is on. When the external power is cut, a POWER CUT report will be sent to the server.

(7) Speeding report: (min. speed is 0.1 km/Hr, max. speed is 1000 km/Hr).
Parameters: on/off, and speed

4.[Trigger report and sleep mode setup]
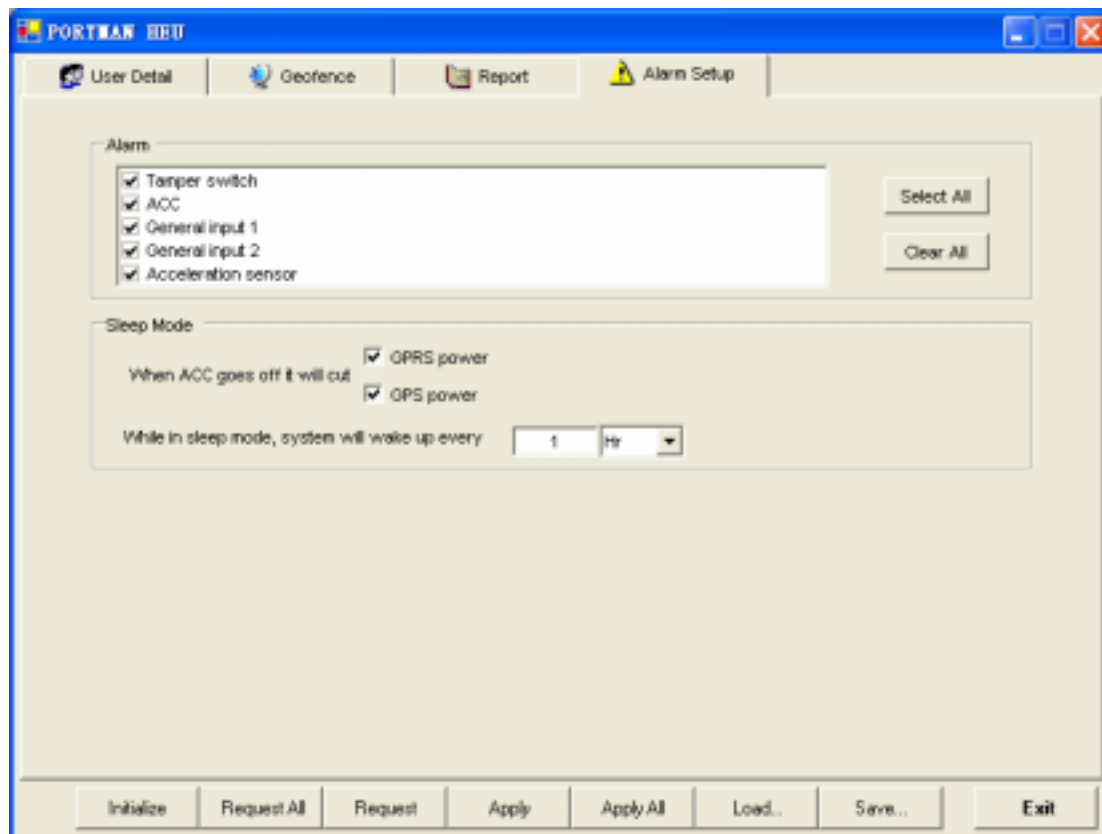
ALARM report

Alarm report(s) is also configurable. User can customize the events generated by the in-vehicle input to be sent to the server. To enable the particular trigger reports by click the box.

Sleep mode (when ACC OFF)

(1) HEU can go to sleep mode when ACC goes off. (The average lasting time after ACC OFF is 5 minutes.) In sleep mode, both GPS & GPRS will be disabled.
All the auto report (Time, Distance, Intelligent…) will not be send when ACC goes off.

(2) During the sleep mode, the system can wait up automatically and send a wake up diagnostic report.

(3) The automatic wakeup time is configurable. (Minimum duration is 5 minutes; maximum duration is 1000 Hours).

(4) If any of the inputs are triggered while in the sleep mode, the system will wake up automatic report and then send reports to the server. The input triggers for waking the device up are selectable. If the GPRS connection is failed, for emergency purpose, HEU will send out SMS report if number is defined.

[Button description]
(1)Initialize: clear all saved parameters in HEU.
(2) Request All: request all parameters that is saved previously in HEU
(3) Request: request parameters in the current page
(4) Apply: set the parameters in the current page
(5) Apply All: save all the parameters into HEU
(6) Load: load the saved configuration file (*.heu)
(7) Save: save the parameters into a files (*.heu).
(8) Exit: exit the PC-Setup program; the system will exit the PC setup mode into the working mode.

INTERNAL BATTERY PROTECT MECHANISM:

To protect internal battery, we added a mechanism to HEU, when the internal battery voltage drop to 9v,HEU will keep to detect battery voltage for 2 minutes, if the battery voltage keep 9v continuously during this 2 minutes period. HEU will send a "battery shut down event" to server to notice user. After this event is sending out, HEU only can work another 30 minutes.
After HEU goes into "battery shut down" mode, HEU will check the battery continuously, if the battery charges to 12v for 2 hours, it can work again.

APPENDIX I
HEUSPECIFICATIONS

Physical Parameters

Enclosure dimensions	160(L)*113(W)*73(H)
Weight	About 600g

Electrical

Rated DC Supply voltage	24V
DC supply voltage range	10V 40V
Battery charge current	20-100mA
Current (Sleep)	7mA (Both GPS and GPRS are off)

Current (only GPS Sleep)	30mA
Current (only GPRS Sleep)	21mA
Current (Sleep & internal battery charge)	3~10 mA
Current (GPRS online)	35~45mA (@24V)
Current (GPRS transmission)	70~80mA(@24V)
Current (Peak)	100~120mA(@24V)

*GPRS**

* Data provided by Sony Ericsson

Frequency Range (MHz)	900&1800 / 850&1900 models
Channel spacing (Hz)	200
GPRS connectivity	GPRS multi-slot class 8
	GPRS mobile station class B
SIM card interface	3V or 5V
SMS storage Capacity	40 in ME
Antenna Connector	Built-in
Antenna Impedance	50ohms

*GPS**

* Data provided by Trimble

Protocol	NMEA0183
Baud Rate	9600
Signal	1575MHz
Accuracy Horizontal	<6 meters (50%), <9 meters (90%)
Altitude	<11 meters (50%), <18 meters (90%)
Velocity	0.06 m/sec.
Hot Start:	<14 sec. (50%), <18 sec. (90%)
Warm Start:	<38 sec. (50%), <45 sec. (90%)
Cold Start:	<90 sec. (50%), <170 sec. (90%)
Antenna Type	Active 3.3V
Antenna Connector	Male SMA

IO Connection

1* three pin connector on board	PC_SETUP cable
1*button on board	RESET
1*temper SW on board	Temper SW
1* 10pin connector	Power supply (2wires), 2 input (2wires)
	ACC (1WIRE) cut relay (2wires) siren
	(1wire) valet SW+LED(2wires)
Fuse box	Inside a 3A glass fuse
GPS antenna	External GPS antenna

<u>**Communication**</u>

GPRS \SMS

<u>**Environmental**</u>

Operating Temperature   -20°C to +55°C

Storage Temperature   -40°C to +85°C

<u>**Optional Accessories**</u>

1. Integrated Antenna for 900/1800 or 850/1900 MHz two types
2. External GPS Active Antenna
3. Valet Switch+LED

Appendix II

Event code summary

GROUP A: (BASIC event)

101 Over the defined maximum speed limit

102 Self-diagnostic report

103 Course changes (direction changes) bigger than defined angles.

104 Exit defined Circular Geofence area0

105 Enter defined Circular Geofence area0

108 Fix time report

109 Fix distance report

110 Intelligent time and distance report

111 Low battery report.

113 Press Valet switch to use 'Panic' button. (We have add on a PANIC function button, and this event occurs when this button is pressed.)

114 Exit defined Circular Geofence area1

115 Enter defined Circular Geofence area1

118 Wakeup report

119 Tamper switch is open

120 Tamper switch is closed

122. GPS antenna be cut

124 Exit defined Circular Geofence area2

125 Enter defined Circular Geofence area2

134 Exit defined Circular Geofence area3

135 Enter defined Circular Geofence area3

144 Exit defined Self-Geofence area4

145 Enter defined Self-Geofence area4

154 Exit defined Circular Geofence area5

155 Enter defined Circular Geofence area5

164 Exit defined Circular Geofence area6

165 Enter defined Circular Geofence area6

174 Exit defined Circular Geofence area7

175 Enter defined Circular Geofence area7

184 Exit defined Circular Geofence area8

185 Enter defined Circular Geofence area8

194 Exit defined Circular Geofence area9

195 Enter defined Circular Geofence area9

150 Press Valet switch to send 'Help' request

GROUP C In-vehicle INPUTS Event

253 (in-vehicle ACC) ACC on
Example: The 'EVENT 253' will be generated and sent to the server when ACC is on.

254 (in-vehicle ACC) ACC off
Example: The 'EVENT 254' will be generated and sent to the server.

257 Acceleration sensor triggerd
Example: The 'EVENT 257' will be generated and sent to the server when acceleration sensor is triggered.

259 General INPUT1 ON
Example: The 'EVENT 259' will be generated and sent to the server when general INPUT1 is triggered by low pulse.

260 General INPUT1 OFF)
Example: The 'EVENT 260' will be generated and sent to the server when general INPUT1 is triggered by high pulse.

261 General INPUT2 ON)
Example: The 'EVENT 261' will be generated and sent to the server when general Input2 is triggered by low pulse.

262 General INPUT2 OFF)
Example: The 'EVENT 262' will be generated and sent to the server when general Input2 is triggered by high pulse..
OUTPUT command ACK event

303 ARM (in-vehicle output) command Success

304 Panic mode (in-vehicle output) command Success

305 Anti-Car jacking (in-vehicle output) command Success

306 Emergency Release (in-vehicle output) command Success

308 Disable sleep function

309 Enable sleep function

402 GPRS connection request (SMS command)

403 GPRS disconnection request (GPRS command, let the UNIT go into GSM mode.

405 Stop store forward

406 Read the UNIT's firmware version.

407 Check the UNIT Geofence status.

408 Read external battery level

Report Setup ACK event

502	Setup the Circular Geofence or Immediate Geofence parameters
505	Setup SMS telephone number.
507	Clear SMS date and max. SMS set
531	Setup Fixed time report
532	Setup Intelligent report
533	Setup Intelligent history report
534	Setup the Maximum speed limit
535	Setup the Self-diagnostic report
536	Setup the fixed distance report
537	Setup Course change report
539	Remote setup server IP and port
540	Setup Low Battery report
579	Setup tamper switch change report
580	Setup ACC tamper switch change report
581	Setup general input1 detect report
582	Setup general input2 detect report
583	Setup shock sensor input detect report

CONNECTED WIRES LIST

1. Red wire 18awg – System power (+24V Constant)

The RED wire supplies power to the system. Connect this to a constant +24V volt source.

2. Yellow wire 18awg ——Cut relay NO

This wire connects to the cutter relay NO contact; when the system is armed, the wire will connect to the other cut relay yellow wire.

3. Yellow wire 18awg ——Cut relay COM

This wire connects to the cutter relay COM contact; when the system is armed, the wire will connect to the other cut relay yellow wire.

4. Yellow wire 22awg— ACC Sensing Input

This wire should be connected to vehicle ACC. When the vehicle ACC is ON, the wire can sense a high voltage to inform the system act.

5. White wire 18awg--- Siren output

This wire can connect to a siren (+), which can provide maximum 1.5A current.

6. Black wire, Ground

The wire connects the system ground. This is main ground connection of system. Make this connection to a solid section of the vehicle frame. Do not connect this wire to any existing ground wires supplied by the factory wire loom; make the connection to the vehicle's frame directly.
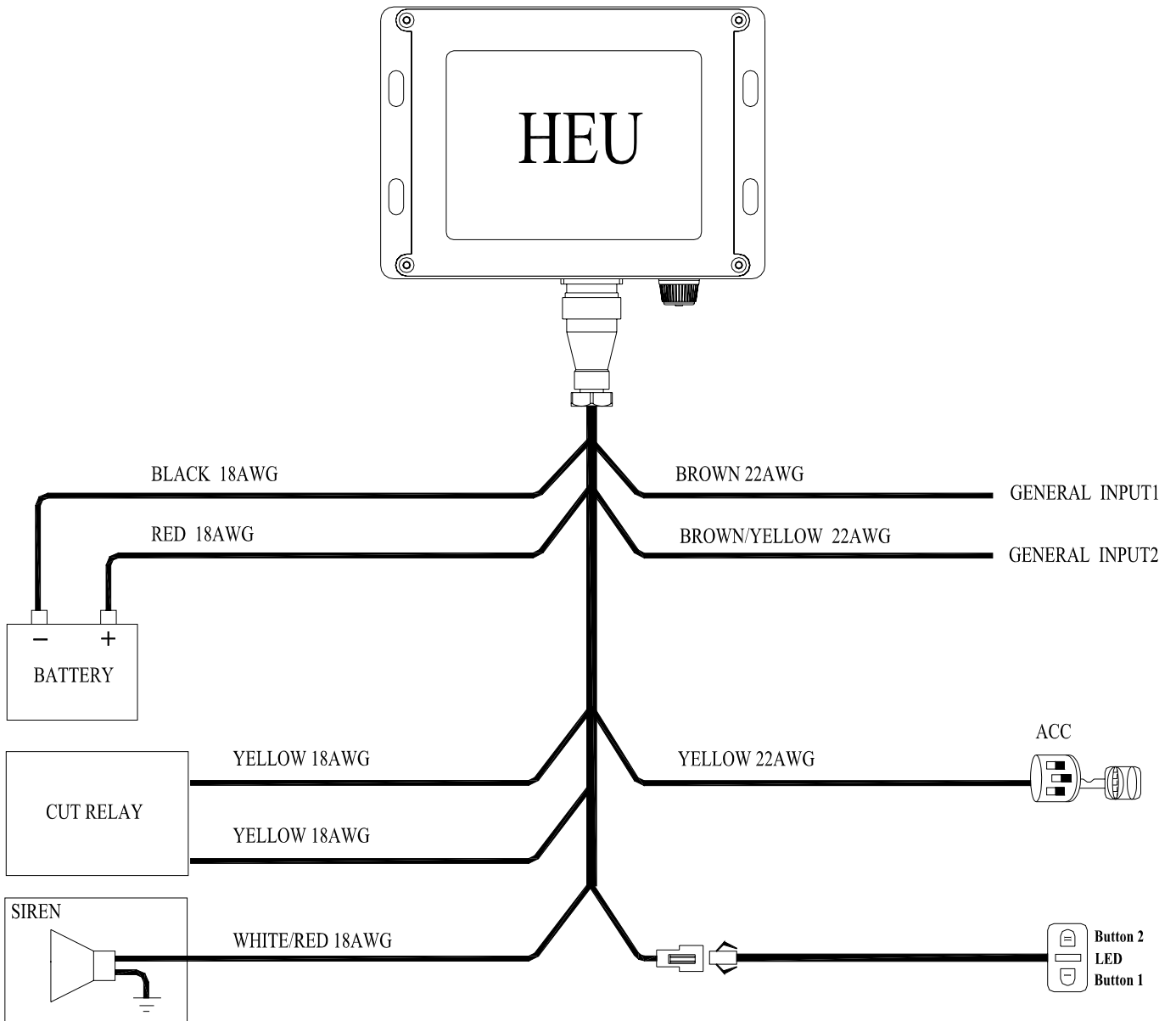
7. Brown wire 22awg: General Trigger Input1

This wire can be activated by a low digital trigger input, normally the port maintains high level.

8. Brown/Yellow wire 22awg: General Trigger Input2

This wire can be activated by a low digital trigger input; normally the port maintains high level.

9. Black Cable for LED & Valet Switch

Installation drawing

HEU

BLACK 18AWG

RED 18AWG

BATTERY − +

BROWN 22AWG
GENERAL INPUT1

BROWN/YELLOW 22AWG
GENERAL INPUT2

CUT RELAY

YELLOW 18AWG

YELLOW 18AWG

ACC

YELLOW 22AWG

SIREN

WHITE/RED 18AWG

Button 2
LED
Button 1

VII. Federal Communications Commission (FCC) Statement

7.1

You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

7.2

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.

VIII. Operation is subject to the following two conditions:

(1) this device may not cause interference and

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

IX. FCC RF Radiation Exposure Statement:

(1) This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

(2) This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

PORTMAN

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