

EGPRS™

User Guide



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1 Product Description

The EGPRS Cellular Monitoring Unit is a self and independent device which provides a cost effective solution for monitoring and controlling vehicles such as: trucks, privates and motorbikes. This is accomplished by locating and tracking them over the cellular wireless network. The EGPRS communicates over the GSM cellular network (for a visual car's whereabouts over a map).

The EGPRS unit is a GPS GSM device that can also be connected to other vehicles indicators (alarm, speed, engine etc...).

The EGPRS is composed of the following modules:

- Internal GSM/GPRS engine
- Internal antenna
- Internal backup battery
- External GPS module
- Controller and I/O circuits

The EGPRS is a GSM / GPRS unit which uses GPRS IP communication (or SMS) in order to send and receive information regarding the vehicle status and location. The EGPRS contains a GPS to provide the vehicle's location data.

The Micro controller and GSM transceiver are the core elements of the EGPRS, as illustrated in the following block diagram (Figure 2).

The Micro controller is the core of the EGPRS. It runs the application program and communicates with the GIS Server and peripheral devices to collect information. It can respond to or issue commands.

The Micro controller interfaces with the GPS over the RS-232 channel.

The charger is fed from the car battery to charge the internal backup battery. The internal backup battery has the ability to be used for up to 10 hours under normal operating conditions when external power is disconnected. The EGPRS utilizes status triggered charging algorithm in order to not harm the internal batteries.

The SIM module holds the relevant IP address used to identify the unit as well as other subscriber identification parameters registered in the system upon activation.

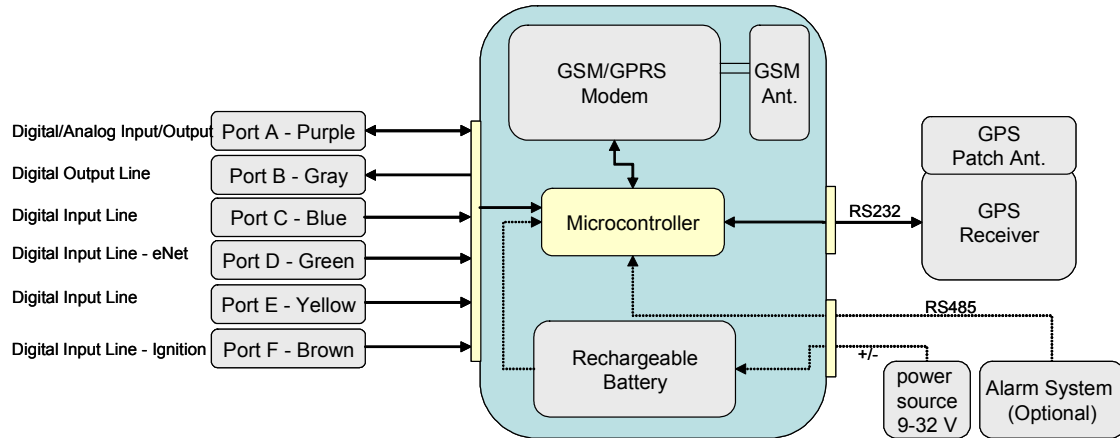
Figure 1 - Product Overview



2 Block Diagram - HW components

The following block diagram shows the main HW components composing the EGPRS unit:

Figure 2 - EGPRS Unit: Block Diagram



2.1 GPS Module

The GPS receiver simultaneously tracks up to sixteen satellites and provides accurate satellite positioning data with fast time-to-first-fix (TTFF) with low power consumption. The highly integrated receiver achieves high performance and minimizes board size and power consumption requirements.

The module provides complete signal processing from antenna to serial data output in NMEA messages protocol.

The GPS device is fed and communicates with the EGPRS over a RS-232 serial channel at a 9600bps baud rate. The GPS device holds the GPS receiver with an antenna on top of it.

2.2 GSM operating frequency

The EGPRS can operate over the GSM-900 MHz, DCS-1800 MHz and PCS 1900 MHz bands:

1. **GSM-900, GSM-850:** The unit in GSM-900/850 operating mode is of class 4, in accordance with the specifications, which determines the nominal 2W peak RF power (+33dBm) on 50 Ohm and sensitivity greater than -102dBm in all operating conditions.
2. **DCS-1800, PCS 1900:** The unit in DCS-1800 operating mode is of class 1, in accordance with the specifications, which determines the nominal 1W peak RF power (+30dBm) on 50 Ohm and sensitivity greater than -102dBm in normal operating conditions.

2.3 Peripheral communication

The Micro controller interfaces with the alarm system over the RS-485 channel and with the GPS over the RS-232 channel. The eNet bi-directional channel is able to carry information between various sensors and devices connected to the bus.

The charger is fed from the car battery to charge the internal backup battery. The internal backup battery has the ability to be used for up to 10 hours under normal operating conditions when external power is disconnected. The EGPRS utilizes status triggered charging algorithm in order to not harm the internal batteries.

2.3.1 RS-232

This serial communication protocol supports communication over a common data line. The EGPRS Micro controller communicates with the GPS device over this data line.

2.3.2 RS-485

The EGPRS Micro controller communicates with the alarm system devices over the RS-485 data line.

2.3.3 eNet

This bi-directional serial communication protocol can be used to connect peripheral devices to the EGPRS such as: alarm units, a portable printer, warning lights, distress buttons, and more.

One of the Open Collector/eNet single line interfaces can be configured as eNet. The eNet bus must have a single master and up to 10 slave devices.

2.3.4 Single Wire Discretes

The EGPRS supports six single line interfaces (Inputs only) of types as listed below:

- 3 General Purpose Input Discrete – one of which can be used for VSS Odometer measuring, and one optionally supports eNet bi-directional communication (See above).
- 1 digital output – 12v active 200ma.
- 1 Ignition line (dedicated Input discrete).
- 1 that can be used as an input or output (according to configuration) and can be defined to digital or analog.

2.4 Physical description

2.4.1 EGPRS

The EGPRS box holds the GPRS engine, internal antenna, backup battery with charger and three external connectors. Shorter than 90mm and narrower than 65mm, it is very compact and easily assimilated and installed in the car environment.

The shell which covers the unit is made of hardened plastic. The SIM socket is present on the right long of the unit. Three connectors are located on the rear side as illustrated below. The unit can be anchored using 2 niches, one on each side of the unit.

Figure 3 - EGPRS module



2.4.2 GPS

The GPS module is provided with a plastic case and 4-wire cable ended with a Molex 4-pin connector. The module size is 45x45mm and the on-top mounted patch antenna is 25x25mm.

Figure 4 - GPS module



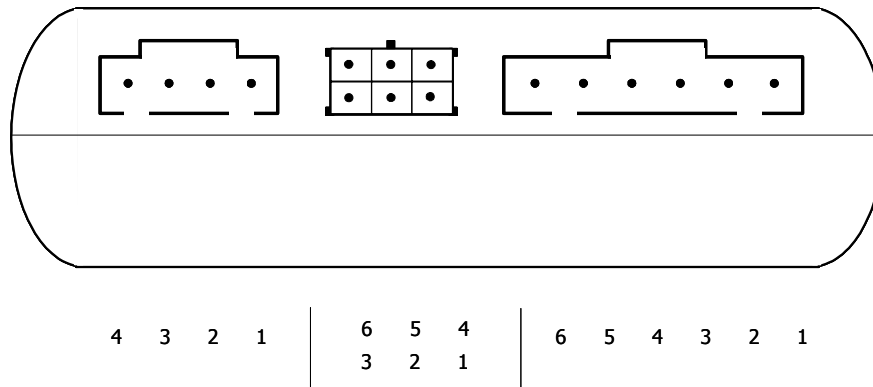
2.4.3 Connectors, Inputs and Outputs

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The EGPRS unit has 3 connectors:

1. Molex 4-pin for GPS (if working with External GPS)
2. Microfit 06P for I/O interfacing (middle connector)
3. Molex 6-pin for power and communication (RS485).

The following diagram shows the structure of the connectors, the numbers below the image are pin's number identification:



2.4.4.1 RS485 Connector - Description

The following figure illustrates the structure of the 6-pin connector used for power supply and communication through RS485. The pinout is given below.

Pin #	Signal	Color	Notes
1	GND	Black	Not in Use
2			
3			
4			
5			
6	Vcc(12V/24V)	Red	Voltage level 9V to 36V

2.4.4.2 RS232 Connector (GPS) - Description

The EGPRS communicates with the GPS device over a RS-232 channel. The pinout is given below.

Pin #	Signal	Color	Notes
1	GND	Black	
2	+4.2 VDC	Red	
3	Rx EGPRS	Gray	GPS to EGPRS
4	Tx EGPRS + Wakeup	Green	EGPRS to GPS

2.4.4.3 Inputs Connector - Description

(HW version 0 analogs):

Pin#	Port Name	Type	Input	Wire	Functionality	Digital Input ID	Digital Output ID	Analog ID
4	Port A	I/O	Pull Up	Purple	Digital Input or Digital Output	1	1	-
1	Port B	Output	-	Gray	Digital Output (active low)	-	2	-
5	Port C	Input	Pull Down	Blue	Digital Input or VSS	2	-	-
6	Port D	Input	Pull Up	Green	Digital Input or eNet or Dallas	3	-	-
3	Port E	Input	Pull Up	Yellow	Digital Input	4	-	-
2	Port F	Input	Pull Down	Brown	Ignition only	-	-	-

(HW version 1 Analog):

Pin#	Port Name	Type	Input	Wire	Functionality	Digital Input ID	Digital Output ID	Analog ID
4	Port A	I/O	Pull Up	Purple	Digital Input or Digital Output or Analog In (0-12)	1	1	3
1	Port B	Output	-	Gray	Digital Output (active low)	-	2	-
5	Port C	Input	Pull Down	Blue	Digital Input or VSS	2	-	-
6	Port D	Input	Pull Up	Green	Digital Input or eNet or Dallas	3	-	-
3	Port E	Input	Pull Up	Yellow	Digital Input	4	-	-
2	Port F	Input	Pull Down	Brown	Ignition only	-	-	-

(HW version 2 Analogs):

Pin#	Port Name	Type	Input	Wire	Functionality	Digital Input ID	Digital Output ID	Analog ID
4	Port A	I/O	Pull Up	Purple	Digital Input or Digital Output or Analog In (0-12)	1	1	3
1	Port B	Output	-	Gray	Digital Output (active low) or Dallas Out	-	2	-
5	Port C	Input	Pull Down	Blue	Digital Input or VSS	2	-	-
6	Port D	Analog	Pull Up	Green	Analog In (0-5v)	3	-	4
3	Port E	Input	Pull Up	Yellow	Digital Input Or Dallas In	4	-	-
2	Port F	Input	Pull Down	Brown	Ignition only	-	-	-

Notes:

- Inputs will have the *Input* value when no wire is connected (for example Port C will be logical 0, and Port E will be logical 1).

2.4.5 Electrical Specification

Nominal Input Voltage Level	12V /24V
Minimal Input Voltage Level	9 V
Maximal Input Voltage Level	36V
Current Consumption (12V)	
Reception (SMS Mode)	11 mA
Reception (GPRS Mode)	17 mA
Transmission	200 mA
Current drain	
Navigation	<45 mA
Powerdown*	<5 mA
Positive Spike Resistibility	+100 Volt for a period of 8 ms.
Negative Spike Resistibility	-100 Volt for a period of 8 ms
Backup Batteries	3 x AA NiMH, 750 mAH
Output Power Voltage	4.2 V
Current	100 mA max
Ripple	< 5 mV

2.4.6 Environment Condition

Storage Temperature	-40 to 85°C
Operating Temperature	-20 to 50°C
Max. Relative Humidity	90±5%
Acceleration	10 m/sec ²
Vibration	Meets ISO 16750 part 3
Mechanical shock	Meets ISO 16750 part 3
Car Voltage	Meets ISO 16750 part 2

2.4.7 Size and Weight

Size: 6x8.5 cm; 2.36x3.35 in.

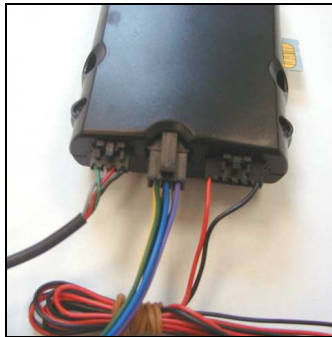
Weight (Excluding the GPS module) 125g

3 Installation Guide

3.1 EGPRS Vehicle Installation

1. Make sure a SIM card is inserted into the unit.
2. Connect the black wire to a permanent GND.
3. Connect the red wire to a permanent 12V or 24V source through a 3A fuse.
 - Note: Suitable approved slow-blow fuse 3A should be provided by the End User.
4. When applicable, connect the brown wire of the I/O harness to the Ignition switch (ignition on should supply 12/24V to the brown wire).
5. Connect the GPS connector to the unit if a GPS is installed.

Figure 5 - Up View



3.1.1 Attention:

- The EGPRS unit must not be installed next to heat sources or moving parts.
- The installation position must be water proof.
- The EGPRS unit should be installed in the cabin or the trunk.
- The EGPRS unit should not be installed behind the fuse box.
- The antenna side of the EGPRS unit should be facing upwards if possible,
- Never install the EGPRS unit with the antenna side next to metal.
- The EGPRS must be installed by qualified service personnel only.

3.1.2 SIM Card

Insert the SIM card as shown in the following picture:

Figure 6 - SIM Card insertion



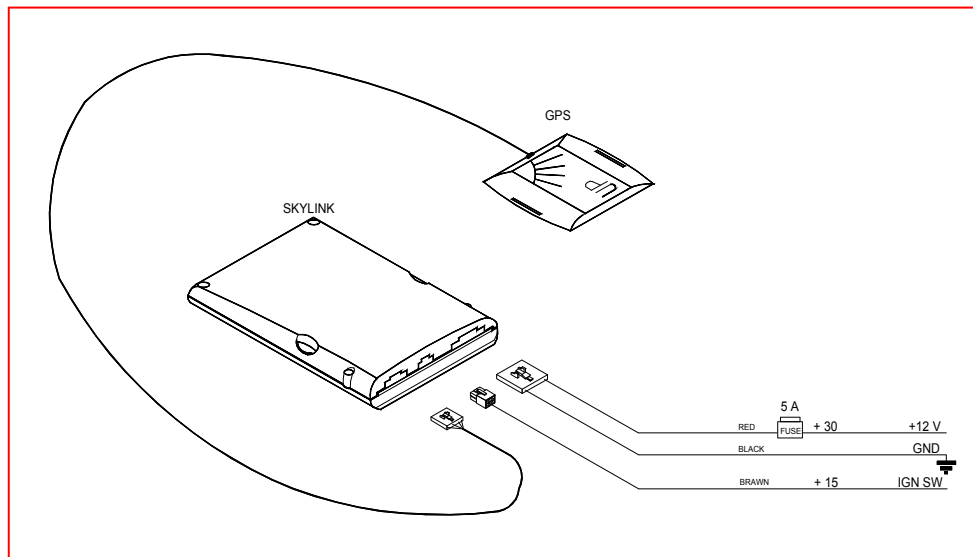
3.1.3 GPS Installation

- The GPS module should be installed in a position which will allow it to "see the sky" as clearly as possible
- The GPS module must not be installed near the front window in cars with front window.
- The GPS module must be installed with the side marked with "UP" being the side facing upwards.

Figure 7 - GPS Module



3.1.4 Installation diagram



3.1.5 Battery replacement:

Caution: Risk of explosion if battery is replaced by an incorrect type.
Dispose of used batteries according to instructions.