



GPS-205 USER MANUAL

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REGULATORY COMPLIANCE

FCC

The GPRS modem was tested and certified to meet FCC Parts 15 in a stand-alone configuration, which demonstrated that it complies with Part 15 emission limits. The GPS-205 uses an Enfora manufactured GPRS modem. FCC Part 22 & Part 24 is covered by the "modular approval" process for a transmitter. This approach, described by FCC Public Notice DA 00-131407 released June 26, 2000, is intended to afford relief to equipment manufacturers by eliminating the requirement for obtaining a new equipment authorization for the same transmitter when installed in a new device.

In order to approve it without additional FCC certification approvals, the installation must meet the following conditions:

For the transmitter to meet the MPE categorical exclusion requirements of 2.1091, the ERP must be less than 1.5 watts for personnel separation distance of at least 20 cm (7.9 in). Therefore, the maximum antenna gain cannot exceed +3.3dBi. If greater than 1.5 watts exists, then additional testing and FCC approval is required.

R&TTE -

The GPRS modem has been fully tested and complies with all the requirements of EN301 489-1, EN301 489-7 and EN60950-1:2001. Compliance to EN301 511 has been demonstrated by testing on the GPS-205.

Disclaimer

The information and instructions contained within this publication comply with all FCC, GCF, PTCRB, R&TTE, IMEI and other applicable codes that are in effect at the time of publication. The GPS-205 uses an Enfora manufactured GPRS modem.

CES Wireless Technologies disclaims all responsibility for any act or omissions, or for breach of law, code or regulation, including local or state codes, performed by a third party.

CES Wireless Technologies strongly recommends that all installations, hookups, transmissions, etc., be performed by persons who are experienced in the fields of radio frequency technologies. CES Wireless Technologies acknowledges that the installation, setup and transmission guidelines contained within this publication are guidelines, and that each installation may have variables outside of the guidelines contained herein. Said variables must be taken into consideration when installing or using the product, and CES Wireless Technologies shall not be responsible for installations or transmissions that fall outside of the parameters set forth in this publication.

CES Wireless Technologies shall not be liable for consequential or incidental damages, injury to any person or property, anticipated or lost profits, loss of time, or other losses incurred by Customer or any third party in connection with the installation of the Products or Customer's failure to comply with the information and instructions contained herein.

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WARRANTY

Complete Warranty details can be found at the CES Wireless web site: www.ceswireless.com

CES Wireless Technologies Corp., (CES Wireless), warrants this product to be free from defects in material and workmanship for 12 months from date of shipment. If such malfunction occurs, it will be repaired or replaced (at our option) without charge for materials or labor if returned to the factory. This warranty does not apply to parts damaged due to improper use- including accident, neglect, unreasonable use, and improper installation - or to unauthorized alterations or modifications of the equipment. It does not extend to damage incurred by natural causes such as lightning, fire, floods, or other such catastrophes, or to damage caused by environmental extremes, such as power surges and or transients. It does not extend to microprocessors if it is determined that the failure of a micro is due to static damage, application of improper voltages to the unit, or other problems not related to circuit design. In such case or in the case of a desire to update the micro to a different version of software, such request must be specified in writing, and there will be a charge agreed upon by both parties.

Software products provided by CES Wireless are only compatible with currently supported Microsoft® operating systems.

This product is warranted to meet published specifications and to operation as specified only properly programmed and installed. CES Wireless is not responsible for any operational problems caused by system design, cellular coverage, outside interference, or improper installation. A qualified two-way radio technician or engineer must complete installation and programming of this CES Wireless product.

Equipment for repair must be returned to the factory, freight prepaid, only with prior authorization. Please call 407-679-9440 for an RMA number. A brief letter describing the nature of the defect should be included with the merchandise. Repair by other than CES Wireless will void this warranty. In-warranty merchandise must be shipped, freight prepaid, to CES. CES Wireless will return the repaired or replaced equipment prepaid to purchaser, within the United States. Outside the US the customer must pay freight.

This warranty applies to the original purchaser of the equipment only. CES Wireless is not liable under this warranty, or any implied warranty, for loss of use or for other consequential loss or damage experienced by the purchaser. Some states do not permit the exclusion or limitation of implied warranties or consequential damages. This warranty provides special legal rights, and the purchaser may have other rights that vary from state to state. Complete current Warranty details can be found at the CES Wireless web site: www.ceswireless.com

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1.0 Introduction

The GPS-205 is one of the smallest and most economical GPS asset tracking devices available today. It is a ruggedized unit, with aluminum extrusion and end caps, affording some protection for environmental elements. This device is neither weather, dust or splash proof.

GPS and event data is made available on-board the GPS-205 for transmission to FleetLinc™ (CES web based subscriber fleet management service).

The GPS-205 can also be licensed for use with POWER-trak™ PC/Server software. Please contact CES for further direction with this.

1.1 About the GPS-205

The GPS-205 is an Automated Vehicle Locating (AVL) device that utilizes a GSM/GPRS cellular modem and a Global Positioning Satellite (GPS) module. Working together, these technologies allow the GPS-205 to simultaneously act as a stand alone GPS reporting device and wireless data retrieval unit. The GPS-205 provides a flexible AVL solution with two Inputs and one Output. The GPS-205 is designed to work as a stand-alone device in a vehicle. It requires DC power and an antenna (GPS and GSM).

1.2 About This Manual

This manual contains instructions on how to install and configure the GPS-205. Please follow the instructions closely to avoid damaging the GPS-205.

1.3 Basic Package Contents

The basic package will contain the following:

- GPS-205 - GPS/GSM/GPRS Tracking and Fleet Management Device
- 12-Pin heavy duty connector with DC cable (HRNS-56)
- Mounting Bracket

1.4 Accessories

The following accessories are available from CES Wireless Technologies:

- ANT-06 Magnetic mount, combo, multi band GSM/GPS antenna
- ANT-07 Through-hole/fixed mount, combo, multi band GSM/GPS antenna
- ANT-13 Loose/covert, combo, multi band GSM/GPS antenna
- ANT-19 Fixed mount, GSM only antenna
- ANT-01 Magnetic mount, GPS only antenna
- ANT-02 Fixed mount, GPS only antenna
- PRG-02 Programming Cable - 12-Pin Serial I/O cable with DB-9 Connector/Pin insertion tool
- GPS-205S Programming Software (can be downloaded from the CES FTP site, and is also available on CD-SOFT1 CD).

1.5 System Requirements

It is necessary to have a computer running Windows 2000, Windows XP or Windows Server 2003 to program the device. The system must include a serial port in order to configure the GPS-205.

1.6 GPS-205 Front and Back View

Front View: On the front of the GPS-205 is the GSM SIM Card Access. **Note:** the SIM Card Lock on the right side of the access window.

Back View: On the back of the GPS-205 are 3 connectors. On the left is the GPS Antenna connector (SMA style connector). In the middle is the 12-Pin I/O connector (described in detail later in this manual). On the right is the Cellular Antenna (TNC style connector).

2.0 Specifications

Note: Specifications subject to change without notice.

2.1 System Information

Dimensions	4.25 x 3.0 x 1.25 in. L x W x H:
Weight	0.439 lbs or 199 g
Housing:	Seamless Aluminum Extrusion with Metal Endcaps
TX Power:	Class 4 (2W @850/900 MHz) Class 1 (1W @1800/1900 MHz)
Frequency:	850/900/1800/1900

2.2 GPRS Packet Data

Mode:	Class B, Multislot 10
Protocol:	GPRS Rel 97 & SMG 31
Coding Schemes:	CS1-CS4
Packet Channel:	PBCCH/PCCCH

2.3 GPS Functionality

Connector:	SMA Female
Antenna:	3.3V Active

2.4 Environment

Operating:	-30°C to +70°C
Storage:	-40°C to +85°C
Humidity:	Up to 95% non-condensing
Vibration:	In accordance with SAE J1211

2.5 Certifications

FCC:	Part 15, 22 & 24
GCF:	Version 3.11.0, R&TTE
PTCRB:	Version 2.9.1
Industry Canada	
CE Mark	
EMark	

2.6 SIM Card/Interface/I/O

SIM Access:	External
GSM Antenna:	TNC
I/O Connector:	12 Pin
	2 User Inputs (3.3V)
	1 Output (3.3V)
	Ignition Sense
	Serial Data in/out

2.7 Power

DC Voltage: 9 – 30 V

GPS-205 @ 12V				
BAND	MODE	(mA)	Avg (A)@	Peak dBm
GSM850/900	1TX/1RX	230mA	2.10@	32.5
	1RX	105mA		
	Idle	<10mA		
GSM1800/1900	1TX/1RX	175mA	1.5@	29.0
	1RX	105mA		
	Idle	<10mA		

3.0 Installation

The instructions in this section describe the hardware installation of the GPS-205. To install the GPS-205 in a vehicle follow these steps:

- Choose a convenient location in the vehicle – either in the trunk or interior of a vehicle. Avoid locations that might expose the GPS-205 to excessive heat or moisture.
- Hold the GPS-205 in place and mark the location for mounting screw holes
- Using the markings as a guide, drill mounting holes in those positions
- Align the GPS-205 in the drilled holes and secure it with mounting screws



The GPS-205 is **NOT** a waterproof or sealed device. Care must be taken to ensure that the device is kept away from water and other liquids. The GPS-205 can be mounted inside a weather proofed box if necessary.

3.1 Mounting Dimensions

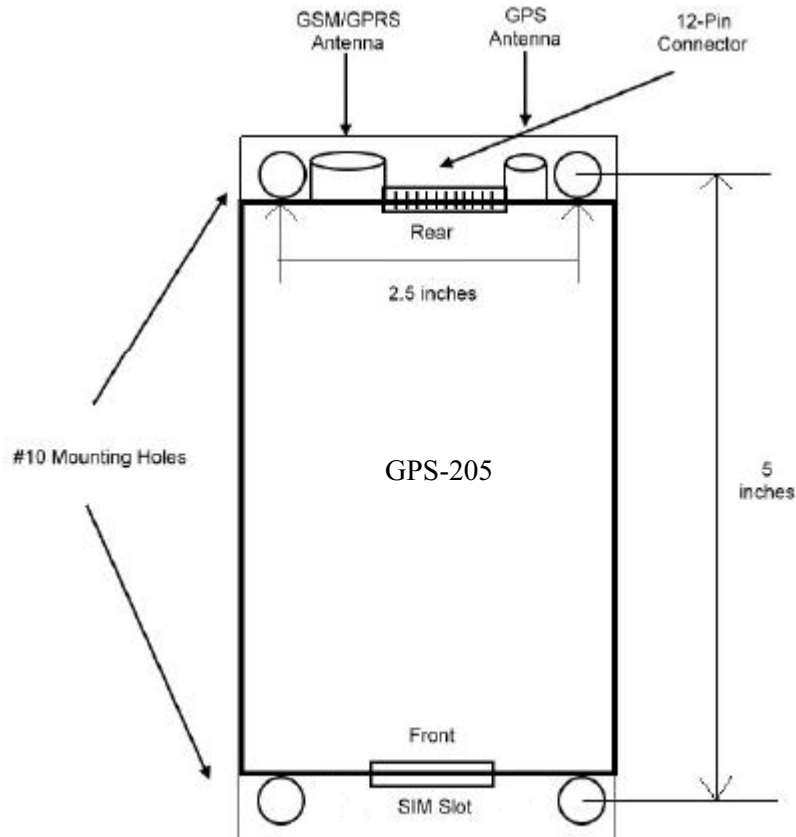


Figure 1: Mounting dimensions of a GPS-205 (shown with mounting plate)

The bracket should be used as a template to mark screw holes for installation. See Figure 2 – GPS-205 Mounting Brackets. The mounting holes are designed for a number 10 screw. Once mounting holes have been located for placement, the mounting plate can be easily broken into two parts as demonstrated in Figure 3 - GPS-205 Mounting Bracket (separated). The mounting bracket must be separated in order to affix it to the GPS-205. The two pieces will easily slide into the grooves on the GPS-205.



Figure 2: GPS-205 Mounting Bracket (attached)



Figure 3: GPS-205 Mounting Bracket (separated)

3.2 Installing Cables

To ensure proper operation of the GPS-205 please follow these precautions:

- Remove power from the GPS-205.
- Do not create sharp bends, loops or crimps in the cables.
- Attach all cables to the vehicle and equipment in such a way as to reduce stress or wear caused by the vibration generated by moving vehicles.
- Properly terminate all power cables.

3.2.1 HRNS-56 - 12-Pin I/O Connector

HRNS-56 is a 12-Pin external I/O connector and cable. This connector provides power and can be used to interface the GPS-205 with other devices. There is also a special tool for this connector which facilitates the addition of extra wires. (CES P/N: CON187T).

CES Wireless Technologies can also provide optional cables with connectors. The part numbers vary with the cable's intended use. Please contact your CES Wireless Technologies sales or support executive for more information.

You may also build your own cable. Table 1 describes the functionality of this 12-Pin connector. Pins that are not planned for usage should be left open without anything connected to them.

Pin Number	Functionality
1	Serial Data Out
2	Serial Data In
3	Not Used
4	Not Used
5	Not Used
6	Not Used
7	Output 1 (Default state is High)
8	Input 2
9	Input 1
10	Switched Power (Ignition)
11	Unswitched Power (Battery)
12	Ground

Table 1: 12-Pin I/O Connector Functionality

3.3 *Installing the SIM (Subscriber Identity Module) Card*

The SIM card is an integral part of any GSM terminal device. The SIM card may be installed by simply inserting the SIM card in the SIM slot provided in the front of the device. With the SIM locking mechanism on the right, the SIM card is inserted into the GPS-205 with the notch on the SIM card on the left and going in first.

NOTE: Not all GPS-205s are provided with SIM cards. The SIM card will be provided by CES Wireless Technologies only if GSM/GPRS data service is purchased along with the device. If purchasing the SIM card separately take steps to ensure that the SIM card is provisioned by the operator for data.

NOTE: Always take care to protect the SIM card. The GPS-205's GSM/GPRS related functionality will not operate without the SIM card installed.



Ensure the power to the GPS-205 is disconnected before inserting the SIM card. Failure to do so might result in an unusable GPS-205 or a damaged SIM card.

3.4 Connecting the GSM/GPRS and GPS Antenna

The GSM/GPRS/GPS combo Antenna is available from CES Wireless Technologies in three versions: magnetic mount, through-hole or loose/covert. These antennas are:

- ANT-06 Magnetic mount, combo, multi band GSM/GPS antenna
- ANT-07 Through-hole/fixed mount, combo, multi band GSM/GPS antenna
- ANT-13 Loose/covert, combo, multi band GSM/GPS antenna

- ANT-19 Fixed mount, GSM only antenna
- ANT-01 Magnetic mount, GPS only antenna
- ANT-02 Fixed mount, GPS only antenna

- The GSM/GPRS antenna connector on the GPS-205 is a TNC female connector. The antenna has to be connected to the connector labeled “CELLULAR ANT”.

- The GPS antenna connector on the GPS-205 is a SMA female connector. The antenna has to be connected to the connector labeled “GPS ANT”.



Ensure the power to the GPS-205 is disconnected before connecting the GPS or GSM/GPRS antenna. Failure to do so might result in an unusable GPS-205.

3.5 Connecting Power

The GPS-205 has an input voltage range of 9 – 30 V DC. (See Table 2 and Table 3). The power and ignition pins can support 9 – 30 V DC input voltage. The user has an option to connect these wires depending on the desired functionality. Described below are the desired functionality and their associated wire connecting procedure:

GPS-205 (@ 12 Volts)			Average Current (mAmps)	Peak Current (mAmps)
GSM 850/900	GSM	1TX/RX	390 mA	0.600@32.5
		1RX	180 mA	
		Idle	65 mA	
GSM1800/1900	GSM	1TX/RX	400 mA	0.570@32.0
		1RX	190 mA	
		Idle	55 mA	

Table 2: GSM Operating Power (Preliminary)

GPS-205 (@ 12 Volts)			Average Current (mAmps)	Peak Current (mAmps)
GSM 850/900	GSM	1TX/RX	400 mA	0.590@32.0
		1RX	190 mA	
		Idle	55 mA	
GSM1800/1900	GSM	1TX/RX	400 mA	0.560@31.5
		1RX	200 mA	
		Idle	55 mA	

Table 3: GPRS Operating Power (Preliminary)

Power to the GPS-205 can be supplied in three different methods, depending upon the application.

GPS-205 Always ON

- Connect the power and ground wires of the GPS-205 to the battery leads. The GPS-205 will always remain ON as long as the battery lasts.
- The GPS-205 will be non-operational when the input voltage and current requirements are not met (battery drains).
- The Ignition wire has to be left open (not connected).

GPS-205 Turns Off when Ignition Turned Off

- Connect the power line of the GPS-205 to an auxiliary power source, i.e. ignition.
- Connect the ground wire to the chassis or negative terminal of the battery
- The Ignition wire has to be left open (not connected).

GPS-205 with Ignition Turned Connected to Provide Ignition On/Off Events

- Connect the power and ground wires of the GPS-205 to the battery.
- Connect the ignition wire of the GPS-205 to an auxiliary power source, i.e. ignition.
- Device goes through a reset upon ignition on.

4.0 Support

If you need help, we are easily accessible

Telephone: Call 407-679-9440, and ask for product support.

Fax: 407-679-8110

Email: support@ceswireless.com

Skype: Please email support@ceswireless.com to obtain your currently assigned support engineer's Skype address.

Product support may ask you to **PRINT** a copy of the programmed parameters, and fax to for analysis. To do this, go to **FILE** on the GPS-205S main menu, and click on **PRINT**.

Support Resources: www.ceswireless.com

FTP Site: Please go to www.ceswireless.com and register for a FTP site User Name and Password

Appendix 1 – Cable Wiring Diagrams

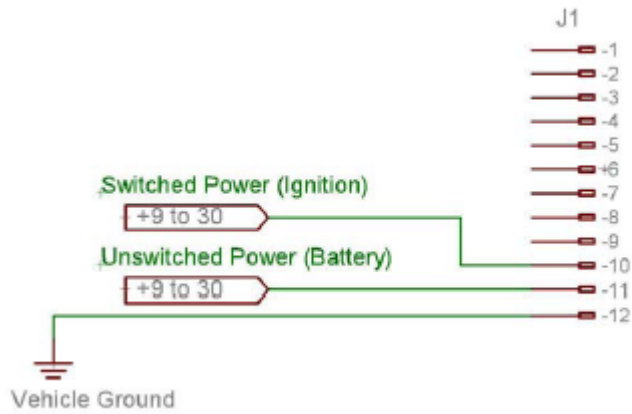


Figure 4: Wiring for Power Only (HRNS56)

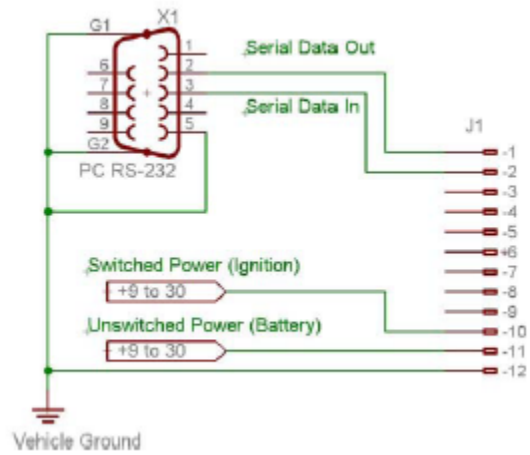


Figure 5: Wiring for Power and Serial Interface (PRG-02)

Appendix 2 – Troubleshooting

All the troubleshooting steps require the GPS205S to be in “Manual Mode”. To enable this mode select the Program menu and select “Mode – Manual”. If this selection is not shown the software is in this mode already. The software can return to automatic mode by selecting the Program menu and then selecting “Mode – Auto”.

A2.1 Verifying the GPS205 has Established a GSM Connection

To verify that the GPS205 has established a GSM connection follow these steps.

- Is the antenna attached?
- Is the SIM card installed? The SIM card must be installed to establish a connection.
- In the GPS205S, Select Function section select Query Commands. This selection is only displayed when the software is in Manual Mode.
- In the Query Commands section click on the “Verify GSM Status” button.
- The modem will reply in the text box at the bottom of the software. If you do not get a reply from the modem verify that has power (12V) and that the correct serial port is selected in the software.
- Modems response: the modem responds with “+CREG: followed by two parameters, comma separated.
 - The desired response is “+CREG: 0,1” or “+CREG: 0,5”.
 - Parameter 1
 - 0: disable network registration unsolicited result code
 - 1: enable network registration unsolicited result code
 - 2: enable network registration and location information unsolicited result code
 - Parameter 2
 - 0: not registered, ME is not currently searching a new operator to register to
 - 1: registered, home network
 - 2: not registered, but ME is currently searching a new operator to register to
 - 3: registration denied
 - 4: unknown
 - 5: registered, roaming
 - If the desired response is not received please discuss the programming of the SIM card with your cellular service provider.

A2.2 Verifying the GPS205 has Established a GPRS Connection

To verify that the GPS205 has established a GPRS connection follow these steps.

- Is the antenna attached?
- Is the SIM card installed? The SIM card must be installed to establish a connection.
- In the GPS205S, Select Function section select Query Commands. This selection is only displayed when the software is in Manual Mode.
- In the Query Commands section click on the “Verify GPRS Status” button.
- The modem will reply in the text box at the bottom of the software. If you do not get a reply from the modem verify that has power (12V) and that the correct serial port is selected in the software.
- Modems response: the modem responds with “%CGREG: followed by two parameters, comma separated.
 - The desired response is “%CGREG: 0,1” or “%CGREG: 0,5”.
 - Parameter 1
 - 0: disable network registration unsolicited result code
 - 1: enable network registration unsolicited result code +CGREG
 - 2: enable network registration and location information unsolicited result code +CGREG

- Parameter 2
 - 0: not registered, ME is not currently searching a new operator to register to
 - 1: registered, home network
 - 2: not registered, but ME is currently searching a new operator to register to
 - 3: registration denied
 - 4: unknown
 - 5: registered, roaming
- If the desired response is not received please discuss the programming of the SIM card with your cellular service provider.
- If the desired response is received but there is still an issue then the GPRS Activation needs to be verified.
 - Click on the Verify GPRS Activation button in the Query Commands section.
 - The modem's response will be "\$NETIP:" followed by 3 IP Addresses. For example, the modem should return something similar to this:
 \$NETIP: "166.214.220.151", "066.102.163.232", "066.209.010.202"
 - If AT\$NETIP returns all zeros, send the following command: AT\$CGEER. This can be done by typing the command into the "Command to send" field in the Other section on the Query Commands view. There are three common responses:
 - \$CGEER: no PDP reject cause (Everything should be working OK)
 - \$CGEER: requested service option not subscribed (APN is incorrect or SIM has not been enabled for data mode.)
 - \$CGEER: user authentication failed (username and/or password is incorrect.)
 - If these three IP Addresses are not returned received please discuss the programming of the SIM card with your cellular service provider. The information from the CGEER command may assist the carrier in determining the cause of the issue.

A2.3 Verifying the GPS205 has Acquired a GPS Satellite Fix

To verify that the GPS205 has established a acquired a GPS Satellite fix follow these steps. Please note that it does take a few minutes for the GPS receiver to acquire a fix the first time. After that it should acquire a fix fairly quickly.

- Is the antenna attached?
- Does the antenna have a clear view of the sky? The GPS205 cannot establish a GPS fix if the antenna is inside a building or if the sky is obscured by trees, buildings, tunnels, etc. It is also quite difficult for it to establish a fix if the antenna has only a partial view of the sky (i.e. it is near a window).
- In the GPS205S, Select Function section select Query Commands. This selection is only displayed when the software is in Manual Mode.
- In the Query Commands section click on the "GPS?" button.
- The modem will reply in the text box at the bottom of the software. If you do not get a reply from the modem verify that has power (12V) and that the correct serial port is selected in the software.
- Modems response: the modem responds with a series of sentences that are produced by the internal GPS receiver. Of particular interest is the "\$GPRMC" sentence which should be the next to last sentence that is produced.
 - "\$GPRMC,,V,,,,,,,,,N*53" is a sample of an invalid sentence.
 - "\$GPRMC,042159.00,A,2835.1039,N,08118.3645,W,000.0,000.0,090407,03.7,W,A*03" is a sample of a valid sentence.
 - For information on the "GPRMC" sentence please search the internet. Entering "GPRMC Sentence", without the quotes, into your favorite search engine will return the desired results.