eGPS M6 GNSS Receiver Quick Start Guide

Trademarks
All product and brand names mentioned in this publication are trademarks of their respective holders.

Safety Warnings
The Global Positioning System (GPS) is operated by the U.S. Government, which is solely responsible for the accuracy and maintenance of the GPS network. Accuracy can also be affected by poor satellite geometry and obstructions, like buildings and heavy canopies.

FCC Interference Statement
This equipment has been designed to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules in Portable Mode. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

Operation is subject to the following two conditions:
(1) this device may not cause harmful interference and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Table of Contents

1. Introduction

The eGPS M6 GNSS Receiver Quick Start Guide describes how to set up and use the eGPS M6 GNSS receiver.

"The receiver" refers to the eGPS M6 GNSS receiver unless otherwise stated.

Even if you have used other Global Navigation Satellite Systems (GNSS) products before, eGPS Solutions recommends that you spend some time reading this manual to learn about the special features of this product.

1.1. Safety Information

1.1.1. Warnings and Cautions

An absence of specific alerts does not mean that there are no safety risks involved.

Warning or Caution information is intended to minimize the risk of personal injury and/or damage to the equipment.

WARNING - A Warning alerts you to a potential misuse or wrong setting of the equipment.

CAUTION - A Caution alerts you to a possible risk of serious injury to your person and/or damage to the equipment.

1.1.2. Regulations and Safety

The receivers contain a built-in wireless modem for signal communication through Bluetooth® wireless technology or through an external communication datalink. Regulations regarding the use of the wireless modem vary greatly from country to country. In some countries, the unit can be used

without obtaining an end-user license. However, in some countries, administrative permissions are required. For license information, consult your local dealer. Bluetooth® operates in license-free bands.

Before operating an eGPS M6 GNSS receiver, determine if authorization or a license to operate the unit is required in your country. It is the responsibility of the end-user to obtain an operator's permit or license for the receiver for the location or country of use.

1.1.3. Use and Care

This receiver is ruggedized to withstand tough environmental conditions that occur in the field. However, the receiver is a high-precision electronic instrument and should be treated with reasonable care.

CAUTION - Operating or storing the receiver outside the specified temperature range will cause irreversible damage.

1.2. Technical Support

If you have a problem and cannot find the information you need in this manual or on the eGPS Solutions website www.egps.net, contact your local dealer from which you purchased the receiver(s).

If you need to contact eGPS Solutions technical support, please call (770) 695-3361.

1.3. Disclaimer

Before using the receiver, please make sure that you have read and understood this Quick Start Guide, as well as the

safety information. eGPS Solutions holds no responsibility for the incorrect operation by users and for the losses incurred by misunderstanding this guide. However, eGPS Solutions reserves the right to update and optimize the contents in this guide regularly. Please contact your local dealer from which you purchased the receiver for new information.

1.4. Your Comments

Your feedback about this user guide will help us to improve it in the future. Please email your comments to info@egps.net.

2. Getting Started with the eGPS M6

2.1. About the Receiver

The eGPS M6 GNSS receiver incorporates a GNSS engine, GNSS antenna, internal radio, 3.75G cellular modem, Bluetooth, WiFi and battery in a ruggedized and miniature unit. Either unit may be a base, rover, or used without other devices for static collection.

The receiver can be used as part of a Network RTK GNSS system with Carlson SurvCE, MicroSurvey Field Genius or CHC LandStar7 Android software. Static positions can be stored in Rinex 2.11 format for easy OPUS submittal using only the receiver. The static data can be stored in internal memory, a USB flash drive using the optional OTG cable, or sent to your FTP using the internal 3.75G GSM modem!

When using the eGPS M6 without additional equipment, configuration of the many features is accomplished through a web browser. CHC LandStar7 may also be downloaded from the Android app store. Static positions can be taken by pressing the function button for 5 seconds.

2.2. Parts of the Receiver

The operating controls are all located on the front panel. Battery compartment, SIM card slot, serial ports and connectors are located on the bottom of the unit.

2.2.1. Front Panel

The following figure shows a front view of the receiver.

Front Panel
(Reference chart on the next page)

Icon	Light Color	Light Status	Description
1. Power	Red	On	Power on
		Flash	Less than 30% battery remaining
2. Satellites	Green	Flash every second	Satellites found
3. Corrections	Yellow	Flash every second	Base is transmitting the corrections
	Green	Flash every second	Rover is receiving the corrections
		Flash	Rover is in RTK float status
		On	Rover is in RTK fixed status
4. WiFi	Orange	On	WiFi on
		Off	WiFi off
5. File Recording	Yellow	Flash according to static sample interval	Static data is logging


Function Button

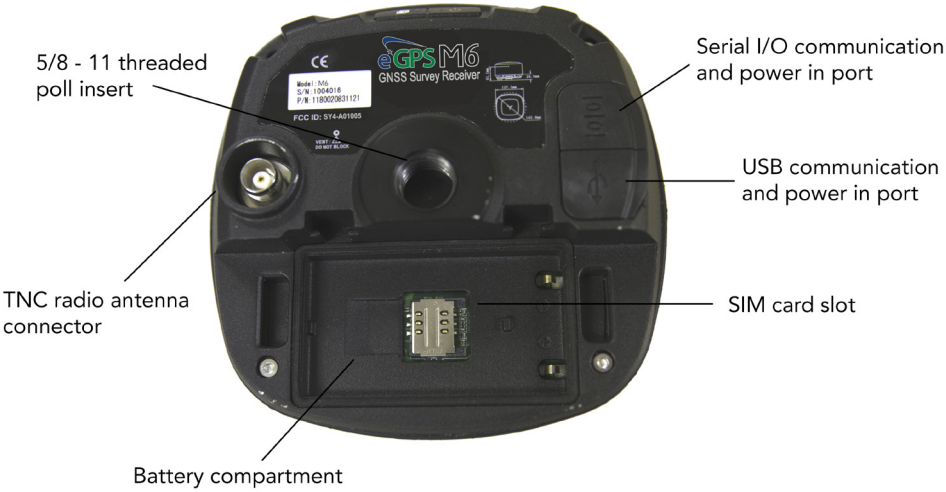

Power Button

Name	**Description**
Function Button	Press and hold for 5 seconds to start and stop static sessions.
Power Button	Works as a Power button: Press and hold this button for 3 seconds to turn on or turn off the receiver
	Works as a Reset button: Hold Function button and press this button 5 times to reset the mainboard.

2.2.2. Lower Housing

The lower housing contains one SIM card slot, battery compartment, one TNC radio antenna connector, two communication and power ports, one 5/8 - 11 threaded insert and nameplate.

2.2.3. Receiver Ports



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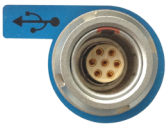
Port	Name	Description
	I/O Port	This port is a 7-pin Lemo connector that supports RS-232 communications and external power.
		Users can use the optional GPS to PC Data Cable to realize RS-232 communications between the receiver and computer or controller. Also, users can use the 7-pin cable to transmit differential data to an external radio.
	USB Port	This port is a 7-pin Lemo connector that supports USB communications and external power.
		Users can use the USB Cable supplied with the system to download the logged data to a computer.
		The optional OTG Cable can be used to upgrade the receiver firmware by connecting the receiver to a USB flash disk or directly log the static data to a USB flash disk.
	Radio Antenna Connector	Connect the UHF radio antenna to the internal radio of the receiver. This connector is not used if you are using an external radio.

2.3. Batteries and Power

2.3.1. Internal Battery

The receiver comes with two rechargeable lithium-ion batteries.

2.3.1.1. Charging the Battery

The rechargeable lithium-ion batteries are supplied partially charged. Charge the batteries completely before using for the first time. To charge the batteries, place them in the supplied charger and wait until the green light at each battery stops flashing and remains solid green.

WARNING - Charge and use the rechargeable lithium-ion batteries only in strict accordance with the instructions. Charging or using the batteries in unauthorized equipment can cause an explosion or fire and can result in personal injury and/or equipment damage.

To prevent injury or damage:

- Do not charge or use the battery if it appears to be damaged or leaking.
- Charge the lithium-ion battery only in an eGPS M6 charger that is specified to charge it. Be sure to follow all instructions that are provided with the battery charger.
- Discontinue charging a battery that gives off extreme heat or a burning odor.
- Use the battery only in eGPS M6 equipment.
- Use the battery only for its intended use and according to the instructions in the product documentation.

2.3.1.2. Battery Safety

WARNING - Do not damage the rechargeable lithium-ion batteries. A damaged battery can cause an explosion or fire and can result in personal injury and/or property damage.

To prevent injury or damage:

- Do not use or charge the battery if it appears to be damaged. Signs of damage include but are not limited to discoloration, warping and leakage of battery fluid.
- Do not expose the battery to fire, high temperature or direct sunlight.
- Do not immerse the battery in water.
- Do not use or store the battery inside a vehicle during hot weather.
- Do not drop or puncture the battery.
- Do not open the battery or short-circuit its contacts.

WARNING - Avoid contact with the rechargeable lithium-ion battery if it appears to be leaking. Battery fluid is corrosive and contact with it can result in personal injury and/or property damage.

To prevent injury or damage:

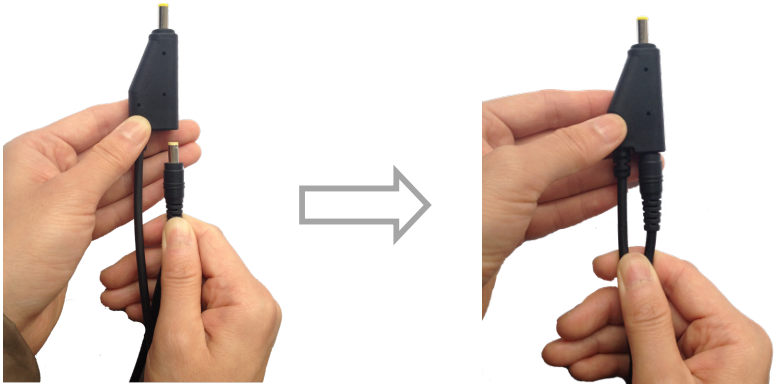
- If the battery leaks, avoid the battery fluid.
- If battery fluid gets into your eyes, immediately rinse your eyes with clean water and seek medical attention. Please do not rub your eyes!
- If battery fluid gets onto your skin or clothing, immediately use clean water to wash off the battery fluid.

2.3.2. External Power Supply

Two methods are available for providing external power to the receiver. Use the included GPS to USB PC Data Cable with Power Adapter and either the wall charging adapter or the optional 12 volt battery cable.

In the office:

The Power Adapter is connected with AC power of 100 - 240 V and the output port of the Power Adapter connects to the Power Port of the GPS to USB PC Data Cable.



In the field:

The external power cable is connected with a vehicle battery, and the output port of the external power cable connects with the Power Port of the GPS to USB PC Data Cable.

WARNING - Use caution when connecting external power cable's clip leads to a vehicle battery. Do not allow any metal object to connect (short) the battery's positive(+) terminal to either the negative(-) terminal or the metal part of the vehicle battery. This could result in high current, arcing, and high temperatures, exposing the user to possible injury.

2.4. Inserting Battery and SIM Card

Press in the spring-loaded buttons on the battery cover to open the cover.

Align the connector of the battery with the connections on the receiver and snap the battery in place. Replace the battery cover when finished.

To remove the battery, press in the spring-loaded buttons and remove the cover.

Insert the SIM card with the contacts facing down while the battery is removed. The notched end of the SIM card does NOT go into the slot.

To remove the SIM card, lightly press down on the end not under the holder, and slide the card out of the socket.

Tip – The SIM card is provided by your GSM cellular network service provider.

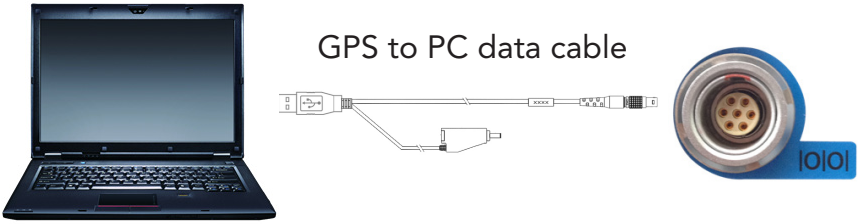
2.5. Product with Accessories

Item	Picture
eGPS M6 GNSS Receiver	
UHF Bar Antenna (450-470 MHz) P/N: 2004 020 011	
Optional OTG Cable P/N: 2004 030 015	
USB Cable with Power Socket P/N: 2004 030 032	
Optional Serial Cable with Power Socket P/N: 2004 030 044	
Lithium Batteries P/N: 2004 050 017	
Auxiliary H.I. Tool	
Tribrach Adapter	
Hard Case P/N: 2004 060 005	

2.6. Connecting to an Office Computer

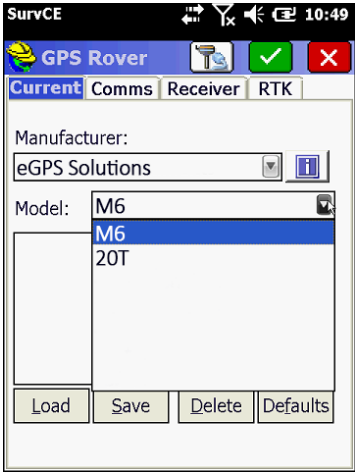
The receiver can be connected to an office computer for serial data transfer or settings via a GPS to PC Data Cable. Before you connect to the office computer, ensure that the receiver is powered on by the internal battery or external power.

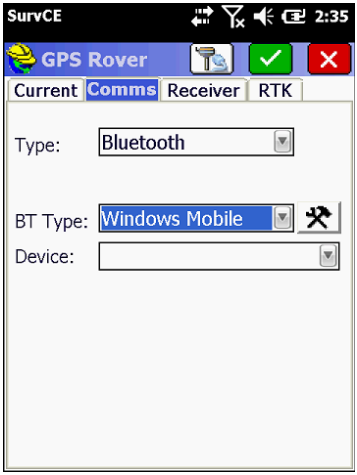
The following figure shows how to connect to the computer for data transfer:



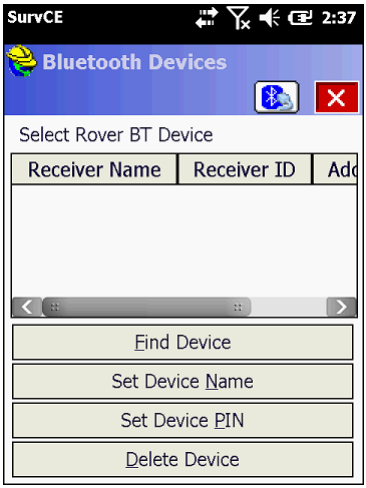
2.7. Connecting to Carlson SurvCE as a Network Rover

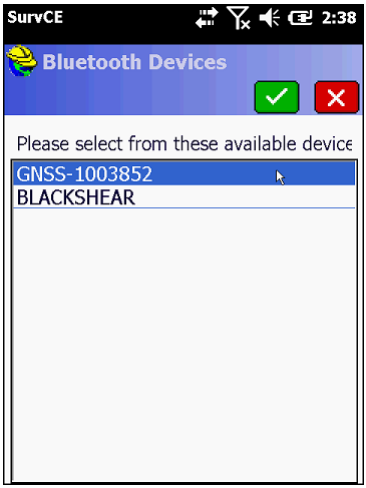
1. Turn on the controller → run SurvCE → tap the **Equip** tab in the main menu.
2. In the **Equip** screen, select the **GPS Rover** button. For the *Manufacturer* field, select **eGPS Solutions** and **M6** for the *Model* field.



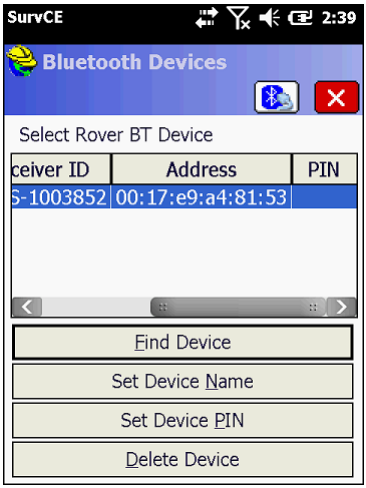


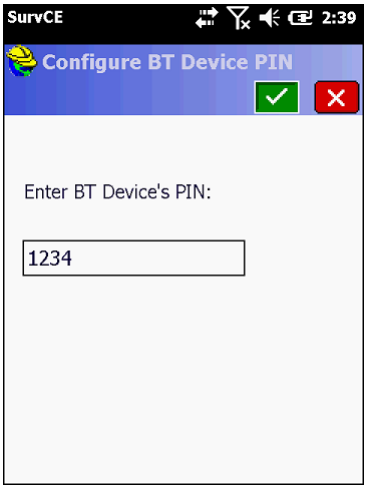
3. Tap the **Comms** Tab next to the **Current** tab. Then select **Bluetooth** for the Communication Type and **Windows Mobile** for the BT Type. Press the hammer and wrench button to search for Bluetooth devices.



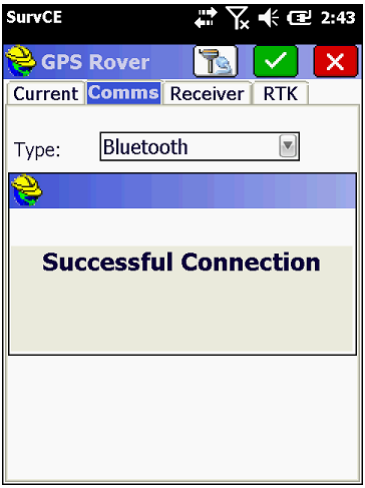


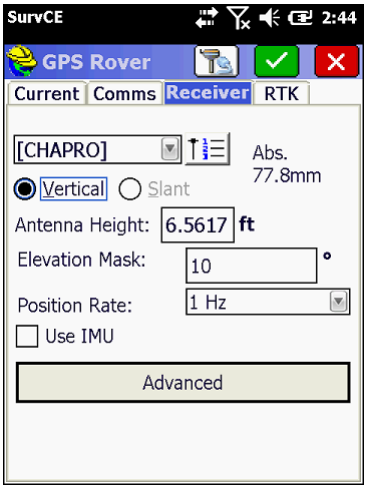
4. Press the **Find Device** button to search for devices. Pick your receiver from the list of devices found, the format is GNSS-???????.



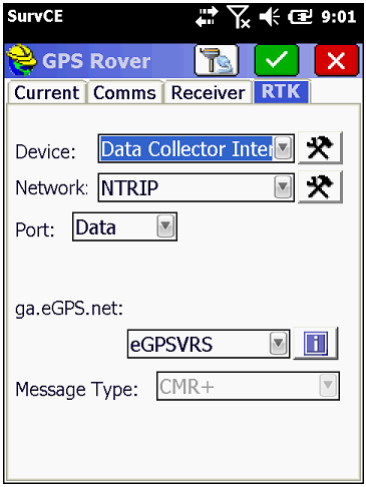


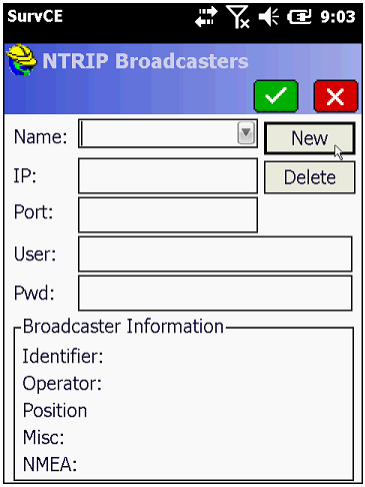
5. After selecting your receiver, press the **Set Device PIN** button and enter **1234** for the device pin. Press the green check mark and then the Bluetooth button to the left of the red X. Before moving to the **Receiver** tab, press the button to connect to the receiver, and wait for a successful connection.





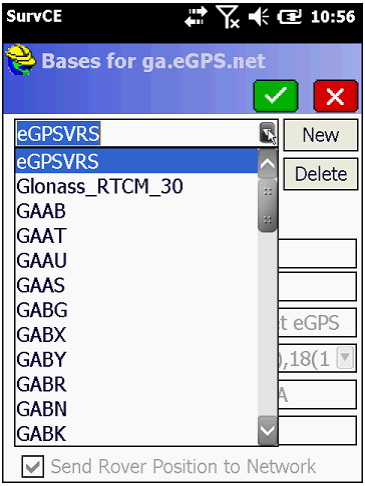
6. The **Receiver** tab should show **CHAPRO** in the antenna selection window. The abs. value should be 77.8mm and the **Vertical** radio button should be selected. The elevation mask should be at least 10, if not higher, depending on site conditions. Check the **IMU** (Inertial Measurement Unit) check box if you intend to use automatic level checking (additional configuration and settings required).





7. To configure the M6 as a network rover, select **Data Collector Internet** for the *Device* field and **NTRIP** for the *Network* field. Press the hammer and wrench icon to add NTRIP broadcasters to the list of selectable broadcasters.

8. On the *NTRIP Broadcasters* screen, enter an arbitrary name to identify the broadcaster account in the *Name* field (eGPS Solutions, for example). Next enter the IP address for the broadcaster in the *IP* field (for example, 107.7.166.152). Next enter the Port number in the *Port* field (for example, 8080). Next, enter your broadcaster account username and password. You should be connected to the internet **BEFORE** starting SurvCE so the collector can connect to the broadcaster and download the base station mount points when you press the green check mark to save the new broadcaster account.

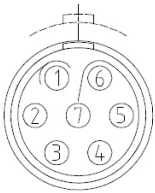


9. After selecting the base, or virtual base (eGPSVRS) in this case, the information about the base will be filled in, and you can press the green check mark to return to the **RTK** tab. Pressing the green check mark from the **RTK** tab will activate the connection, and you should be on your way to a FIXED position!

A. Communication Ports Definition

A.I. eGPS M6 Receiver I/O Port (7-Pin Lemo Port)

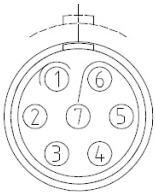
Definition



Pin	Function
1	Ground (-)
2	Ground (-)
3	RS232-TX (Output)
4	Not Used
5	Not Used
6	VIN
7	RS232-RX (Input)

A.II. eGPS M6 Receiver USB Port (7-Pin Lemo Port)

Definition



Pin	Function
1	Ground (-)
2	Ground (-)
3	VBUS
4	DM
5	DP
6	VIN
7	ID

B. M6 Specifications

GNSS Specifications	
336 channels with simultaneously tracked satellite signals[1]	
GPS	L1, L2, L5
GLONASS	L1, L2, L5
BeiDou	B1, B2[2]
Galileo	E1, E5A, E5B
SBAS	L1
Performance Specifications	
Real-Time Kinematics (RTK)	
Horizontal	8 mm + 1 ppm RMS
Vertical	15 mm + 1 ppm RMS
Initialization Time	< 5 s
Initialization Reliability	> 99.9%
Rapid Static	
Horizontal	5 mm + 1 ppm RMS
Vertical	10 mm + 1 ppm RMS
Post Processing Static	
Horizontal	2.5 mm + 0.5 ppm RMS
Vertical	3.5 mm + 0.5 ppm RMS
Baseline Length	≤ 300 km

[1] *Reception is dependent upon firmware versions and licensed features*
[2] *Includes BeiDou satellites 1-14*

Communication	
1x UHF antenna port	
1x 7-pin LEMO USB port, for power supply, data download	
1x 7-pin serial port, for power supply, correction output	
Integrated GSM/GPRS 3.75G modem (usable with 4G)	
Multimode Bluetooth completely compatible with Android, Windows Mobile, and Win 7/8/10 OS	
WiFi, 802.11 b/g/n, supporting AP, 150 m distance, 108 Mbps	
Button	1x power button, 1x FN button
LED Indicator	1x power, 1x SVs, 1x corrections, 1x WiFi, 1x data logging
Radio Modem	Internal Rx/Tx: 403-473 MHz; External Tx DL5: 1 W - 20 W adjustable
Data Formats	
RTCM 2.1, RTCM 2.2, RTCM 2.3, RTCM 2.x, RTCM 3.x, RTCM 3.2 MSM4, CMR, CMR+, SCMRX	
NMEA0183 output	
RINEX and HCN outputs for GNSS raw data	
NTRIP	
Data Storage	
32G	
HCN, RINEX 2.11/3.02	
GPS device mounts as a USB external hard drive	

Physical Specifications	
Size	5.0 in x 5.0 in x 3.3 in (127 mm x 127 mm x 84.6 mm)
Weight	1.01 kg with battery (35.63 oz)
Environment	
Operating Temperature	-40 °C to +60 °C (-40 °F to 140 °F)
Storage Temperature	-40 °C to +80 °C (-40 °F to 176 °F)
Humidity	100% condensation
Waterproof & Dustproof	IP67 - protected from temporary immersion to depth of 1 meter
Drop	2 m protection
Electrical Specifications	
Li-ion Battery Capacity	3400 mAh/8.4 V
Battery Life	Typical 4 hours in RTK mode
Int. UHF Base	3 h
Int. UHF Rover	5.4 h
Network Rover	5.5 h
External Power	12 ~ 36 VDC
Auto switch between battery and external power	

Specifications are subject to change without notice.

C. Contact Information

eGPS Solutions
4317 Park Drive Suite 104
Norcross, GA 30093
Telephone: (770) 695-3361
Web: www.egps.net
Email: info@egps.net

D. Warranty Terms

The eGPS M6 is guaranteed against defective material and workmanship under normal use and application consistent with this guide. The equipment is guaranteed for the period indicated on the warranty card accompanying the product starting from the date that the product was sold to the original purchaser by an authorized dealer. During the warranty period, eGPS Solutions will, at its option, repair or replace this product at no additional charge. Repair parts and replacement products will be furnished on an exchange basis and will be either reconditioned or new. This limited warranty does not include service to repair damage to the product resulting from an accident, disaster, misuses, abuse or modification of the product. Warranty service may be obtained from an authorized warranty service dealer. If this product is delivered by mail, purchaser agrees to insure the product or assume the risk of loss or damage in transit, to prepay shipping charges to the warranty service location and to use the original shipping container or equivalent. A letter should accompany the package furnishing a description of the problem and/or defect. The purchaser's sole remedy shall be replacement as provided above. In no event shall eGPS Solutions be liable for any damages or other claim including any claim for lost profits, lost savings or other incidental or consequential damages arising out of the use of, or inability to use, the product.
NOTE: Please use the original factory parts.