Global Positioning System

It is short for Global Positioning System. The system is based on a number of satellites orbiting the Earth. The satellites consistently transmit their location and time signals. GPS receivers are receiving the signals and use them to calculate their present position. There are enough satellites to provide continuous coverage around the globe. Obviously, in real life, the term GPS refers to a receiver, not to the satellites.

A GPS receiver must be locked on to the signal of at least three satellites to calculate a 2D position (latitude and longitude) and track movement. With four or more satellites in view, the receiver can determine the user's 3D position (latitude, longitude and altitude). Once the user's position has been determined, the GPS unit can calculate other information, such as speed, bearing, track, trip distance, distance to destination, sunrise and sunset time and more.

GPS receivers are accurate to within 15 meters on average.

24 satellites that make up the GPS space segment are orbiting the earth about 12,000 miles above us. They are constantly moving, making two complete orbits in less than 24 hours. These satellites are traveling at speeds of roughly 7,000 miles an hour.

GPS satellites transmit two low power radio signals, designated L1 and L2. Civilian GPS uses the L1 frequency of 1575.42 MHz in the UHF band. The signals travel by line of sight, meaning they will pass through clouds, glass and plastic but will not go through most solid objects such as buildings and mountains.

A GPS signal contains three different bits of information — a pseudorandom code, ephemeris data and almanac data. The pseudorandom code is simply an I.D. code that identifies which satellite is transmitting information. You can view this number on your Garmin GPS unit's satellite page, as it identifies which satellites it's receiving.

Ephemeris data tells the GPS receiver where each GPS satellite should be at any time throughout the day. Each satellite transmits ephemeris data showing the orbital information for that satellite and for every other satellite in the system.

Almanac data, which is constantly transmitted by each satellite, contains important information about the status of the satellite (healthy or unhealthy), current date and time. This part of the signal is essential for determining a position.

Procedure:

Calibration:

The electronic compass requires that it is recalibrated every time the batteries are changed or Every time before you use. Failure to calibrate the compass could result in errors of 20° or more to the displayed heading. Calibration is very simple and doesn't take more than a couple of minutes. It's very important that there are no metallic objects near the Color during this calibration.

Calibrating the Compass and Altimeter

The 'CALIBRATE' selection on the MENU Page allows the Electronic Compass and the Altimeter to be calibrated for the most accurate performance.

The procedure for calibrating the Electronic Compass:

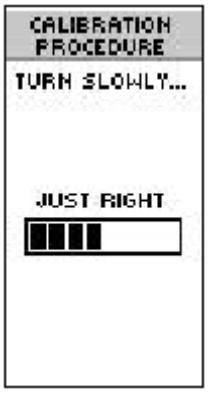
1. Press the **PAGE** Button until the MENU Page is displayed.

2. Using the **UP** or **DOWN** Button, highlight 'Calibrate' and press the **ENTER** Button.

3. Using the **UP** or **DOWN** Button, highlight 'Compass' and press the **ENTER** Button.

4. With 'Start' highlighted, press the **ENTER** Button to begin the calibration.

5. Making sure that the unit is level; rotate the GPS slowly two turns in the same direction. On the display there will be a speed scale that indicates whether you are rotating the unit 'Too Fast', 'Too Slow' or 'Just Right'. A message will be displayed when the compass has been successfully calibrated.



Calibrating the Altimeter manually:

1. With the MENU Page displayed highlight 'CALIBRATE' and press **ENTER**.

2. Using the **UP** or **DOWN** Button highlight 'ALTIMETER' and press **ENTER**.

3. You will be asked 'DO YOU KNOW THE CORRECT ELEVATION'? Using the **UP** or **DOWN** Button select 'YES' or 'NO' and press **ENTER**.

4. **If you selected 'YES'**— the ENTER CORRECT ELEVATION Page will be displayed. Pressing the **DOWN** Button will move the highlight to the next number in the elevation field. With the desired digit selected, press **ENTER** to activate the drop down number list. Using the **UP** or **DOWN** Button select the correct number then press **ENTER**. When all numbers are entered correctly, highlight 'OK' and press **ENTER**. A message 'CALIBRATION COMPLETED SUCCESSFULLY' will be displayed, highlight 'OK' and press **ENTER** to end the calibration.

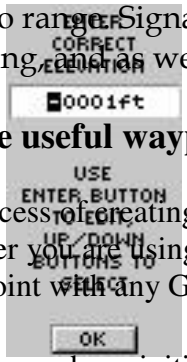
5. **If you selected 'NO'**—you will be asked 'DO YOU KNOW THE CORRECT BAROMETRIC PRESSURE'. Using the **UP** or **DOWN** Button, select 'YES' or 'NO' and press **ENTER**.

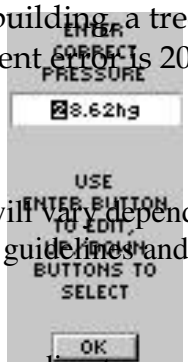
6. **If you selected 'YES'**— the ENTER CORRECT PRESSURE Page will be displayed. Pressing the **DOWN** Button will move the highlight to the next number in the pressure field. With the desired digit selected, press **ENTER** to activate the drop down number list. Using the **UP** or **DOWN** Button select the correct number then press **ENTER**. When all numbers are entered correctly, highlight 'OK' and press **ENTER**. A message 'CALIBRATION COMPLETED SUCCESSFULLY' will be displayed, highlight 'OK' and press **ENTER** to end the calibration.

7. If you selected **'NO'**—and you are tracking satellites, you will be asked **'DO YOU WANT TO USE CURRENT GPS ALTITUDE'**? If you do highlight **'YES'** and press ENTER. A message '**CALIBRATION COMPLETED SUCCESSFULLY'** will be displayed. Highlight '**OK**' and press ENTER. If you don't highlight 'NO' and press ENTER. You will be prompted that '**YOU DO NOT HAVE ENOUGH INFORMATION**' and referred to this manual. Highlight '**OK**' and press **ENTER** to return to the MENU Page

Errors:

1. In a GPS receiver the noise translates into errors in. Not all receivers are equal, some are noisier than others. While taking the readings raise the device above your shoulder, since our human body produces some radiations and it will be added a noise.
2. Kindly avoid using the GPS in areas which are having Trees. Since trees are capable of producing the signal delays. Also avoid using in magnetic surface areas.
3. Multi path Errors, where the signals are split into two or more paths by reflection or refraction, can complicate the receiver resolving a good pseudo range. Signals can reflect off a metal building, a tree, or almost anything, and as well as causing a measurement error is 20 meters off.





Hints to take useful waypoints in the field?

The actual process of creating a waypoint for a position will vary depending on the type of GPS receiver you are using. The following are general guidelines and tips for creating a useful waypoint with any GPS receiver.

1. Be sure you have initialized your GPS receiver according to your individual unit's instructions. The first time a GPS unit is used in a new location (or whenever it has been moved 500 miles from where it was last used), the unit will need up to

15 minutes to orient itself. The more often you use the unit in its new location, the faster it will receive satellite data and record positions.

2. Fire up your GPS according to the unit's instructions. Most GPS receivers operate in different modes. The receiver will usually tell you something about the mode in which it is operating as it locates satellites. When three satellites have locked into your GPS unit, you will get a reading

3. Multi channel units allow the GPS receiver to read an additional satellite. When a fourth satellite comes into view, the unit will be able to add an elevation reading thus increasing the accuracy of its calculation. This is sometimes called 3D mode.

4. When your GPS receiver has four satellites in view. Check your Accuracy level Some GPS receivers have a display labeled DOP or PDOP. This reading will give you an idea of how accurate your readings are. The lower the DOP/PDOP the more accurate your reading should be.

5. Record your position as a waypoint. There are various ways to do this, and your unit may have a Position Averaging feature which will allow you to take a slightly more accurate waypoint reading, so follow the instruction of your individual unit.

6. Give your waypoint a record number. Most GPS units allow you to give your waypoints some kind of text or numeric identifier so that each waypoint is easy to index in the GPS unit's memory. Keep track of your individual waypoint's ID and record it in the Data ID field of your Site/Feature record.